Floods of November 1965 to January 1966 in the Gila River Basin, Arizona and New Mexico, and Adjacent Basins in Arizona

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1850-C

Floods of November 1965 to January 1966 in the Gila River Basin, Arizona and New Mexico, and Adjacent Basins in Arizona

By B. N. ALDRIDGE

FLOODS OF 1965 IN THE UNITED STATES

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1850–C

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1970

UNITED STATES DEPARTMENT OF THE INTERIOR

WALTER J. HICKEL, *Secretary*

GEOLOGICAL SURVEY

William T. Pecora, *Director*

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price $2.50 (paper cover)

CONTENTS

ILLUSTRATIONS

[Plates in pocket]

TABLES

FLOODS OF NOVEMBER 1965 TO JANUARY 1966 IN THE GILA RIVER BASIN, ARIZONA AND NEW MEXICO, AND ADJACENT BASINS IN ARIZONA

By B. N. ALDRIDGE

ABSTRACT

Above-normal precipitation, which fell over much of Arizona and New Mexico in November and December 1965 during five distinct storm periods, caused flooding in several parts of the Gila River basin. The floods caused about $5 million in damages in the Gila River basin upstream from Salt River and about $6 million in damages along the Salt River and Gila River below Salt River. The most significant flood was the Phoenix flood, which resulted from the release of water from storage reservoirs on the Salt and Verde Rivers. A large volume of fall and winter runoff added to a large carryover storage from the preceding spring raised the contents of the reservoirs to an unusually high level for December. The regulated discharge in the Salt River below Granite Reef Dam was the highest since the reservoir system was completed in 1939; however, several larger floods had occurred in earlier years.

The maximum discharge of the Salt River through the downtown area during the Phoenix flood was 66,000 cfs (cubic feet per second) on December 31, 1965. Without the storage provided by the upstream reservoirs, the peak discharge during the flood would have been more than 80,000 cfs, and the peak discharge on December 23 might have exceeded 120,000 cfs. If the reservoirs were not present, a peak discharge of 66,000 cfs, equal to that of December 31, would occur on an average of about once every 6 years.

The peak discharge during the Phoenix flood was reduced only slightly as it traveled from Granite Reef Dam on the Salt River to Gillespie Dam on the Gila River; however, the volume of flow was reduced considerably in the same reach. More than 500,000 acre-feet of water passed over Granite Reef Dam, but only 37,000 acre-feet of water reached the mouth of the Gila River. Rises in groundwater levels in the flood plains indicate that a large amount of the streamflow loss went to ground-water recharge.

INTRODUCTION

Five major storms moved into Arizona and western New Mexico from the Pacific Ocean in November and December 1965. From the last week in November until the end of December, storms were a weekly occurrence, and rain or snow fell on about four out of every 10 days. The major storms occurred November 22–25, December 9–11, December 14–15, December 22–23, and December 29–30. Only the last two storms caused appreciable flooding, although the earlier storms did cause extremely high flows in some areas. The earlier storms set the stage for the floods later in December by thoroughly soaking the soil at low altitudes and by depositing snow in the mountains.

The most significant flood with respect to property damage began December 31, when water was released from storage reservoirs into the normally dry channel of the Salt River below Granite Reef Dam; the reservoirs were full because of the unusually heavy autumn and winter runoff and the above-normal carryover storage from the 1965 irrigation season. The flood, which is called the Phoenix flood, caused severe damage along the Salt River below Granite Reef Dam and along the Gila River below Salt River. Flood runoff continued until May 1966 in the lower reaches of the Gila River. Severe flooding also occurred in the Gila River basin upstream from the Salt River following the storm of December 22–23 and in the Gila River basin upstream from Coolidge Dam following the storm of December 29–30.

The purpose of the report is to summarize the conditions preceding the floods, to give a factual account of the floods, to describe the floods in proper perspective to past floods, and to show the effects of the reservoirs on the floods in the Salt and Verde Rivers. Although the report deals primarily with the Phoenix flood, it contains data for the other floods (fig. 1).

ACKNOWLEDGMENTS

The author wishes to acknowledge the assistance given by L. C. Goldsmith, hydrology analyst, Salt River Valley Water Users' Association; Paul Kangeiser, State climatologist, U.S. Weather Bureau; R. W. Enz, snow-survey supervisor, U.S. Soil Conservation Service; Ralph Edde, supervisor of county mapping, Photogrammetry and Mapping Division, Arizona Highway Department; and the Los Angeles district, U.S. Army Corps of Engineers, who supplied hydrologic data concerning the area.

GEOGRAPHIC SETTING

The Mogollon Rim extends across the eastern half of Arizona and divides the north-flowing tributaries of the Little Colorado River from the south-flowing tributaries of the Verde, Salt, and Gila Rivers (pl. 1). The Mogollon Rim rises sharply above the surrounding area and is generally at altitudes between 6,500 and 7,500 feet. The White Mountains in Arizona and the Gallo and Mangas Mountains in New Mexico form the eastern end of the divide between the Gila and Little Colorado Rivers. The floods of November 1965 to January 1966 originated along this divide, in the rugged mountainous area south of the divide, and in a few small areas in southern Arizona (fig. 1).

The Gila River heads in New Mexico and flows generally westward across Arizona to the Colorado River. The Gila River is joined by the south-flowing San Francisco River and Eagle Creek a few miles across the Arizona-New Mexico State line in Arizona. The Gila River is controlled at Coolidge Dam. Downstream from Coolidge Dam, the Gila is joined by the San Pedro and Santa Cruz Rivers, which flow northward from Mexico through southern Arizona.

The Salt River heads in the mountainous area of eastern Arizona and flows westward to its confluence with the Gila River west of Phoenix. The Salt River is joined by its main tributary—the Verde River—25 miles upstream from Phoenix. The drainage basin above the confluence of the Salt and Verde Rivers is 12,900 square miles and is from 1,400 to 11,490 feet above mean sea level; the altitude of most of the area is between 3,000 and 7,000 feet. Generally, six reservoirs—four on the Salt River and two on the Verde River—impound all the runoff from the drainage basin. Water is released at a slow rate and is diverted into irrigation canals, and very little flow passes Granite Reef Dam—a diversion dam on the Salt River 3½ miles downstream from the Verde River. In the last several years the Salt River channel through Mesa, Tempe, Scottsdale, and Phoenix has been dry, except for occasional small flows from local runoff.

STORMS AND WEATHER CONDITIONS

Precipitation in November and December 1965 was above average in all of Arizona and most of western New Mexico. The largest amounts of precipitation were reported in the mountainous area that extends from central Arizona into New Mexico. Unusually large amounts of precipitation also fell over the isolated mountain ranges between Tucson and Safford, Ariz.

The number of stations that recorded record-high amounts of precipitation in December 1965 are too numerous to list. Several stations

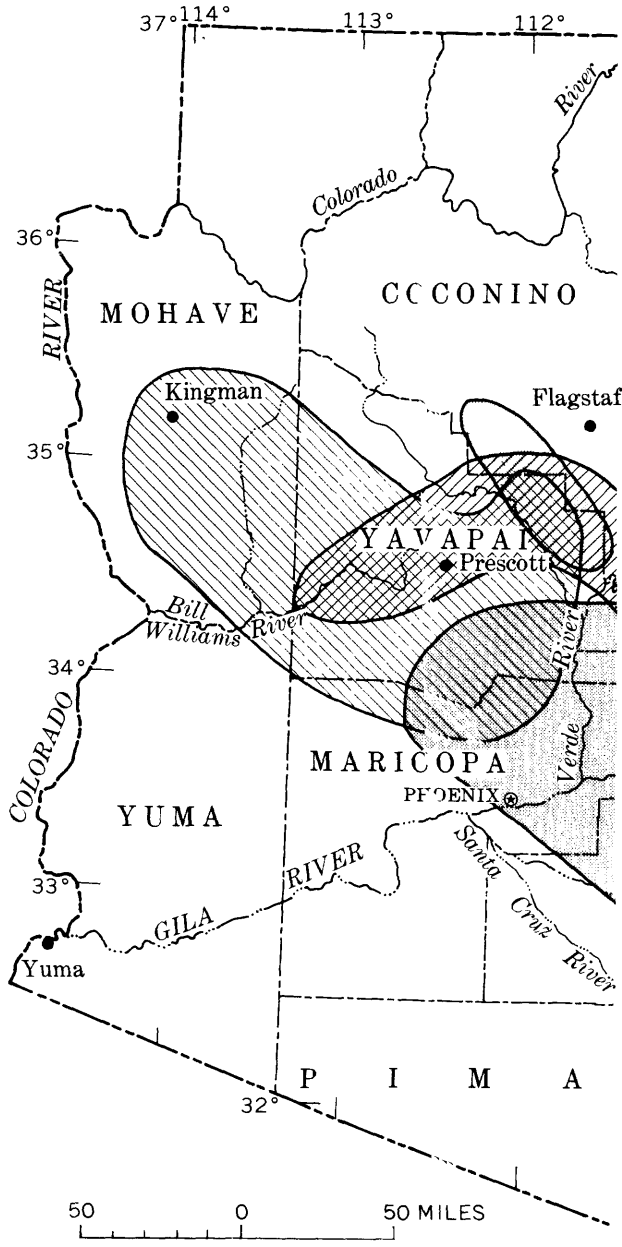
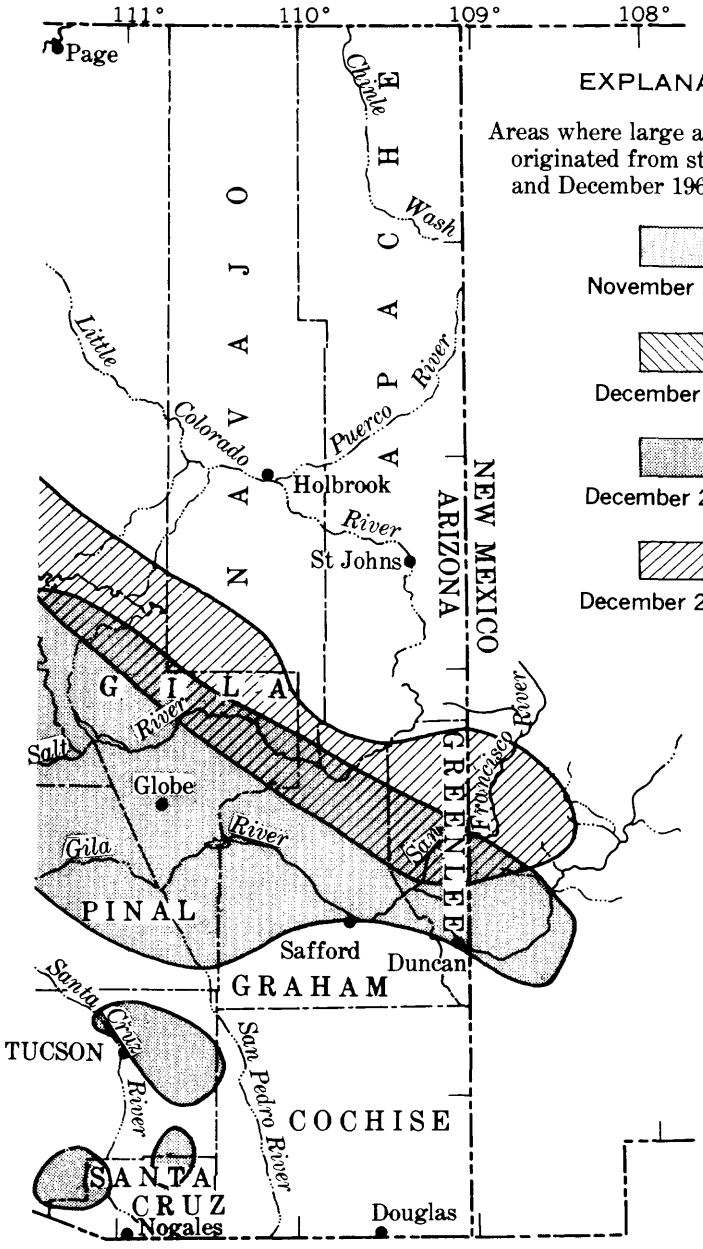


FIGURE 1.—Major areas where large amounts of runoff originated from



storms of November and December 1965 in Arizona and New Mexico.

having at least 50 years of record recorded more precipitation in December 1965 than in any previous month. The largest amount of precipitation measured in December was 16.32 inches at precipitation station 10, which is 20 miles north of Roosevelt (pl. 1).

Although precipitation data were scanty in many areas, sufficient data were available to indicate the general distribution of the precipitation during the five storm periods. Isohyetal maps have been prepared for four of the storms by using the published climatological data of the U.S. Weather Bureau (1966a, 1966b, 1966c, 1966d, 1966e, 1966f) and unpublished data collected by personnel of the U.S. Geological Survey (pl. 2). In areas where no precipitation data were available, isohyets were based on runoff or on isohyets by the University of Arizona (1965) for winter precipitation.

STORMS OF NOVEMBER 22–25, 1965

During the storms of November 22–25, almost every precipitation station in Arizona recorded some precipitation. In general, less than 1 inch was recorded; however, several areas in the Salt River basin received from 3 to 5 inches of rain (pl. 2), and larger amounts were reported at individual stations in the Gila River basin. Precipitation station 10 (pl. 1) recorded 11.59 inches of rainfall in the 4-day period, and station 19 (pl. 1) at the head of Oak Creek recorded 7.58 inches. Most of the precipitation occurred during two periods—1100 hours November 22 to 1800 hours November 23 and 0200 hours to 1700 hours November 25. Station 10 recorded 7.70 inches during the first period and 2.94 inches during the second period; station 19 recorded 4.40 inches during the first period and 2.82 inches during the second period.

The 4-day precipitation was related closely to altitude—the higher the altitude, the larger the amount of precipitation. Precipitation stations 11, 12, and 13 are within a few miles of station 10 (altitude 6,970 feet) but are at lower altitudes; records for the three stations show a sharp decrease in precipitation with a decrease in altitude—station 11, altitude 5,550 feet, precipitation 5.73 inches; station 12, altitude 5,100

feet, precipitation 4.36 inches; and station 13, altitude 2,205 feet, precipitation 2.35 inches.

The soil was quite dry at the time of the November 22–25 storm, because only a small amount of precipitation had fallen during October and the first 3 weeks of November. In most of the State much of the precipitation from the storm was either intercepted by plants or absorbed by the soil. Some snow fell above 6,500 feet, but most of it melted immediately. U.S. Weather Bureau stations at altitudes of as much as 8,000 feet had no snow remaining after November 27.

STORMS OF DECEMBER 9–11 AND DECEMBER 14–15, 1965

The storm of December 9–11 was the largest in areal extent of any storm during the period of this report. Precipitation ranged from 2 to 5 inches over most of Arizona and New Mexico (pl. 2); most of the precipitation occurred in a period of about 20 to 30 hours—from midmorning of December 9 to midafternoon of December 10. Large amounts of snow fell at high altitudes, and on the evening of December 9 the snow level was at about 6,000 feet. Another storm began December 13; precipitation was intense December 14–15 and tapered off until cessation of the storm on December 18. The widespread precipitation increased the snow depth considerably in the mountainous areas. The snow level was down to 3,000 feet when the precipitation ceased on December 18, and there was 2 to 3 feet of snow in parts of the White Mountains. The snow depths at selected stations in the Gila River basin and adjacent area are shown in table 1. Stations that received no snow during the month and those that failed to report are not included. Because of the unseasonably large amount of snow, the U.S. Soil Conservation Service made special snow surveys at the snow courses listed in table 2 (R. W. Enz, snow-survey supervisor, Soil Conservation Service, written commun., 1966). Warm daytime temperatures of December 20–21—generally in the 55° to 70°F range—caused snow to melt at the lower altitudes, but cold nighttime temperatures prevented any sustained snowmelt in the mountains.

TABLE 1.—*Snowfall and snow*

[Tr., trace; N, no record of snow on the ground. Data from respective datum was zero. Dash leaders indicate

Site on pl. 1	Station	Altitude (feet above mean sea level)	Snow (inches)	Day					
				9	10	11	12	13	14
1	Blue	5,760	Fall						
			On the ground						
2	Alpine	8,020	Fall					6.0	2.0
			On the ground					6	8
3	Maverick	7,800	Fall		8.0	8.0		4.0	3.0
			On the ground		8			15	18
4	Whiteriver	5,280	Fall			Tr.		.5	1.0
			On the ground					1	1
5	McNary	7,320	Fall			6.0		1.0	5.0
			On the ground			6	3	4	8
6	Lakeside Ranger Station	6,700	Fall		.1	3.0			2.0
			On the ground			3			
7	Snowflake	5,640	Fall						.3
			On the ground						Tr.
8	Heber Ranger Station	6,590	Fall					.5	2.0
			On the ground						
9	Chevelon Ranger Station	7,006	Fall					5.0	2.5
			On the ground					4	6
12	Sierra Ancha	5,100	Fall						7.0
			On the ground						
14	Pinal Ranch	4,520	Fall						5.5
			On the ground						6
15	Payson	4,910	Fall						
			On the ground					4	11
16	Natural Bridge	4,607	Fall					2.0	3.3
			On the ground					Tr.	5
17	Montezuma Castle	3,180	Fall (N)						
18	Sedona Ranger Station	4,223	Fall (N)					Tr.	
19	Junipine	5,124	Fall		Tr.			1.0	2.5
			On the ground					1	4
20	Burrus Ranch	6,800	Fall		Tr.		Tr.	.4	4.0
			On the ground					Tr.	3
21	Flagstaff (airport)	6,993	Fall	2.2	6.0	Tr.	.2	2.3	3.6
			On the ground		5	4	3	4	6
			Water equivalent		.6	.6	.6	.6	.6
22	Fort Valley	7,347	Fall		3.5	1.0		2.0	4.0
			On the ground		4	4	3	5	6
23	Jerome	5,245	Fall				Tr.		
			On the ground						
24	Williams	6,750	Fall		4.0	6.0	.5	11.5	4.0
			On the ground			3	2	14	18
25	Ash Fork	5,200	Fall					Tr.	5.3
			On the ground						
26	Hillside 4 NNE	3,320	Fall (N)						Tr.
27	Chino Valley	4,750	Fall						1.5
			On the ground						1
28	Prescott (airport)	5,017	Fall				Tr.	Tr.	3.0
			On the ground						Tr.
29	Prescott	5,410	Fall					Tr.	3.0
			On the ground						1
30	Crown King	6,000	Fall						1.2
			On the ground						
31	Kitt Peak	6,875	Fall			Tr.			1.5
			On the ground						2

on the ground, December 1965

U.S. Weather Bureau (1966a, b). A blank indicates that the
that the item was not zero but was not recorded]

Day—Continued																	Site on pl. 1
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
9.0		14.0					9.0										1
7		17	14	10	8		12	12	10	8	7	5	4		3		
	14.0						7.0	3.0									2
20					17	24	24					19			15		
10.0	4.0	3.0					8.0	2.0	1.0								3
28	24	25	24	24	24	23	31	27	28	28	28	28	27	26	22	22	
3.0	Tr.	1.0						Tr.									4
3	1	1	Tr.					Tr.									
8.0	7.0	5.0	4.0					20.0	4.0								5
14	14	17	19	19	12	11	9	20	20	15	15	15	14	12	8	6	
9.0		3.0	1.3				1.0	6.0									6
10		12	13					7									
																	7
6.5	6.8	6.0	6.0				8.5	9.3						12.0			8
1.0	Tr.	2.0	Tr.				5.0	4.0						Tr.			9
6	6	8	6				7	8	7	7	5	5	5	6	3	2	
13.0								1.4									12
.5							.5	1.5									14
6	2						1	2									
																	15
15	12	17															
6.8		3.0						3.5									16
12	12	10	8	5	4	4		3	2	1	Tr.						
1.2		Tr.															17
1.0																	18
2.5	Tr.	5.0						2.0									19
4	3	6	3	3	1	1		2	Tr.								
Tr.	2.0	3.0					1.0							Tr.	Tr.		20
3	3	5	5	4	3	3	2	1	1	Tr.							
2.9	1.4	3.8				.5	12.7	2.7						.2			21
9	12	12	15	13	10	8	11	17	16	14	13	12	11	10	8	6	
.9	1.0	1.0	1.1	1.0	.9	.8	1.0	2.4	2.4	2.0	2.0	1.9	1.9	1.8	1.3	1.1	
7.0	1.0	3.0	1.0				7.0	2.0									22
9	14	13	14	12	11	11	13	17	16	16	15	14	14	14	13	12	
4.5	8.0																23
	4.0	5.0					2.5	2.0									24
15	16	17	16	16	14	13	14	15	14	13	13	12	11	10	8	8	
Tr.		3.6															25
		Tr.															26
.5	Tr.	3.5															27
2	Tr.	2	1	1	1	Tr.											
1.0	2.0	3.0						Tr.									28
	Tr.	3	1	1													
2.0	1.0													Tr.	Tr.		29
2	2	1	Tr.	Tr.	Tr.	Tr.	Tr.	Tr.									
8.0	2.0	10.0															30
8	10	20	20	18	15	13	8	7	7	7	7	7	7	7	6		
12.0		3.5	1.5	Tr.	Tr.		Tr.	6.0									31
14	10	14	15	13	12	10	8	14	14	10	5	4	3	3	2	1	

TABLE 2.—*Snow-survey data, December 1965*

[Data from R. W. Enz, snow-survey supervisor, U.S. Soil Conservation Service, written commun., 1966]

Site (on pl. 1)	Soil Conservation Service No.	Snow course	Altitude (feet above mean sea level)	Day	Snow depth (inches)	Water equivalent (inches)
1	9S4	Nutrioso	8,500	21	17	4.0
2	9S7	Coronado Trail	8,000	21	24	5.0
3	9S11	Hannagan Meadow	9,090	21	37	7.5
4	9R6	Wilson Lake	9,000	20	26	4.9
5	9R9–A [1]	Mount Ord	11,000	20	75	12
6	9R7–A [1]	Smith Cienega No. 1	10,000	20	56	10
7	9R7–A [1]	Smith Cienega No. 2	9,700	20	50	9
8	(1)	Skeeter	9,300	20	42	8
9	9R10	Hawley Lake	8,300	20	26	6.0
10	9R2–M	McNary	7,200	21	18	4.0
11	10R4	Heber	7,600	21	16	3.6
12	11R6	Baker Butte	7,300	21	26	5.0
13	11R5	Happy Jack	7,630	29	17	4.5
14	11P5–M	Newman Park	6,750	29	9	2.5
15	12P1–M	Chalender	7,100	30	12	2.9
16	12R2	Iron Springs	6,200	28	3 2	.9
17	12R6	Copper Basin Divide	6,720	27	13	3.6

[1] Aerial markers; water equivalent estimated on basis of data from surrounding courses.

STORM OF DECEMBER 22–23, 1965

The storm that moved into Arizona on December 21 brought more snow. On December 22, 20 inches of snow fell at McNary (pl. 1, precipitation station 5), and 13 inches fell at the Flagstaff airport (pl. 1, precipitation station 22). Observers at several U.S. Weather Bureau precipitation stations reported about 10 inches of snow during the storm. Southerly winds brought warmer temperatures on December 22, and snow changed to rain at lower altitudes. The combination of rain and warm temperatures caused rapid melting of the snow that had accumulated during the preceding 10 days. By the afternoon of December 22, the snow level had risen several thousand feet, but more snow fell in the evening. After the storm, the depth of snow at an altitude of 6,500 feet was about equal to that before the storm; above 6,500 feet the depth was greater, below 6,500 feet it was considerably less, and very little snow remained below 5,500 feet. Many of the climatological stations in the Gila River basin reported from 1 to 3 inches of precipitation December 22–23, and a few reported as much as 4 inches. Isohyets for the December 22–23 storm are shown on plate 2.

STORM OF DECEMBER 29–30, 1965

Temperatures remained warm for several days after the December 22–23 storm, and snow continued to melt and increase in water con-

tent or density. The average density of the snow at eight courses measured on December 20 or 21 was 21.3 percent whereas the average density of the snow at four courses measured December 27–29 was 27.5 percent. A light rain started to fall on December 29, and the intensity of the storm increased rapidly early on December 30. In a few hours 1 to 2 inches of precipitation, mostly rain, fell on most of the Salt River watershed, along the north side of the Mogollon Rim, and in the San Francisco River and Eagle Creek basins (pl. 2). The combination of rain and warm temperatures removed much of the remaining snow, and by December 31 there was very little snow left below 7,000 feet.

FLOODS AND RUNOFF

The only significant floods that resulted from the storms of November 22 to December 15 were those of November 23–25 in small areas south and west of Flagstaff (fig. 1). Elsewhere, the storms and runoff in November and early December were significant only because of their wetting effect on soil and stream channels and their contribution to storage in reservoirs in the Salt River basin. As a result of the November storms Santa Fe Reservoir overflowed into the normally dry channel of Cataract Creek. The flood damaged several inexpensive homes and a few small bridges in Williams. Streams entering the Verde River from the north between Paulden and Camp Verde reached the highest stages in several years. On Thanksgiving Day (November 25), Oak Creek near Cornville peaked at 17,600 cfs (cubic feet per second), which was the highest discharge since 1938. The flood washed away several housetrailers and damaged trailer courts, forest camps, and minor road crossings. Several homes were isolated but received little damage. Streams in Beaver Creek basin had outstanding peaks on November 23 and November 25. Streams farther south and east in the Verde, Salt, and Gila River basins showed only moderate rises. Peak discharges at individual stations are shown in table 9.

The December 9–11 storm caused fairly large amounts of runoff in most of Arizona; however, the runoff was not excessive. Small streams in the western deserts of Arizona reached exceptionally high winter stages, but the peaks were small compared with those that have resulted from summer convective storms. The Bill Williams and Verde Rivers were the only large streams having high peaks. The maximum discharge during the flood period at Verde River near Clarkdale gaging station occurred on December 10. The storm of December 14–15 produced high flows in only a few low-lying desert areas, and the peak flows were not of sufficient magnitude to be called floods. In the mountains much of the precipitation fell as snow; although there was little in-

crease in streamflow, the runoff remained above normal through the following week.

The storms of December 22-23 and December 29-30 caused major flooding in much of the Gila River basin, and the December 29–30 storm also caused high flows in a strip about 10–15 miles wide along the north side of the Mogollon Rim between McNary and Flagstaff. On December 30, tributaries to the Little Colorado River had the highest flows since January 1952; on Clear and Chevelon Creeks, the peaks were the third highest in about 50 years. A few small streams overtopped roads and washed out shoulders and culverts, but in most places the high flows caused little damage because streams were confined to rock channels. Reservoirs in the Salt River basin had insufficient reserve storage to contain the high flows from the upper parts of the Verde and Salt River basins, and on December 31 water was released into the Salt River through Phoenix and other cities of the metropolitan area. The effects of this flood, hereafter referred to as the Phoenix flood, extended to the mouth of the Gila River and lasted until May 1966 in the lower reaches of the Gila.

In this report the floods in the Gila River basin that resulted from the storms of December 22–23 and December 29–30 are discussed under three geographical areas: (1) Gila River basin above Coolidge Dam, (2) Gila River basin between Coolidge Dam and Salt River, and (3) Salt River basin and Gila River below Salt River. Both storms caused unusually high peak flows in the Gila River basin above Coolidge Dam and the Salt River basin; only the first storm caused flooding in the Gila River basin between Coolidge Dam and Salt River. Although the Salt River basin and Gila River below Salt River area was affected by both floods, only the later flood had much effect below the reservoirs.

GILA RIVER BASIN ABOVE COOLIDGE DAM

The large amounts of precipitation that fell along the Arizona-New Mexico State line as rain and wet snow December 22–23 produced damaging floods in the lower reaches of the San Francisco River, in the Gila River below San Francisco River, and in south-flowing tributaries to the Gila River between San Francisco River and Coolidge Dam. Flooding along tributaries to the Gila River above San Francisco River was minor except along Bear Creek, where irrigation-diversion headings, canals, dikes, levees, and crops were damaged. Minor flooding was reported along other tributaries in New Mexico, and some flooding occurred along the Gila River above San Francisco River, but the peak discharge was small compared with that of other floods in recent years.

The gaging station on the San Francisco River at Clifton and those on the Gila River between San Francisco River and Coolidge Dam recorded the highest stages since 1916. Records for San Francisco

River, Eagle Creek, and San Carlos River show one crest late on December 22 and another late on the morning of December 23 (pl. 3). The first peak was higher at Eagle Creek above the pumping plant near Morenci, Gila River at the head of Safford Valley near Solomon, and San Carlos River near Peridot; the second peak was higher at the upper stations on Willow and Eagle Creeks and at San Francisco River at Clifton. The Gila River above San Francisco River peaked on December 24 and produced a third peak at the head of Safford Valley, where high flows continued for 2 days. By the time the flood reached the station at Calva, the first two peaks had combined into a single peak. Detailed tabulations of gage heights and discharges for the principal streamflow stations are given in the section "Streamflow data at gaging stations and miscellaneous measuring sites."

The recurrence intervals for the 1965 floods on the Gila River above Coolidge Dam are not as great as might be inferred from the number of years since the occurrence of similar floods; several floods in the late 1800's and early 1900's exceeded those of December 22–24. Curves developed by Patterson and Somers (1966) indicate average recurrence intervals of 12–17 years for the 1965 floods.

On December 30 the Gila River reached the second highest stage since 1916. Peak discharges were higher than those of December 22–23 in the Eagle Creek basin and in the central part of the San Francisco River basin but were lower on the main stem of the Gila River. The peak discharge in Eagle Creek was the highest since at least 1916.

From December 22 to January 5, 230,000 acre-feet of water was added to storage in the San Carlos Reservoir; the total amount of water in storage on January 5 was 330,000 acre-feet, which was the maximum since 1942 when the reservoir contained 819,200 acre-feet. By April 15, 1966, storage had increased to 504,700 acre-feet.

In the Gila River basin above Coolidge Dam, flood damages were about $1.6 million in New Mexico (U.S. Geological Survey, New Mexico, written commun., 1967) and $1.8 million in Arizona (D. E. Burkham, written commun., 1966). Most of the damage in New Mexico occurred near Cliff, Redrock, Virden, and Glenwood. Burkham (written commun., 1966) stated that in Arizona most of the damage from the floods was to farms, roads, and irrigation systems. Many of the farms were diked, and only a narrow band of the flood plain at the edge of the main river channel was uncultivated. The uncultivated part of the flood plain had become congested with a dense growth of saltcedar, which confined low and medium flows to a narrow main channel having a low conveyance capacity. As the flood wave moved downstream, the discharge exceeded the capacity of the main channel and overflowed onto the cultivated fields. After the fields were flooded to capacity, cross dikes between the fields broke, and the temporarily

stored water spilled into the next downstream field. The movement of water through the cultivated fields breached many of the irrigation canals and scoured large channels in several fields. During the recession of the December 22–26 flood and during the flood of December 30 to January 5, many of the fields carried more water than the main channel. Several farms and ranches were damaged by floods in tributaries of the Gila River. Agricultural damages were estimated at $465,000 in Greenlee County (Greenlee County Agriculture Disaster Committee, written commun., Jan. 14, 1966) and $1,260,000 in Graham County (Joint Graham County and Cities Civil Defense, written commun., Jan. 14, 1966).

Cities and small communities in the area received relatively little damage. Many private homes in the northern part of Clifton were flooded, but those in the southern part were protected by floodwalls; South Clifton would have been flooded if the walls had been overtopped. The damage to sewage systems, roads, and parks in Clifton was estimated at $25,000 (Tony Rodrigues, Mayor of Clifton, written commun., Jan. 28, 1966). In Safford the estimated flood damage was $25,000 (Joint Graham County and Cities Civil Defense, written commun., Jan. 14, 1966). The damage was mostly to roads, sewers, and water systems. Many dwellings in Little Hollywood—a community of about 500 farmworkers near Safford—were flooded, but none were washed away. The San Carlos River flooded several homes in the village of San Carlos. The flood overtopped most of the roads in the flood plain, and many roadbeds were severely eroded. Bridges over the Gila River at Solomon, Safford, and Pima were overtopped and closed to traffic for several hours.

GILA RIVER BASIN BETWEEN COOLIDGE DAM AND SALT RIVER

After the storm of December 22–23, major tributaries to the Gila River between Coolidge Dam and Salt River had the highest flows in several years; however, compared with past floods the flows were not as high as those above the dam. Records for the Gila River below Coolidge Dam indicate that no water was released from the dam during the flood—the maximum flow at the gage during the flood period was 5 cfs. The San Pedro River upstream from Benson contributed little flow to the flood; the peak at the San Pedro River gaging station at Charleston was only 690 cfs. Downstream from Benson, the peak on the San Pedro River increased rapidly as flow entered the river from the east slopes of the Rincon and Santa Catalina Mountains. A large flow in Aravaipa Creek washed out the approaches to a highway bridge near the mouth of the creek, swelled the San Pedro River to flood stage, and caused considerable flooding in the Winkelman area. The flood destroyed the gaging station on San Pedro River near

Winkelman, inundated several hundred acres of farmland and part of the sewage-treatment plant at Kearny, and isolated a community near Kelvin; however, the amount of damage was generally small along the Gila River from Coolidge Dam to the Santa Cruz River.

Near Tucson, the flood of December 22–23 did considerable damage along Rillito Creek and the Santa Cruz River below Rillito Creek, but the magnitudes of peak discharges on the main streams were not unusual. The discharge of Rillito Creek was the highest since 1940 and the sixth highest since 1908. High flows prevailed for 3 days (pl. 3), and mean discharges for December 22–23 were more than the maximum instantaneous discharge of many peaks. The 3-day volume for December 22–24 was the fourth greatest since 1908. The flow of Rillito Creek originated mainly in tributaries that drain to Tanque Verde Creek from the north slopes of the Tanque Verde Mountains and the south slopes of the Santa Catalina Mountains. The peak discharge of Tanque Verde Creek, which may be the highest since at least 1929, has a recurrence interval of about 27 years. Small streams that originate in the foothills had little or no flow. At the gage at Santa Cruz River at Tucson, the peak was the highest winter peak since 1916, but summer peaks of similar magnitude can be expected about once every 2 years. The peak at the gage at Santa Cruz River at Cortaro was the second highest since 1936.

Rillito Creek eroded large sections from its banks, washed out the approaches to two bridges, undercut a trailer park, destroyed several trailers, and caused two major breaks in a main sewage-interceptor line. About 3.5 mgd (million gallons per day) of raw sewage from Tucson poured into Rillito Creek over a period of several days. Arizona State Health Department officials found traces of contamination in wells within a quarter of a mile of the creek. The cost of repairing the sewerline was estimated at $1.3 million. Damages to roads and bridge approaches in Pima County were estimated to be $156,000 (D. A. DiCicco, Pima County Engineer, oral commun., 1966). Upstream from the gaging station near Tucson, Rillito Creek was confined to its channel, and there was little inundation damage; however, several small areas downstream from the gage were inundated. Much more of the flood plain probably would have been inundated if extensive lateral cutting had not occurred. The duration of the flood (pl. 3) may be the main reason why the flood was so destructive, but the place of origin of the flood also may have been a contributing factor. Large rock exposures exist in the mountains where the flood originated; therefore, the sediment-carrying potential of the water may have been much greater than the load. When water reached the alluvial channel of Rillito Creek, it began picking up sediment from the banks. The relatively steep stream gradient (fig. 2) made it possible for the stream to carry large amounts of sediment.

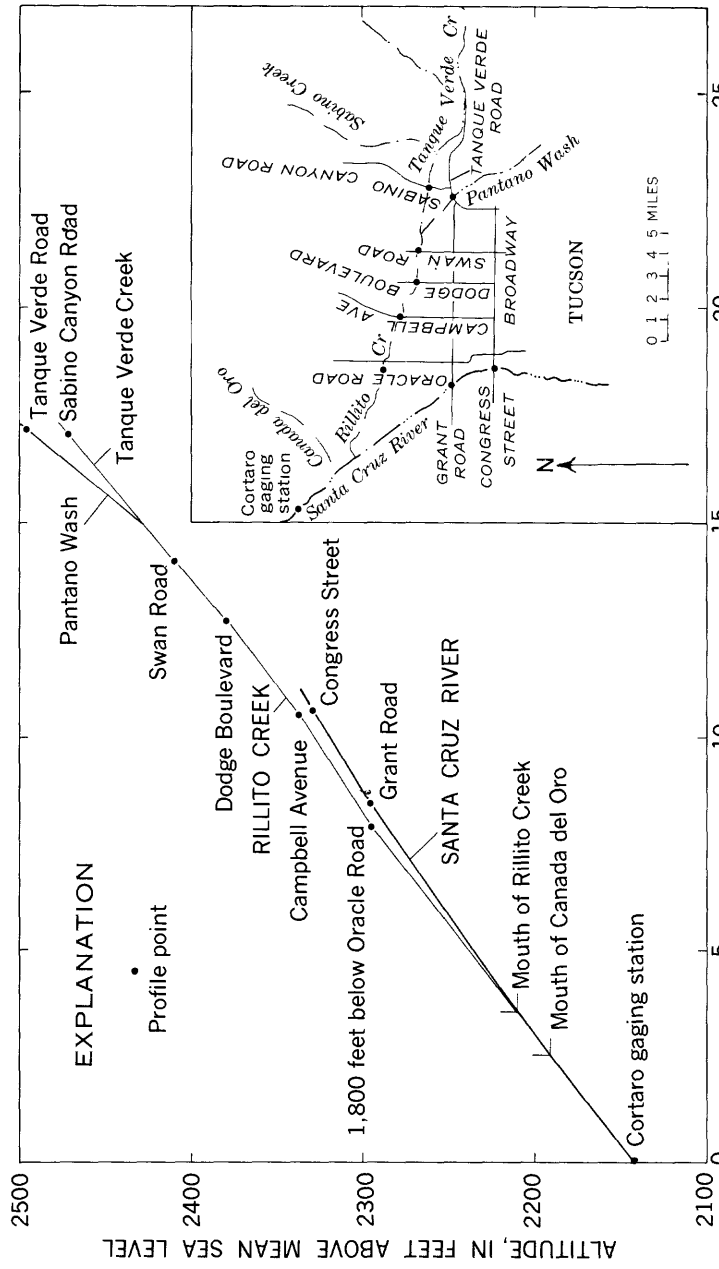


FIGURE 2.—Profile of flood crest on Rillito Creek and the Santa Cruz River near Tucson, December 22, 1965.

Flooding also occurred along Arivaca Creek, a tributary to Altar Wash at the head of Los Robles Wash. On December 24, a dam upstream from the community of Arivaca was washed out, and about 2,000 acre-feet of water was released. Although the dam failure caused the highest known flow through the community of Arivaca, only a small part of the water reached the Santa Cruz River.

SALT RIVER BASIN AND GILA RIVER BELOW SALT RIVER RESERVOIR INFLOW

Most of the inflow to Theodore Roosevelt Lake, hereafter referred to as Roosevelt Lake, is measured at gaging stations on the Salt River near Roosevelt (drainage area, 4,306 square miles) and Tonto Creek above Gun Creek near Roosevelt (drainage area, 675 square miles). During most of December 1965, the flow of the Salt River exceeded the previously recorded maximum flows for corresponding dates. On plate 4 the daily mean discharge of the Salt River near Roosevelt in November and December 1965 is compared with the previous maximum daily discharge for corresponding dates in the 30-year period 1931–60 and with the daily discharge that was exceeded 10 and 50 percent (median value) of the time during the same period. Flow into the Verde River reservoir system was also above average. The amount of water in storage in the Salt and Verde reservoir systems increased 378,700 acre-feet between November 21 and December 21. On December 21, there was more than 1½ million acre-feet of water in storage and only 537,700 acre-feet of reserve storage remained.

The large amounts of precipitation that fell on December 22–23 caused extremely high runoff from the East Verde River eastward to the lower reaches of the Black River. The Salt River, Tonto Creek, and Verde River had the highest peaks in several years. The contents of reservoirs on the Salt River increased 192,000 acre-feet in 2 days; the contents of reservoirs on the Verde River increased 69,300 acre-feet in the same period. Only a small amount of water was released from Roosevelt Lake into the three downstream reservoirs.

The measured flow at the two inflow stations and an estimated inflow from 843 square miles of ungaged drainage area were combined by the flood-routing method to define a hydrograph of total inflow to Roosevelt Lake (pl. 4). Routing coefficients were estimated from flood records for Salt River near Chrysotile and Salt River near Roosevelt and from velocities measured at these stations. The maximum rate of flow into Roosevelt Lake was computed as 88,000 cfs. Although the maximum inflow to Horseshoe Reservoir on the Verde River was not computed, it was probably about the same as that at the gaging station

below Tangle Creek (peak flow 39,300 cfs), where most of the inflow to Horseshoe Reservoir is measured.

After the high flow of December 22–23, continued warm weather resulting in increased snowmelt caused above-normal runoff for the rest of the month. By December 29, the total amount of water in storage in the Salt and Verde reservoir systems—1,891,000 acre-feet—was more than in any preceding December. The reserve storage capacity had been reduced to 181,000 acre-feet—20,000 acre-feet in the Verde River reservoirs and 161,000 in the Salt River reservoirs—and hydrologic conditions in the upper parts of the basins were conducive to more runoff. It was considered certain that the reservoirs would spill before the spring runoff season was over, but no one anticipated the magnitude of the spill or how soon it would take place. There was little warning that a flood was in progress until streams began rising rapidly at about 0400 hours on December 30. Tributaries to the Salt River upstream from Cibecue Creek and to the Verde River upstream from the East Verde River had higher peak discharges on December 30 than on December 22–23. Downstream from Cibecue Creek and the East Verde River, however, peaks were lower on December 30 but of longer duration. The peak at Salt River near Roosevelt was only slightly lower than that of December 22–23, but at Tonto Creek above Gun Creek and Verde River below Tangle Creek, the peaks were considerably lower. The maximum rate of inflow to Roosevelt Lake was computed as 66,000 cfs on December 30.

REGULATED DISCHARGE AT STEWART MOUNTAIN AND BARTLETT DAMS

The reservoirs contained most of the high flow of December 22–23. Water was released from Stewart Mountain Dam at a maximum rate of 4,360 cfs, but no water was released from Bartlett Dam. The water released from Stewart Mountain Dam and the flow from small tributaries below Stewart Mountain and Bartlett Dams produced a peak discharge below Granite Reef Dam of 9,500 cfs on December 23.

When the streams began rising rapidly on December 30, the reservoirs were nearly full, and it became obvious before the peaks arrived that the entire flow could not be contained. At 1100 hours on December 30, the release of water at Bartlett Dam was increased by control valves from a few hundred to about 4,000 cfs, and the Phoenix flood was underway. The release of this amount of water was continued until the reservoir began to spill at about 1400 hours. Discharge increased rapidly and reached 35,600 cfs at 1900 hours on December 30. The flow was gradually reduced to a low of 28,000 cfs at 1100 hours on December 31. The flow was held between 28,000 and 31,400 cfs

until 1900 hours on December 31, when it was gradually decreased to slightly more than 3,000 cfs (pl. 4).

Water began flowing over the Stewart Mountain Dam spillway at 1930 hours on December 30, and by 2100 hours the reservoir was spilling 39,600 cfs. Except for a 1½-hour period on January 1, the flow from Stewart Mountain Dam was held between 35,000 and 41,000 cfs until 0230 hours on January 2. A low of 5,050 cfs occurred at 0800 hours on January 2. At 1300 hours on January 3, the flow again was increased to about 10,000 cfs and was held to this amount for several days.

STAGES AND DISCHARGES DOWNSTREAM FROM GRANITE REEF DAM DURING THE PHOENIX FLOOD

The flow of the Salt River below Granite Reef Dam was derived by combining the flows of Salt River below Stewart Mountain Dam and Verde River near Scottsdale and subtracting diversions (pl. 4). Attenuation between the gaging stations and Granite Reef Dam was not computed, but such attenuation would be a small amount of the total flow. The combined maximum flow of the Salt and Verde Rivers was 67,500 cfs from 2000 to 2400 hours on December 31, and the flow was held within 3,000 cfs of this amount from 0800 hours on December 31 to 0100 hours on January 1. During this time, canals at Granite Reef Dam were diverting about 500 cfs, which left a peak flow of 67,000 cfs over Granite Reef Dam.

After 0100 hours on January 1, the discharge decreased rapidly until 1400 hours on January 1, when increased releases at Stewart Mountain Dam caused another sharp rise of short duration. On January 2 the discharge over Granite Reef Dam was less than 10,000 cfs. However, in order to lower the water in the Salt River reservoirs enough to provide some protection if another flood should occur, the discharge at Stewart Mountain Dam was increased on January 3, thus bringing the flow at Granite Reef Dam to 13,000 cfs. The flow over Granite Reef Dam was held between 11,000 and 13,000 cfs until January 11, when the flow was shut off.

The first water reached the Phoenix area about 0300 hours on December 31. The water rose rapidly to depths of from 10 to 15 feet, and in places the river was more than a mile wide. A gage-height record furnished by the Salt River Valley Water Users' Association (pl. 4) shows that at Jointhead Dam near 52d Street the river reached its maximum stage at about 0900 hours on December 31, dropped off 0.4 foot, and then rose slightly about midnight. The river began to recede about 0400 hours on January 1.

Severe scour during the flood eliminated the possibility of making a reliable indirect measurement of the peak discharge through Phoenix. Personnel of the Geological Survey made several discharge measurements as the flow receded, however, and these measurements provide fair definition for a stage-discharge relation for Jointhead Dam below 43,000 cfs. The maximum discharge at Phoenix was computed to be 66,000 cfs by interpolating between the peak discharge at Granite Reef Dam (67,000 cfs) and that at Gillespie Dam (64,200 cfs). In computing the discharges past the gage at Jointhead Dam, it was assumed that the maximum discharge (66,000 cfs) occurred at the time of the second (lower) peak in stage. The assumption appears logical because a secondary channel that carried a large amount of bypass flow around the dam was enlarged during the flood and may have allowed the higher discharge of the second peak to pass at the lower stage. Also, the flood washed out several downstream street crossings, which may have affected the stage-discharge relation during the early part of the flood.

In the 74-mile reach between Granite Reef and Gillespie Dams, the peak was reduced only slightly—the peak discharge at Gillespie Dam was 64,200 cfs—but the volume of flow was reduced appreciably by infiltration and pondage in numerous gravel pits (pl. 4). The Gila River above Salt River did not contribute any flow to this flood, and most of the flood peaks in tributaries to the Salt and Gila Rivers below Granite Reef Dam were either dissipated or stored by reservoirs before reaching the main stream. The only tributary flow between Granite Reef and Gillespie Dams from December 30 to January 13 was from the Agua Fria River, which had a peak flow of 480 cfs on December 30, and the Hassayampa River, which had a peak flow of about 1,000 cfs on the same day.

Water in the Painted Rock Reservoir rose to a depth of nearly 56 feet as a result of the flood. This was the first time that water had been stored behind the dam, which was built in 1959. Inflow to Painted Rock Reservoir (pl. 4) was computed using change in reservoir contents. The peak was quite sharp; therefore, the shape of the hydrograph, plotted on plate 4, and the magnitude of the peak are sensitive to the increment of time used in computing the flow. A 1-hour increment gives a peak inflow rate of about 65,000 cfs; a 3-hour increment, 62,000 cfs; and a 6-hour increment, 55,900 cfs. The U.S. Army Corps of Engineers (1966) used the 6-hour increment in their report but qualified it as a 6-hour average. They stated that wind-caused surge and a lack of refinement in the table of reservoir contents made the use of a shorter period infeasible. A 6-hour increment, however, is quite long for such a sharp peak, and a 3-hour increment has been used in this

report. According to the U.S. Army Corps of Engineers (oral commun., 1966) surface-water inflow ceased January 15.

Plate 4 shows a steepening of the rising limb of the hydrograph and a large reduction in duration and volume of the flood peak but little reduction in peak discharge as the flood wave moved downstream. The peak traveled much faster than the front of the flood wave. The front took 10 hours to cover the 20 miles from Granite Reef Dam to Jointhead Dam and 36 hours to cover the 54 miles from Jointhead Dam to Gillespie Dam, whereas the traveltimes for the peak were 4 and 24 hours, respectively (table 3). The change in the shape of the hydrograph (pl. 4) as the flood moved downstream is typical for floods that occur in dry sand channels because the first water to reach each section of channel infiltrates into the dry sand. After the channel has been wetted, the water moves along the channel at a faster rate; therefore, the traveltime for the peak is less than that for the flood front.

TABLE 3.—*Times when the Phoenix flood reached different points on the Salt and Gila Rivers*

Location	Miles from Granite Reef Dam	Time main rise began		Time of peak	
		Hour	Date	Hour	Date
Granite Reef Dam	0	2000	12–30	2000	12–31
Jointhead Dam	20	0600	12–31	2400	12–31
Jack Rabbit Road	51	1900	12–31		
Gillespie Dam	74	1800	1–1	2400	1–1
Painted Rock Dam	103	[1] 1200	1–2	[1] 1700	1–2

[1] Approximate time based on increments of reservoir storage (pl. 4).

Water was released from Painted Rock Dam at a maximum rate of 2,850 cfs. No serious flooding occurred downstream from the dam, but grade-level road crossings were inundated for 2 or 3 months, and many were not reopened to traffic until late in April. The Bureau of Reclamation installed a gaging station at Avenue 51E near Mohawk to measure infiltration in the Wellton-Mohawk Irrigation and Drainage District. The first water from the flood reached that gage on February 2 and reached the gaging station at Gila River near Dome on February 19 (pl. 4). The maximum daily discharges were 1,200 cfs at the Bureau of Reclamation gage and 615 cfs at the Dome gage. The last of the impounded water was released from Painted Rock Dam on March 25, but ground-water discharge in the reservoir area sustained flow in the Gila River for several months. Less than half the water released from Granite Reef Dam reached Painted Rock Dam as surface flow, and less than 10 percent of the water reached the mouth of the Gila River (table 4).

TABLE 4.—*Runoff of the Salt and Gila Rivers downstream from Granite Reef Dam*

Location	Period of runoff [1]	Discharge (acre-feet)
Inflow, Granite Reef Dam to Gillespie Dam:		
Salt River below Granite Reef Dam	12-22-65 to 1-11-66	509,000
	2-12-66 to 5- 4-66	42,800
		551,800
Total from Gila River near Laveen, Santa Cruz River near Laveen, Agua Fria River at Avondale, and Hassayampa River near Arlington	12-10-65 to 2-28-66 [2]	60,000
Total	12-10-65 to 3- 4-66	611,800
Gila River at Gillespie Dam	12-10-65 to 3-30-66	436,600
Gila River below Painted Rock Dam	12-27-65 to 7- 9-66	257,350
Gila River at Avenue 51E near Mohawk	2- 2-66 to 4- 8-66	99,500
Diversions between Avenue 51E and Dome gage	2- 2-66 to 4- 6-66	−14,150
Gila River near Dome	2-19-66 to 5- 6-66	37,600

[1] The closing date for period of runoff is the date on which the discharge at a particular location reached zero after the flood, except at Gila River at Avenue 51E near Mohawk, where records were stopped on Apr. 8 when discharge was 4 cfs, and Gila River near Dome, where flow continued for more than a year. The discharge of Gila River near Dome reached a low of 2.2 cfs on May 6, increased slightly, and then gradually dropped off to 0.5 cfs June 4–9. May 6 is the last date on which flow can be attributed solely to the flood.

[2] No flow Jan. 10 through Feb. 6, 1966.

EFFECTS OF THE PHOENIX FLOOD

Soon after the release of water at Bartlett Dam on December 30, about 8,000 persons were evacuated from the area along the Salt River channel in Phoenix. Most of them returned to their homes that night, however, and fewer than 400 were housed in emergency quarters. Transportation facilities were damaged badly by the flood. Within 6 hours after the first water reached Phoenix, every grade-level crossing in the metropolitan area was flooded. Floodwater cut into the south approach of the bridge on the Maricopa Freeway (Interstate Highway 10), which had been opened to traffic only a month earlier. About 1,000 feet of shoulder, curb, and one traffic lane was washed away, and highway officials closed the bridge to traffic. One pier of the Central Avenue Bridge failed, and the bridge was closed early on January 1. For a while, the U.S. Highway bridge at Tempe was the only usable crossing. Half the Maricopa Freeway bridge was reopened on the afternoon of January 1, and two lanes of the Central Avenue Bridge were opened on January 3. Other crossings remained closed for 2–3 weeks.

As much as 15 inches of water flooded 2,600 feet of runway at Sky Harbor Airport. Some power-transmission towers and poles in the river channel were washed out, and there were many power failures. Several sewage-oxidation ponds at treatment plants serving Mesa, Tempe, and Scottsdale and a sewerline that crossed Salt River were washed out. The damaged facilities discharged large amounts of raw sewage into the river, but dilution by the large volume of floodwater

minimized the health hazard. Gaslines also were damaged, and gravel companies and cattle feedlots in the river channel were inundated.

Aerial photographs of the Salt River from Phoenix to Poosevelt Lake were taken near the crest of the flood by personnel of the Geological Survey. The pictures of the metropolitan area (pl. 5) were taken between 1230 and 1245 hours on December 31 when stage and discharge were slightly below the maximum (pl. 4). Photographs not included in this report are available from files of the Geological Survey. The Arizona Highway Department also obtained excellent aerial photographic coverage of the flood, and their files contain pictures that cover the reach from the Verde River to Painted Rock Dam.

In a 25-mile reach through the metropolitan area from Oak Street near Mesa to 51st Avenue in Phoenix, the average width of the Salt River was slightly more than half a mile. The width ranged from 400 feet near 16th Street to 7,000 feet near Scottsdale Road. Although a large area was inundated (pl. 5), most of it was within the natural river channel, and water spread out onto the flood plain in only a few small areas. At Scottsdale Road (pl. 5), land half a mile from the main channel was inundated, but in most areas flooding was confined to a narrow strip within a few hundred feet of the main channel.

Throughout the metropolitan area, the channel was enlarged and cleaned out by the flood; a wide well-defined channel was formed in what previously had been a poorly defined channel. The "before" photograph on plate 5 shows a flat brushy area crisscrossed by roads and powerlines and pocked with gravel pits and sewage-treatment tanks. The area shown in the "before" photograph is typical of the channel before the flood in most of the metropolitan area. In places the entire channel was a series of large gravel pits, and in others it was constricted by manmade landfills and commercial development. At Central Avenue more than a third of the bridge opening had been blocked off by waste material from a gravel operation. Levels run to debris lines that had been left by the flood showed that during the peak there was 3½ feet of fall through the constriction formed by the fill. In the 25-mile reach through the metropolitan area, 17 grade-level crossings, similar to those shown in the "before" photograph, were destroyed.

The after photograph on plate 5 shows a smooth sand channel that contains very little brush. The gravel pits have been filled, and the roads have been washed away. At the time this photograph was taken, temporary crossings had been constructed on Scottsdale and Hayden Roads, and a new dike had been built around the sewage-treatment beds between the roads.

Damage data were collected and evaluated by the U.S. Army Corps of Engineers (1966) in cooperation with many Federal, State, county,

city, and local agencies. Damages were estimated to be $5,820,000 along the Salt River from Mesa to the mouth and $250,000 along the Gila River from Salt River to Gillespie Dam (table 5). Little damage occurred in the first 10 miles of the Salt River channel downstream from Granite Reef Dam, but in the 28-mile reach from Oak Street to the mouth of the Salt River the amount of damage was large. The damage along the Gila River was spotty and occurred mainly in agricultural areas and on streets and highways.

TABLE 5.—*Summary of damages from the Phoenix flood along the Salt and Gila Rivers*

[Data from U.S. Army Corps of Engineers, 1966]

Type of property	Damages		
	Physical damages	Emergency costs and business losses	Total
Salt River, Granite Reef Dam to mouth			
Residential	$5,000	$1,000	$6,000
Commercial	65,000	38,000	103,000
Industrial	2,041,000	398,000	2,439,000
Public	230,000	138,000	368,000
Utilities	892,000	268,000	1,160,000
Streets, highways, and bridges	1,326,000	360,000	1,686,000
Irrigation works	35,000	2,000	37,000
Agricultural	15,000	2,000	17,000
Railroad	3,000	1,000	4,000
Total	4,612,000	1,208,000	5,820,000
Gila River, mouth of Salt River to Gillespie Dam			
Residential	$32,000	$3,000	$35,000
Commercial	0	3,000	3,000
Industrial	27,000	8,000	35,000
Public	0	6,000	6,000
Utilities	0	0	0
Streets, highways, and bridges	85,000	6,000	91,000
Irrigation works	0	0	0
Agricultural	72,000	8,000	80,000
Railroad	0	0	0
Total	216,000	34,000	250,000

Industrial damage comprised about 42 percent of the total along the Salt River; industrial damages were estimated to be $2,439,000, of which $1,967,000 was sustained by gravel companies located in the river bottom. The second largest loss was sustained by cattle feedlots, also located in the river bottom. The flood damage to the runway at Sky Harbor Airport was estimated to be $235,000. Damages to the utilities along the Salt River were $1,160,000.

REDUCTION IN PEAK DISCHARGE BY STORAGE IN RESERVOIRS

Without the storage provided by the six reservoirs on the Verde and Salt Rivers, the peaks of December 22–23 would have reached the confluence of the two streams at about the same time, and the combined flow would have caused a much higher flood than the one that occurred on December 31. In order to obtain an estimate of what the peak discharges during the floods would have been without the dams, the floods were routed from the gaging stations above the reservoirs to Granite Reef Dam. The coefficients used to develop the estimated hydrograph (pl. 4) were determined in the same manner as those used to compute the flow into Roosevelt Lake, which has been discussed previously. Without the storage provided by the reservoirs, the peak discharge at Granite Reef Dam would have been about 120,000 cfs on December 23 and slightly more than 80,000 cfs on December 31. The duration of the December 31 peak would have been about the same as that for the regulated peak.

COMPARISON WITH PREVIOUS FLOODS

The peak discharge during the Phoenix flood is the highest flood on the Salt River and Gila River below Salt River since the completion of Bartlett Dam on the Verde River in 1939. The flood was publicized as a major catastrophe because most residents were not aware of previous floods and because businesses that had encroached on the river channel sustained damage; however, hydrologically, the magnitude of the flood was relatively small. The recurrence interval for unregulated conditions for the peak discharge is about 6 years (Patterson and Somers, 1966). Several higher peaks occurred prior to construction of the upstream dams; in the 50-year period 1890 to 1939, at least 14 floods exceeded the 1965 Phoenix flood (tables 6 and 7). Early floods, prior to 1910 when filling of Roosevelt Lake began, were from unregulated flows from the Salt and Verde Rivers; the floods of 1916 and 1920 were a combination of unregulated flow from the Verde River and spill from Roosevelt Lake; the floods of 1923–38 resulted only from unregulated flow in the Verde River.

The largest known flood in the Salt River basin occurred in February 1891, when a peak of about 300,000 cfs inundated most of the present downtown area of Phoenix. Water reached the Arizona State Hospital, on Van Buren Street between 24th and 28th Streets, and the corner of Jefferson and Central Avenues in downtown Phoenix, which is 1¼ miles north of the Maricopa Freeway (pl. 5). The discharge of Salt River below Granite Reef Dam was more than 100,000 cfs on at least five occasions between 1905 and 1920, and several peaks since

TABLE 6.—*Discharge data for major floods,*

[Peaks are those for which daily flow of the Salt River was computed to be more than 30,000

Date of flood	Peak discharge, in cfs				
	Salt River near Roosevelt	Tonto Creek	Salt River at Roosevelt	Salt River above Verde River	Verde River
Feb. 22–23, 1890					
Feb. 19, 1891					
Feb. 23–24, 1891 [2]			150, 000		
Jan. 17–18, 1895					
Feb. 4–5, 1905			[3] 43, 400		
Feb. 28 to Mar. 1, 1905			[3] 36, 400		
Mar. 13–14, 1905			[3] 48, 000		
Mar. 17–18, 1905			[3] 54, 000		
Mar. 20–21, 1905			[3] 54, 000		
Apr. 12–13, 1905			[3] 68, 000		
Nov. 27, 1905			[3] 145, 000	[5] 138 000	96, 000
Mar. 13–14, 1906					
Mar. 27, 1906					
Dec. 3–4, 1906					
Mar. 6, 1907					
Dec. 16–17, 1908					
Jan. 30, 1915					
Jan. 19–20, 1916	100, 000		[7] 120, 000		[8] 68, 900
Jan. 29–30, 1916					
Nov. 28, 1919					
Dec. 6, 1919					
Feb. 22–23, 1920					
Dec. 28, 1923	43, 000				
Feb. 17–18, 1927	40, 000				70, 000
Feb. 10–11, 1932	57, 000				53, 000
Feb. 7–8, 1937	88, 000		>100, 000	28	63, 000
Mar. 4, 1938	24, 100			53	95, 000
Mar. 14–15, 1941	117, 000	32, 000	136, 000	29	45, 800
Jan. 18–19, 1952	111, 000	45, 400	139, 000	10	237
Dec. 25–26, 1959	78, 200	25, 200	103, 000	[10] 700	[10] 620
Dec. 22–24, 1965	68, 800	44, 700	88, 000	4. 360	8, 540
Dec. 30–31, 1965	59, 900	22, 100	66, 000	50 100	31, 300

[1] Data not previously published; from J. H. Gardiner and S. O. Decker (written commun., 1948).
[2] Figures for February 23–24, 1891, have been published previously as maxima and as daily mean discharges. J. H. Gardiner and S. O. Decker (written commun., 1948) have indicated that the published figures should be used as maxima; they gave a daily discharge of about 225,000 cfs at Arizona Dam. Daily mean discharge at Roosevelt not determined.
[3] Data not previously published; obtained by applying an extension of 1905 rating to maximum stage noted by observer.
[4] C. T. Newton (U.S. Army Corps of Engineers, written commun., 1957).

1920 would have exceeded 100,000 cfs if they had not been reduced greatly by storage in the reservoirs. At least three and possibly four of these floods would have exceeded 150,000 cfs; the two largest floods would have been on March 14–15, 1941, and January 18–19, 1952. Without regulation, the 1941 flood would have had a peak discharge of about 170,000 cfs at Granite Reef Dam, and the 1952 peak would have been only slightly less. A maximum discharge of 45,800 cfs was released at Bartlett Dam during the 1941 flood and no water, except for the normal amounts for irrigation, was released during the 1952 flood.

Salt River and main tributaries, 1888–1965

cfs at Roosevelt or more than 50,000 cfs below Verde River; sources of data given in table 7]

Peak discharge, in cfs—Con.	Maximum daily discharge associated with the flood, in cfs					
Salt River below Verde River	Salt River near Roosevelt	Tonto Creek	Salt River at Roosevelt	Salt River above Verde River	Verde River	Salt River below Verde River
----------	----------	----------	71,600	----------	64,500	143,000
[1] 267,000	----------	----------	----------	----------	----------	[1] 225,000
300,000[2]	----------	----------	----------	----------	135,000	[1] 225,000
----------	----------	----------	46,800	49,800	33,200	83,000
----------	----------	----------	31,400	32,300	33,000	65,000
----------	----------	----------	27,600	29,100	25,100	54,000
----------	----------	----------	38,700	28,600	25,500	54,000
----------	----------	----------	39,800	34,800	29,400	64,000
----------	----------	----------	44,400	35,800	10,600	45,000
[4] 115,000	----------	----------	45,500	60,600	32,100	87,000
>200,000	----------	----------	97,700	[6] 90,000	61,500	[6] 150,000
----------	----------	----------	35,700	37,300	31,300	66,000
----------	----------	----------	28,200	28,200	30,400	58,000
----------	----------	----------	36,600	38,000	15,400	53,000
----------	----------	----------	14,200	18,600	32,200	51,000
----------	----------	----------	----------	35,000	51,600	63,000
----------	37,500	11,000	48,500	79	15,700	16,000
[4] 120,000	91,000	18,000	109,000	50,000	53,400	95,000
[4] 105,000	69,500	8,690	78,200	50,000	22,600	73,000
----------	36,500	6,430	42,900	294	46,800	47,000
----------	50,600	8,920	59,500	508	16,900	17,000
[4] 130,000	56,000	9,880	65,900	28,000	48,200	76,000
----------	32,200	20,000	52,200	0	40,800	41,000
([9])	31,600	12,600	40,900	1,110	48,300	([9])
([9])	35,200	8,000	42,200	25	41,500	([9])
([9])	35,000	18,000	49,000	23	39,200	([9])
[1] 85,000	17,800	6,000	23,800	14	59,700	([9])
([9])	60,200	16,500	76,700	29	32,700	([9])
----------	46,600	21,200	58,500	5	189	----------
[8] 8,800	41,800	14,300	51,800	134	182	----------
9,530	45,100	15,300	56,000	3,750	2,950	6,900
67,000	30,600	11,200	40,400	37,200	30,200	64,000

[5] Maximum observed; previously published as daily mean flow, but figure is inconsistent with records for Salt River at Roosevelt.
[6] Approximate; estimated from records for Salt River near Roosevelt and Verde River near McDowell.
[7] Approximate; estimated from records for Salt River near Roosevelt and Tonto Creek near Roosevelt.
[8] From Salt River Valley Water Users' Association.
[9] Discharge approximately equal to that in the Verde River but may differ slightly because of inflow, attenuation, and time of travel.
[10] Originated in tributaries below reservoir systems.

Upstream from the reservoirs, the flood resulting from the storm of December 29–30 generally had a larger recurrence interval than the flood below the reservoirs, but it was not a major flood except in a few small areas. Recurrence intervals of peak discharges at specific sites exceeded 50 years for sites on Carrizo and Corduroy Creeks and ranged from 9 to 19 years for sites on Tonto, Oak, and Dry Beaver Creeks, the headwaters of the East Verde River, and the lower reaches of the Black and Salt Rivers. Elsewhere in the Salt River basin the recurrence intervals were 7 years or less.

TABLE 7.—*Sources of data for major floods,*

[Stream designations are

Stream designation	Period	Location of gaging station
Salt River near Roosevelt	1915–65	17 miles above Roosevelt Dam
Tonto Creek	1915–41	17 miles above Roosevelt Dam
	1941–65	26 miles above Roosevelt Dam
Salt River at Roosevelt	1890–95	
	1905–7	A quarter of a mile above present site of Roosevelt Dam.
	1915–65	
Salt River above Verde River	1895–1910	Within 2 miles of Verde River
	1915–23	At Roosevelt Dam
	1923–29	At Mormon Flat Dam
	1930–49	Three-quarters of a mile below Stewart Mountain Dam.
	1950–65	3½ miles below Stewart Mountain Dam
Verde River	1890–1925	Within 1¼ miles of the mouth
	1926–41	18 miles above mouth
	1942–61	21 miles above mouth
	1961–65	2.5 miles above mouth
Salt River below Verde River	1888–96	1¼ miles below Verde River
	1896–1965	

The December 22–23 storm produced unusually high flows in Sycamore and Tonto Creeks and the lower reaches of the East Verde and Black Rivers. On Tonto Creek, the peak was the second highest since 1941, when the gage was installed above Gun Creek, and earlier records collected 9 miles downstream indicate that it may have been the second highest since at least 1913. Recurrence intervals of peak discharges ranged from 9 to 14 years for sites on Corduroy Creek and the Black and Salt Rivers and from 20 to 25 years on Sycamore Creek and the East Verde River, and they were about 50 years for sites on Tonto Creek. Elsewhere in the basin, recurrence intervals were generally less than 5 years. The December 23 peak on the Salt and Verde Rivers has been exceeded by about 10 other floods in the last 80 years (table 6). At the Salt River near Roosevelt gage, the 1891 flood had a peak discharge of more than 150,000 cfs, and at least four other floods had peak discharges of more than 100,000 cfs.

Salt River and main tributaries, 1888–1965

those used in table 6]

Source of data during period shown	Discharge
Published records for Salt River near Roosevelt	Natural discharge of the Salt River above Roosevelt Lake.
Published records for Tonto Creek near Roosevelt	Natural discharge of Tonto Creek.
Published records for Tonto Creek above Gun Creek, near Roosevelt.	Do.
Published records computed from records above and below Verde River.	Natural discharge of the Salt River below Tonto Creek.
Published records for Salt River at Roosevelt	Do.
Unpublished records; from summation of flow of Salt River near Roosevelt and Tonto Creek at corresponding times.	Do.
Published records for Salt River at McDowell	Natural discharge of the Salt River above the Verde River.
Unpublished records from Salt River Valley Water Users' Association.	Regulated discharge from the Salt River reservoir system.
do	Do.
Published records for Salt River below Stewart Mountain Dam.	Do.
do	Do.
Published records for Verde River near McDowell	Natural discharge of the Verde River.
Published records for Verde River above Camp Creek near McDowell.	1926–39: Natural discharge of the Verde River. 1939–41: Regulated discharge from the Verde River reservoir system; inflow between gage and mouth not included.
Published records for Verde River below Bartlett Dam.	Regulated discharge from the Verde River reservoir system; inflow between gage and mouth not included.
Published records for Verde River near Scottsdale	Regulated discharge from the Verde River reservoir system plus natural inflow between Bartlett Dam and the mouth of the Verde River.
Published records for Salt River at Arizona Dam	1888–1908: Natural discharge of the Salt River below the Verde River.
Unpublished records; from summation of flow of Salt River above Verde River and Verde River at corresponding times.	1915–38: Regulated discharge from the Salt River reservoir system plus natural discharge of the Verde River. 1939–65: Regulated discharges from the Salt and Verde River reservoir systems plus varying amounts of inflow between the reservoirs and the mouth of the Verde River.

EFFECTS OF THE FLOODS ON GROUND-WATER LEVELS

Although the floods were damaging to some parts of Arizona's economy, they were beneficial to others. The arid lands affected by the floods depend, to a large extent, on ground water for their water supplies. Recharge to the ground-water reservoirs was beneficial except in the Wellton-Mohawk area, where drainage is a problem. Annual water-level measurements made in several hundred wells in Arizona provide a general index of changes in water levels. The water levels in wells along most of the major flood plains affected by the floods rose from spring 1965 to spring 1966 (table 8). Rises of more than 40 feet were measured in wells along Rillito Creek, and rises of 35 to 40 feet were measured in wells along the Salt River downstream from Granite Reef Dam.

Larger rises in water levels were recorded during the flood period. The water level in a well near Rillito Creek at Tucson rose 53 feet between December 7, 1965, and January 4, 1966 (University of Arizona, written commun., 1966). (See Well C on pl. 6.) The close correlation

between rises in ground-water levels and streamflow in the Salt and Gila Rivers indicates that a large part of the water lost from surface flow during the Phoenix flood infiltrated into the ground-water reservoir (table 4, pls. 5 and 6). In general, water-level rises from spring 1965 to spring 1966 in other areas were less than 25 feet and extended from 1 to 3 miles away from the stream channels; between the flood plains and the mountain fronts, however, water levels continued to decline. Along a 40-mile reach of the Santa Cruz River from the international boundary northward, water levels were the highest ever measured, and rises of 10 feet were measured as much as 3 miles from the river (Clyma and Shaw, 1968). Although the floods of December 1965 to January 1966 were the main contributor to the rises in water levels, other periods of prolonged surface flow on unregulated streams and a reduction in pumping in some areas may have been contributing factors.

TABLE 8.—*Representative rises in ground-water levels along major flood plains in the Gila River basin, spring 1965 to spring 1966*

[Data from Hodges and others (1967)]

Location (see pl. 1)	Range in water-level rise, in feet
1. Duncan basin	1–3
2. Safford basin	4–12
3. Aravaipa Valley	5–23
4. Lower San Pedro River valley	2–11
5. Upper Santa Cruz basin:	
Above Rillito Creek	3–21
Rillito Creek basin	As much as 50
6. Lower Santa Cruz basin	[1] 2–10
7. Salt River Valley	As much as 37
New River and Skunk Creek basin	5–20
8. Gila Bend area	0–12
9. Palomas Plain	0–4

[1] In T. 9 S., Rs. 7 and 8 E., rises of 12–30 feet occurred.

Water-level rises were a detriment in the Wellton-Mohawk area, where waterlogging has been a problem for several years, and water is pumped to lower the water table. The high flows in February, March, and April 1966 practically nullified 5 years of pumping, and it was not until March 1967 that water levels were drawn down to about the same level as they had been before the flood. The U.S. Bureau of Reclamation (1967) reported that 54,140 acre-feet of water infiltrated to the ground-water reservoir within the boundaries of the Wellton-Mohawk Irrigation and Drainage District from the releases from Painted Rock Dam. The amount of land in the district having depths to water of less than 8 feet increased more than 300 percent. The

U.S. Bureau of Reclamation (1967) also reported a total deposition of 47,150 tons of salts in the district.

STREAMFLOW DATA AT GAGING STATIONS AND MISCELLANEOUS MEASURING SITES

DETERMINATION OF FLOOD DISCHARGES

The operation of a stream-gaging station consists principally of the measurement of stage and discharge and the definition of the stage-discharge relation from which discharge can be calculated for a given stage. The development of a stage-discharge relation is based on current-meter measurements throughout the range of stage experienced or through a sufficient part of the range so that the discharge corresponding to the maximum stage can be obtained by a reasonable extension of the stage-discharge relation or rating curve. A short extension of a rating curve is usually made by logarithmic plotting or by the use of hydraulic principles. A long extension of a rating curve is based on indirect discharge measurements in which discharge is computed from channel geometry and high-water profiles. Techniques for making indirect measurements are given by Benson and Dalrymple (1967), Dalrymple and Benson (1967), Hulsing (1967), Matthai (1967), and Bodhaine (1968). Indirect measurements also were made at miscellaneous sites where peak-discharge data were desired.

SUMMARY OF FLOOD STAGES AND DISCHARGES

Maximum stages and discharges at continuous-recording stations, crest-stage stations, and miscellaneous sites are summarized in table 9. The reference numbers in the table correspond to those on plate 1.

The derivation of the maxima data is explained in the station descriptions for each site. The peak discharges in table 9 are those actually determined; that is, no adjustments for storage, regulation, or diversion have been made.

Explanation of data in the 12 columns in table 9 follows:

Number.—The number by which each station is identified on plate 1. The numerical order follows the Geological Survey's standard downstream order of listing stations. Sites 108 and 131 are not plotted on plate 1; each is a system of reservoirs that cannot be plotted at any one place.

Permanent station number.—The number used in the Geological Survey's water-supply papers of surface-water supply in the United States and the annual reports of surface-water records of New Mexico and Arizona. Blank spaces in the column indicate a measurement at a miscellaneous site without a number. The number for each station in-

cludes the part number, which locates the station in one of the Geological Survey's 14 major geographical divisions of principal river basins; all stations in this report are in Part 9, Colorado River basin. The station number is completed by a 4- to 6-digit number that is unique for each station.

Stream and place of determination.—The permanent name adopted for the site to which the listed data apply; each name is unique.

Drainage area.—The gross drainage area, in square miles, upstream from the station as determined from topographic maps.

The last eight columns in the table give data for the maximum known floods prior to November 1965 and for the maximum peaks of November 1965 to January 1966.

Period.—The period of known floods prior to November 1965. This period does not necessarily correspond to that in which continuous records of discharge were obtained, but for many records it extends back to an earlier date. In some instances it may start at a later date if early records are inadequate for determination of maximum discharge. For stations where part of the record represents natural flow and the remainder represents regulated flow and for the stations where it is desirable to show both the peak discharge during the period of record and one or more historical peaks, two or more concurrent periods have been used.

Year.—The calendar year in which the maximum stage or discharge during the period of known floods occurred.

Gage height and discharge.—Data in each pair of columns are associated with the year or date in the preceding column.

Date.—The date of peak discharge during the floods of November 1965 to January 1966.

Recurrence interval.—The average time interval in which a flood of a given discharge would be equaled or exceeded. The recurrence interval does not indicate the length of time between such floods; there may be decades between 10-year floods, and several 10-year floods may occur in a short period of time. The probability of a peak of a given magnitude occurring in any given year is equal to the reciprocal of the recurrence interval. Therefore, the probability of a 10-year flood occurring in any one year is 0.1. Expressed as a percentage, there is a 10 percent chance of such a peak occurring in any given year. Recurrence intervals were computed from the flood-frequency curves developed by Patterson and Somers (1966), unpublished regional studies by the author, or the frequency curves for individual stations. Recurrence intervals generally have not been computed for regulated peaks or for short-term stations in areas for which flood-frequency relations have not been defined.

EXPLANATION OF STATION DATA

The data in this section of the report consist of descriptions of the stream-gaging stations or other measuring sites, daily and monthly discharges at gaging stations for November 1965 to January 1966, and stages and discharges at indicated times for selected gaging stations. The station description gives information relative to location, size of drainage basin, nature of the gage-height record obtained during the period covered by this report, datum or altitude of gage, definition of the stage-discharge relation, maximum stage and discharge during the floods of November 1965 to January 1966 and the previous maximum, effect of regulation and diversion, and other pertinent general information.

Historical data from Senate Document 436 (Olmstead, 1919) are given for several stations in the Gila River basin above Coolidge Dam. Little is known about the accuracy of the data, but Olmstead (1919, p. 39) stated:

> Of necessity the field work was carried out under considerable pressure, but the results obtained, it is believed, are sufficiently accurate to be used with full confidence in the general study of the hydrography of the Gila River mountain watershed.
>
> * * * The record of flood flows has been secured by careful observation [of] the height of drift and high-water marks of all kinds in many places. The parallel measurements of present flow and of crest the two weeks preceding give somewhat of a truthful account of the condition of the various minor drainage areas. * * * The undertaking has been accomplished in the only available or practical way possible, and while some of the flood discharges may be 20 percent off, they are generally consistent and sufficiently close for the purposes for which the data have been used.

The table of stages and discharges at indicated times contains sufficient data for the construction of hydrographs. The time period included starts prior to the beginning of the major rise and ends at an arbitrary cutoff point on the recession; therefore, the time period is not the same for all stations. Beyond the cutoff point on the recession, daily discharges will give adequate definitions for a hydrograph. More detailed information may be obtained from the Arizona district office of the U.S. Geological Survey in Tucson.

The stages and associated discharges should not be used in the preparation of a stage-discharge relation because, for many stations, the relation used to compute the discharge was shifted from the basic rating.

For many stations, the figures of daily mean discharge differ slightly from those that would be obtained from the tables of discharge at indicated times in this report because the daily discharges were computed from additional data or were computed from mean discharges

for different increments of time. Unless otherwise noted, the daily mean discharges are those published in the annual streamflow reports of the U.S. Geological Survey (1967a, 1967b).

Records for several stations in the Gila River basin are not included in this report because (1) at many of the stations no flow was recorded during the period, and (2) at other stations the peak did not contribute to flooding in the Gila River and its tributaries either because of the small magnitude of the flow or because of the time when the peak occurred. Records for stations not included in this report are in the annual streamflow reports (U.S. Geological Survey, 1967a, 1967b).

The stations are numbered and arranged in downstream order from headwaters to mouth; stations on tributaries are inserted in corresponding order following the order in which the tributaries enter the main stream. The number preceding the permanent station number is the same as that used on plate 1 and will aid in identifying the site.

Table 9.--Summary of flood stages and discharges

No.	Permanent station number	Stream and place of determination	Drainage area (sq mi)	Maximum previously known				Maximum November 1965 to January 1966			
				Period	Year	Gage height (feet)	Discharge (cfs)	Date	Gage height (feet)	Discharge	
										Cfs	Recurrence interval (years)
		Little Colorado River basin									
1	9-3880	Little Colorado River near Hunt, Ariz.	6,280	1929-33,	1929	-	8,000	Dec. 10	8.04	83	1
				1940-65	1955	17.3	-				
2	9-3905	Show Low Creek near Lakeside, Ariz	68.6	1953-65	1965	6.28	2,430	Dec. 30	7.42	3,880	11
3	9-3920	Show Low Creek below Jaques Dam, near Show Low, Ariz.	73.0	1941-65	1952	a9.9	6,250	Dec. 31	(b)	1,100	-
				1953-65	1965	(b)	500				
4	9-3928	Long Lake tributary near Show Low, Ariz	5.67	1964-65	1965	3.83	231	Dec. 30	4.27	298	(b)
5	9-3935	Silver Creek near Snowflake, Ariz	886	1929-65	1940	a12.37	11,000	Dec. 30	14.29	6,800	12
6	9-3945	Little Colorado River at Woodruff, Ariz	c8,100	1916-19,	1916	a12.7	(b)	Dec. 30	18.50	5,320	2
				1929-65	1919	a12.0	25,000				
7	9-3952	Decker Wash near Snowflake, Ariz.	16.8	1963-65	1965	6.82	135	Dec. 30	8.25	1,170	45
8	9-3970	Little Colorado River at Holbrook, Ariz.	c11,300	1905-09,	1957	10.96	d21,800	Dec. 30	10.71	9,320	3
				1949-65							
9	9-3975	Chevelon Creek below Wildcat Canyon, near Winslow, Ariz.	275	1947-65	1952	18.2	19,800	Dec. 30	12.70	9,560	12
10	9-3978	Brookbank Canyon near Heber, Ariz	27.6	1964-65	1964	7.49	666	Dec. 30	5.90	310	2
11	9-3980	Chevelon Creek near Winslow, Ariz.	1,010	1915-19,	1952	19.8	25,300	Dec. 31	18.52	13,300	12
				1929-65							
12	9-3985	Clear Creek below Willow Creek, near Winslow, Ariz	321	1947-65	1952	21.5	16,400	Dec. 30	19.10	13,100	16
13	9-3990	Clear Creek near Winslow, Ariz.	607	1929-65	1929	18.1	50,000	Dec. 30	13.41	18,500	14
14	9-4009.1	Fay Canyon near Flagstaff, Ariz.	c3.32	1964-65	1965	1.98	9	Dec. 30	3.09	87	(b)
15	9-4020	Little Colorado River near Cameron, Ariz.	c26,500	1947-65	1952	20.7	24,900	Jan. 3	12.1	9,100	2
		Havasu Creek basin									
16	9-4039.3	West Cataract Creek near Williams, Ariz	3.18	1964-65	1965	6.68	99	Nov. 25	7.13	122	(b)
17	9-4040.2	Dogtown Wash above Kaibab Reservoir, near Williams, Ariz.	c15.4	1964-65	1965	2.25	169	Nov. 25	2.7	330	-
18	9-4040.4	Cataract Creek near Williams, Ariz	c46.4	-	-	-	-	Nov. 25	4.87	2,270	-
		Gila River basin									
19	9-4299	Snow Creek near Mogollon, N. Mex.	89.6	1958-65	1964	11.44	608	Dec. 23	10.87	500	3
20	9-4301.5	Sapillo Creek below Lake Roberts, near Silver City, N. Mex.	c78	1964-65	1965	5.58	1,210	Dec. 22	5.40	970	-
21	9-4305	Gila River near Gila, N. Mex	1,864	1929-65	1941	17.2	25,400	Dec. 23	3.77	6,240	9
22	9-4309	Duck Creek at Cliff, N. Mex	228	1957-65	1963	10.30	6,300	Dec. 23	5.87	2,970	6
23	9-4310	Gila River near Cliff, N. Mex.	2,438	1892-1965	1941	14.0	-	Dec. 23	12.18	13,500	8
				1942-65	1949	12.6	17,200				
24	9-4315	Gila River near Redrock, N. Mex.	2,829	1892-1965	1941	31.0	40,000	Dec. 23	18.5	16,800	15
25	9-4320	Gila River below Blue Creek, near Virden, N. Mex.	3,203	1892-1965	1941	25.78	41,700	Dec. 23	17.3	10,900	6
26	9-4420	Gila River near Clifton, Ariz.	4,010	1892-1965	1941	20.12	28,200	Dec. 24	14.82	10,700	5
27	9-4426.8	San Francisco River near Reserve, N. Mex.	350	1959-65	1965	3.9	1,160	Dec. 30	2.40	520	1

28	9-4427.4	Tularosa River near Reserve, N. Mex	426	1956-65	1956	-	2,280	Dec. 23	4.35	465	1
29	9-4430	San Francisco River near Alma, N. Mex	1,546	1904-14, 1964-65	1905	a14.0	25,000	Dec. 30	7.45	7,500	14
30	9-4440	San Francisco River near Glenwood, N. Mex.	1,653	1927-65	1949	10.74	7,800	Dec. 30	11.00	8,200	17
31	-	Blue River near Clifton, Ariz	505	-	-	-	-	Dec. 23 or 30	-	9,380	19
32	9-4444	Chase Creek near Clifton, Ariz.	1.37	1963-65	1964	13.9	600	Dec. 22	5.64	29	(b)
33	9-4445	San Francisco River at Clifton, Ariz	2,766	1880-1965 1927-65	1906 1949	- 10.9	143,450 24,100	Dec. 23	11.00	30,500	12
34	9-4455	Willow Creek near Point of Pines, near Morenci, Ariz.	102	1944-65	1952	10.1	2,590	Dec. 30	11.7	3,710	e1.2
35	9-4460	Willow Creek near Double Circle Ranch, near Morenci, Ariz.	149	1944-65	1965	9.47	4,880	Dec. 30	9.00	7,500	e1.7
36	9-4465	Eagle Creek near Double Circle Ranch, near Morenci, Ariz.	377	1944-65	1958	8.7	7,270	Dec. 30	9.20	13,600	e1.4
37	9-4470	Eagle Creek above pumping plant, near Morenci, Ariz.	613	1917-65	1932	-	13,000	Dec. 31	12.8	21,000	e1.4
38	-	Bonita Creek near Solomon, Ariz	310	-	-	-	-	Dec. 30	-	6,200	15
39	9-4485	Gila River at head of Safford Valley, near Solomon, Ariz.	7,896	1914-65	1916	a14.0	100,000	Dec. 22	13.7	43,000	15
40	9-4570	San Simon River near Solomon, Ariz	2,192	1885-1965	1931	19.0	27,500	Dec. 22	5.08	428	1
41	9-4585	Gila River at Safford, Ariz.	10,459	1940-65	1941	-	33,000	Dec. 23	14.2	42,000	15
42	9-4665	Gila River at Calva, Ariz	11,470	1906-65 1929-65	1916 1941	- a11.82	100,000 27,900	Dec. 24	15.5	39,000	15
43	9-4671.2	Salt Creek near Peridot, Ariz	34.2	1964-65	1964	13.11	604	Dec. 22	15.71	1,270	2
44	9-4685	San Carlos River near Peridot, Ariz	1,027	1929-65	1941	a11.4	40,600	Dec. 22	14.8	36,300	17
45	9-4690	San Carlos Reservoir at Coolidge Dam, Ariz.	12,886	1928-65	1942	2,501.62	f819,200	Jan. 31	2,465.00	f374,300	-
46	9-4695	Gila River below Coolidge Dam, Ariz	c12,886	1914-65	1916	-	130,000	Dec. 22	.18	5	-
47	9-4700	Gila River at Winkelman, Ariz	c13,268	1917-18, 1928-65	1944	a18.40	55,000	Dec. 22	8.80	6,200	g3
48	9-4705	San Pedro River at Palominas, Ariz	741	1927-65	1940	16.16	22,000	Dec. 23	5.05	798	1
49	9-4710	San Pedro River at Charleston, Ariz	1,219	1904-65	1926	a21.9	98,000	Dec. 23	4.47	690	1
50	9-4720	San Pedro River near Redington, Ariz.	2,939	1943-65	1951	20.2	28,600	Dec. 22	13.45	5,020	1
51	9-4730	Aravaipa Creek near Mammoth, Ariz	538	1919-21, 1931-42, 1965	1919	a6.3	20,000	Dec. 22	(b)	6,340	3
52	9-4734	San Pedro River near Winkelman, Ariz.	4,449	1962-65	1964	7.7	6,460	Dec. 22	(b)	16,800	10
53	9-4736	Tam O'Shanter Wash near Hayden, Ariz	4.37	1963-65	1965	9.18	412	Dec. 22	7.45	145	1
54	9-4740	Gila River at Kelvin, Ariz	c18,011	1911-65 1928-65	1916 1930	a19.5 a12.6	132,000 42,800	Dec. 23	18.5	26,300	h9
55	9-4795	Gila River near Laveen, Ariz	c20,615	1940-65	1941	9.33	11,900	Dec. 26	10.08	10,900	h9
56	9-4800	Santa Cruz River near Lochiel, Ariz	82.2	1949-65	1965	8.90	4,810	Dec. 22	2.56	97	1
57	9-4805	Santa Cruz River near Nogales, Ariz.	533	1930-65	1935	12.3	12,000	Dec. 23	8.84	3,840	3
58	9-4815	Sonoita Creek near Patagonia, Ariz	209	1930-65	1946	13.0	14,000	Dec. 22	8.39	2,240	1
59	9-4820	Santa Cruz River at Continental, Ariz	1,662	1940-65	1955	11.34	17,500	Dec. 23	9.34	5,990	3
60	9-4825	Santa Cruz River at Tucson, Ariz.	2,222	1905-65	1961	21.30	16,600	Dec. 23	11.82	4,830	2
61	9-4830	Tucson Arroyo at Vine Avenue, Tucson, Ariz	8.2	1944-65	1961	10.35	5,000	Dec. 22	5.76	517	1
62	9-4831	Tanque Verde Creek near Tucson, Ariz	43.0	1959-65	1964	4.86	2,630	Dec. 22	4.93	2,760	8
63	9-4832	Agua Caliente Wash tributary near Tucson, Ariz	2.18	-	-	-	-	Dec. 22	4.30	40	1

See footnotes at end of table.

Table 9. --Summary of flood stages and discharges—Continued

No.	Permanent station number	Stream and place of determination	Drainage area (sq mi)	Maximum previously known				Maximum November 1965 to January 1966			
				Period	Year	Gage height (feet)	Discharge (cfs)	Date	Gage height (feet)	Discharge	
										Cfs	Recurrence interval (years)
		Gila River basin—Continued									
64	9-4840	Sabino Creek near Tucson, Ariz	35.5	1904-12, 1932-65	1954	8.43	5,100	Dec. 22	8.00	3,920	11
65	9-4842	Bear Creek near Tucson, Ariz	16.3	1959-65	1960	2.30	575	Dec. 22	4.90	1,150	1
66	9-4845	Tanque Verde Creek at Tucson, Ariz.	221	1940-45, 1965	1940	a7.85	9,000	Dec. 22	7.89	12,200	27
67	9-4845.1	Ventana Canyon Wash near Tucson, Ariz	6.46	-	-	-	-	Dec. 22	11.34	260	1
68	9-4846	Pantano Wash near Vail, Ariz	457	1958-65	1958	24.0	38,000	Dec. 22	3.52	1,120	1
69	9-4850	Rincon Creek near Tucson, Ariz.	44.8	1952-65	1955	9.90	8,250	Dec. 22	7.25	3,100	4
70	9-4855	Pantano Wash at Tucson, Ariz.	602	1940-41, 1958-65	1958	7.5	20,000	Dec. 22	1.7	2,460	2
71	9-4859	Pima Wash near Tucson, Ariz.	4.93	1964-65	1964	11.12	195	Dec. 22	9.93	125	1
72	9-4859.5	Geronimo Wash near Tucson, Ariz.	2.08	1964-65	1964	11.9	445	Dec. 22	5.04	65	1
73	9-4860	Rillito Creek near Tucson, Ariz	918	1908-65	1929	a24.0	24,000	Dec. 22	10.36	12,400	16
74	9-4863	Canada del Oro near Tucson, Ariz	250	-	-	-	-	Dec. 23	4.53	2,290	2
75	9-4865	Santa Cruz River at Cortaro, Ariz	3,503	1936-65	1940	a9.9	17,000	Dec. 22	8.60	16,800	9
76	9-4866	Arivaca Creek near Arivaca, Ariz	c78.4	-	-	-	-	Dec. 24	13.3	i15,900	-
77	9-4872.5	Los Robles Wash near Marana, Ariz	1,170	1962-65	1962	(b)	32,000	Dec. 24	7.0	2,040	(b)
78	9-4890	Santa Cruz River near Laveen, Ariz	8,581	1940-65	1962	17.50	9,200	Dec. 26	15.50	2,940	5
79	9-4890.7	North Fork of East Fork Black River near Alpine, Ariz.	38.1	1965	1965	2.47	126	Nov. 25	2.12	76	1
80	9-4890.8	Hannagan Creek near Hannagan Meadow, Ariz.	1.61	1964-65	1965	4.79	20	(b)	(b)	< 20	(b)
81	9-4891	Black River near Maverick, Ariz.	315	1962-65	1965	4.20	2,010	Dec. 30	3.55	1,290	2
82	9-4892	Pachete Creek at Maverick, Ariz.	14.8	1957-65	1958	4.33	312	Dec. 31	3.36	78	2
83	9-4895	Black River below pumping plant, near Point of Pines, Ariz.	560	1953-65	1954	9.35	5,000	Dec. 30	10.86	6,380	10
84	9-4897	Big Bonita Creek near Fort Apache, Ariz.	119	1957-65	1959	6.20	1,200	Dec. 30	6.25	1,640	10
85	9-4905	Black River near Fort Apache, Ariz	1,232	1912-18, 1957-65	1916	(b)	(j)	Dec. 30	20.05	24,800	14
86	9-4908	North Fork White River near Greer, Ariz	39	1965	1965	1.18	125	Nov. 25	2.94	191	1
87	9-4910	North Fork White River near McNary, Ariz.	66	1945-65	1946	5.36	1,290	Dec. 30	2.77	250	1
88	9-4918	North Fork White River tributary near White River, Ariz.	2.7	1964-65	-	-	No flow	Dec. 22	5.40	24	2
89	9-4924	East Fork White River near Fort Apache, Ariz.	38.9	1957-65	1961	4.82	563	Dec. 30	2.41	194	2
90	9-4940	White River near Fort Apache, Ariz	632	1917-18, 1957-65	1959	9.2	4,900	Dec. 30	8.71	4,360	4
91	9-4943	Carrizo Creek above Corduroy Creek, near Show Low, Ariz.	225	1953-65	1960	6.95	3,260	Dec. 30	9.85	10,000	e1.1
92	9-4960	Corduroy Creek near mouth, near Show Low, Ariz	203	1951-65	1952	11.1	10,900	Dec. 30	11.75	10,900	e1.2
93	9-4965	Carrizo Creek near Show Low, Ariz	459	1951-65	1952	12.08	20,500	Dec. 30	13.0	23,000	e1.2

94	9-4967	Cibecue No. 2, tributary to Carrizo Creek, near Show Low, Ariz.	0.065	1958-65	1963	(b)	120	Dec. 22	1.67	3	1
95	9-4968	Carrizo Creek tributary near Show Low, Ariz.	c4.63	1963-65	1964	20.94	1,260	(b)	(b)	< 80	1
96	9-4975	Salt River near Chrysotile, Ariz.	2,849	1906-65	1916	18	74,000	Dec. 30	14.32	41,100	9
97	9-4978	Cibecue Creek near Chrysotile, Ariz.	295	1959-65	1964	10.04	8,480	Dec. 30	10.70	8,800	5
98	9-4979	Cherry Creek near Young, Ariz	62.1	1963-65	1965	6.48	3,280	Dec. 22	6.61	3,400	4
99	9-4979.8	Cherry Creek near Globe, Ariz.	200	-	-	-	-	Dec. 22	12.3	6,620	5
100	9-4985	Salt River near Roosevelt, Ariz	4,306	1906-65	1941	24.4	117,000	Dec. 23	25.8	68,800	14
101	9-4988	Tonto Creek near Gisela, Ariz	430	1964-65	1965	11.7	12,600	Dec. 22	19.0	30,000	50
102	-	Houston Creek at mouth, near Gisela, Ariz.	56.2	-	-	-	-	Dec. 22	-	4,530	7
103	9-4988.7	Rye Creek near Gisela, Ariz.	122	-	-	-	-	Dec. 22	8.0	8,130	10
104	9-4989	Gold Creek near Payson, Ariz.	6.52	1963-65	1963	7.75	1,370	Dec. 22	4.04	500	2
105	9-4990	Tonto Creek above Gun Creek, near Roosevelt, Ariz.	675	1940-65	1952	16.55	45,400	Dec. 22	16.7	44,700	50
106	9-5005	Salt River at Roosevelt, Ariz.	5,830	1888-1965	1891	-	150,000	Dec. 22	-	k88,000	15
107	9-5010	Reservoir system on Salt River at and below Roosevelt Dam, Ariz.	6,211	1910-65	1941	-	f1,764,000	Dec. 31	-	f1,684,000	-
108	9-5013	Tortilla Creek at Tortilla Flat, Ariz	24.3	-	-	-	-	Dec. 22	8.0	2,240	6
109	9-5020	Salt River below Stewart Mountain Dam, Ariz.	c6,232	1910-65	1916	-	m50,000	Jan. 1	22.4	51,600	-
110	9-5027	Crookton Wash near Seligman, Ariz.	6	1963-65	1964	2.40	168	(b)	(b)	< 1	(b)
111	9-5028	Williamson Valley Wash near Paulden, Ariz	255	-	-	-	-	Dec. 30	6.38	3,630	2
112	9-5030	Granite Creek near Prescott, Ariz.	39	1932-47, 1963	1963	12.5	6,660	Dec. 10 or 30	8.0	1,500	2
113	9-5037	Verde River near Paulden, Ariz.	c2,530	1963-65	1964	5.44	1,270	Dec. 30	8.48	6,130	1
114	9-5037.2	Hell Canyon near Williams, Ariz	14.9	-	-	-	-	Dec. 30	4.78	1,080	(b)
115	9-5038	Volunteer Wash near Bellemont, Ariz	142	-	-	-	-	Dec. 30	4.55	578	(b)
116	9-5040	Verde River near Clarkdale, Ariz	c3,520	1915-21, 1965	1920	a19.1	50,600	Dec. 10	12.30	12,900	1
117	9-5041	Hull Canyon near Jerome, Ariz.	.91	1963-65	1964	7.23	25	(b)	6.33	3	(b)
118	9-5044	Munds Canyon tributary near Sedona, Ariz.	1.6	1963-65	1965	6.91	222	Nov. 25	6.91	222	8
119	9-5045	Oak Creek near Cornville, Ariz	357	1885-1965	1938	23	(b)	Nov. 25	15.18	17,600	30
				1939-65	1951	14.5	17,200				
120	9-5052	Wet Beaver Creek near Rimrock, Ariz.	95.2	1961-65	1965	11.58	6,100	Nov. 25	11.62	6,150	12
121	9-5052.5	Red Tank Draw near Rimrock, Ariz.	49.4	1957-65	1964	7.55	1,970	Nov. 25	7.62	2,010	3
122	9-5053	Rattlesnake Canyon near Rimrock, Ariz	24.6	1957-65	1965	8.50	1,430	Dec. 30	9.20	1,880	7
123	9-5053.5	Dry Beaver Creek near Rimrock, Ariz.	139	1960-65	1965	9.07	7,970	Nov. 23	9.69	9,670	17
124	9-5056	Dirty Neck Canyon near Clints Well, Ariz	1.5	1964-65	1965	4.83	85	Dec. 30	5.59	118	4
125	9-5058	West Clear Creek near Camp Verde, Ariz.	240	1964-65	1965	8.3	6,510	Dec. 30	8.24	6,330	5
126	9-5065	Verde River at Childs, near Camp Verde, Ariz	c5,090	1911-17	1916	a23	(b)	Dec. 30	9.5	27,200	5
127	9-5076	East Verde River near Pine, Ariz	6.65	1961-65	1963	3.05	264	Dec. 30	3.67	960	16
128	9-5077	Webber Creek above West Fork Webber Creek, near Pine, Ariz.	4.92	1959-65	1961	3.13	399	Dec. 30	3.05	366	5
129	9-5079.8	East Verde River near Childs, Ariz.	317	1961-65	1963	16.0	11,400	Dec. 22	-	17,000	25
130	9-5085	Verde River below Tangle Creek, above Horseshoe Dam, Ariz.	c5,872	1888-1965	1891	-	(n)	Dec. 22	16.43	39,300	7
				1892-1965	1938	19.0	100,000				
131	9-5095	Reservoir system on Verde River at and below Horseshoe Dam, Ariz.	6,185	1939-65	1965	-	f313,200	Dec. 30	-	f315,200	-

See footnotes at end of table.

Table 9. --Summary of flood stages and discharges—Continued

No.	Permanent station number	Stream and place of determination	Drainage area (sq mi)	Maximum previously known				Maximum November 1965 to January 1966			
				Period	Year	Gage height (feet)	Discharge (cfs)	Date	Gage height (feet)	Discharge	
										Cfs	Recurrence interval (years)
		Gila River basin—Continued									
132	9-5100	Verde River below Bartlett Dam, Ariz	c 6,185	1888-1965	1891	-	(n)	Dec. 30	a 16.95	35,600	-
				1939-65	1941	a 17.5	45,800				
133	9-5100.7	West Fork Sycamore Creek above McFarland Canyon, near Sunflower, Ariz.	4.58	-	-	-	-	Dec. 22	4.45	430	(b)
134	9-5100.8	West Fork Sycamore Creek near Sunflower, Ariz	9.80	1961-65	1963	3.29	116	Dec. 22	6.75	698	(b)
135	9-5101	East Fork Sycamore Creek near Sunflower, Ariz	4.49	1961-65	1963	a 2.84	30	Dec. 22	5.07	330	5
136	9-5101.5	Sycamore Creek near Sunflower, Ariz	53.4	1961-65	1963	5.7	1,120	Dec. 22	7.90	4,800	20
137	9-5101.7	Camp Creek near Sunflower, Ariz	2.6	1963-65	1963	4.96	391	Dec. 22	2.90	167	3
138	9-5101.8	Rock Creek near Sunflower, Ariz	15	1963-65	1963	5.40	916	Dec. 22	6.80	1,900	20
139	9-5102	Sycamore Creek near Fort McDowell, Ariz	165	1959-65	1959	15.0	15,800	Dec. 22	12.1	11,200	20
140	9-5113	Verde River near Scottsdale, Ariz	c 6,600	1961-65	1965	9.73	8,770	Dec. 31	12.75	31,300	-
141	9-5115	Salt River below Granite Reef Dam, Ariz	c 12,900	1888-1965	1891	-	300,000	Dec. 31	-	67,000	-
				1939-65	1941	-	45,000				
142	-	Salt River at Jointhead Dam, Phoenix, Ariz	c 13,500	1888-1965	1891	-	300,000	Dec. 31	10.3	66,000	-
143	9-5123	Cave Creek near Cave Creek, Ariz	121	1958-65	1959	8.47	8,570	Dec. 22	6.90	6,000	12
144	9-5125	Agua Fria River near Mayer, Ariz	588	1940-65	1941	11.97	13,000	Dec. 10	11.65	12,100	7
145	9-5137.8	New River near Rock Springs, Ariz	67.3	1962-65	1964	6.3	4,900	Dec. 22	5.80	4,020	12
146	9-5138	New River at New River, Ariz	85.7	1960-65	1963	7.33	4,620	Dec. 22	7.50	4,180	10
147	9-5138.2	Deadman Wash near New River, Ariz	11.1	1959-65	1959	7.0	1,850	Dec. 22	3.41	200	3
148	9-5138.35	New River at Bell Road near Peoria, Ariz	187	1963, 1965	1963	-	1,550	Dec. 22	5.5	4,060	6
149	9-5138.6	Skunk Creek near Phoenix, Ariz	64.6	1959-65	1964	4.49	11,500	Dec. 22	1.22	280	1
150	9-5139.7	Agua Fria River at Avondale, Ariz	c 2,013	1959-65	1959	11.0	4,700	Dec. 23	8.89	800	-
151	9-5155	Hassayampa River at Box damsite, near Wickenburg, Ariz.	417	1938-65	1951	18.3	27,000	Dec. 10	10.36	5,560	3
152	9-5170	Hassayampa River near Arlington, Ariz	1,470	1961-65	1964	6.05	o 6,500	Dec. 10	4.35	o 1,600	(b)
153	9-5195	Gila River below Gillespie Dam, Ariz	c 49,650	1888-1965	1891	-	250,000	Jan. 2	16.1	64,200	h 30
154	9-5198	Gila River below Painted Rock Dam, Ariz	c 50,910	1959-65	1960	3.26	240	Jan. 3	8.70	2,850	-
155	-	Gila River at Avenue 51E near Mohawk, Ariz	(b)	-	-	-	-	(p)	(b)	m 1,208	-
156	9-5205	Gila River near Dome, Ariz	c 57,850	1903-65	1916	-	m200,000	(p)	8.35	618	-
				1929-65	1932	16.75	20,700				

a At site and (or) datum then in use.
b Not determined.
c Includes some noncontributing area, or discharge is materially affected by storage or regulation in reservoirs above station.
d Maximum recorded.
e Ratio of peak discharge to 50-year flood.
f Contents, in acre-feet.
g Based on contributing area.
h Based on regulated conditions.
i Result of dam failure.
j Not determined; known to have exceeded 18,000 cfs, the maximum recorded in 1914.
k Inflow to Roosevelt Lake; computed by flood-routing procedures.
m Maximum daily mean discharge, in cubic feet per second.
n Probably exceeded 150,000 cfs.
o Stage-discharge relation is indefinite; discharges are approximate.
p Flow did not reach station until February; maximum flow occurred Mar. 24-26.

STATION DATA

LITTLE COLORADO RIVER BASIN

(1) 9-3880. Little Colorado River near Hunt, Ariz.

Location. --Lat 34°39', long 109°42', in NE¼NW¼ sec. 4, T. 14 N., R. 25 E., near left bank at U. S. Highway 180, 2 miles downstream from Zuni River, and 5 miles northwest of Hunt.

Drainage area. --6,280 sq mi, approximately (about 2,100 sq mi, including 790 sq mi above Lyman Reservoir on Little Colorado River and 1,320 sq mi above Hubbel Lake and Blanes Lake in Carrizo Creek basin, is noncontributing, except during years of high runoff).

Gage-height record. --Water-stage recorder graph except Dec. 20-22, Jan. 3-19, 22-31 when float was frozen. Datum of gage is 5,371.59 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements. Backwater from ice Nov. 28-30, Dec. 19, 23-29, Jan. 20-21. Discharge during periods of no record and backwater estimated on basis of records for nearby stations.

Maxima. --November 1965 to January 1966: Discharge, 83 cfs 0730 hours Dec. 10 (gage height, 8.04 ft).

1929-33, 1940 to October 1965: Discharge, 8,000 cfs July 28, 1929 (gage height, 16.8 ft); gage height, 17.3 ft Aug. 8, 1955.

Remarks. --Considerable regulation by many reservoirs (combined capacity about 59,000 acre-ft). Minor peaks may be affected by storage in Zion Reservoir (capacity, 760 acre-ft in 1952) located on Little Colorado River 19 miles upstream from gaging station.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1....	3.2	7.9	7.9	16....	4.5	9.6	6.0
2....	3.2	7.6	10	17....	4.8	8.7	6.0
3....	4.5	6.8	10	18....	5.2	9.0	6.0
4....	5.2	6.8	10	19....	6.0	11	6.0
5....	5.0	6.8	9.0	20....	6.2	10	6.5
6....	5.2	6.8	9.0	21....	6.2	10	6.0
7....	5.2	6.8	9.0	22....	6.5	10	5.0
8....	4.8	6.8	9.0	23....	7.9	10	5.0
9....	4.1	7.6	8.0	24....	9.0	7.9	5.0
10....	3.4	35	8.0	25....	8.7	7.5	6.0
11....	3.0	26	8.0	26....	11	8.0	6.0
12....	3.9	11	8.0	27....	9.0	8.0	6.0
13....	4.1	9.0	7.0	28....	7.0	7.9	6.0
14....	4.3	10	7.0	29....	7.0	8.7	7.0
15....	4.8	9.5	7.0	30....	4.1	8.4	7.0
				31....	------	7.9	7.0
Monthly mean discharge, in cubic feet per second..					5.57	9.90	7.21
Runoff, in acre-feet					331	609	443

(2) 9-3905. Show Low Creek near Lakeside, Ariz.

Location. --Lat 34°10'50", long 109°59'10", in NW¼ sec. 14, T. 9 N., R. 22 E., 1 mile upstream from pumping plant on Show Low Lake, 1¾ miles northwest of Lakeside, 2¼ miles upstream from Jaques Dam, and 5¾ miles southeast of Show Low.

Drainage area. --68.6 sq mi.

Gage-height record. --Water-stage recorder graph, except Dec. 25-29. Altitude of gage is 6,610 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Slight backwater from ice Jan. 27-29. Discharge during period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 3,880 cfs 1530 hours Dec. 30 (gage height, 7.42 ft).
1953 to October 1965: Discharge, 2,430 cfs Jan. 7, 1965 (gage height, 6.28 ft); gage height, 6.40 ft Mar. 23, 1954.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1....	3.5	1.1	198	16....	0.4	8.6	3.3
2....	3.5	1.0	88	17....	.6	7.9	4.0
3....	3.5	.8	53	18....	.6	7.4	4.8
4....	3.6	.8	42	19....	.7	6.1	4.9
5....	3.7	.7	35	20....	.7	5.6	6.1
6....	4.0	.6	28	21....	.6	5	6.6
7....	3.7	.7	26	22....	.7	79	6.3
8....	3.6	.6	25	23....	1.0	134	7.0
9....	3.6	1.2	24	24....	1.2	50	7.2
10....	3.6	96	24	25....	3.0	25	7.2
11....	7.2	50	18	26....	7.5	20	6.8
12....	4.6	19	7.2	27....	3.4	20	3
13....	1.7	14	5.3	28....	1.8	20	2
14....	.7	11	4.0	29....	1.2	56	3
15....	.4	11	3.6	30....	1.1	2,140	11
				31....	------	744	13
Monthly mean discharge, in cubic feet per second..					2.51	114	21.8
Runoff, in acre-feet					150	7,020	1,340

(3) 9-3920. Show Low Creek below Jaques Dam, near Show Low, Ariz.

Location. --Lat 34°11'40", long 110°00'15", in NW¼ sec. 10, T. 9 N., R. 22 E., on right bank just downstream from Jaques Dam, 3½ miles northwest of Lakeside, and 4½ miles southeast of Show Low.

Drainage area. --73.0 sq mi.

Gage-height record. --Water-stage recorder graph supplemented by once-daily staff-gage readings at Jaques Dam during periods of spill from Show Low Lake. Altitude of gage is 6,530 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Relation affected by backwater Dec. 30 to Jan. 31 during period of flow through spillway that enters a quarter of a mile downstream from gage; discharge during this period computed from head on spillway and records of inflow to Show Low Lake.

Maxima. --November 1965 to January 1966: Discharge, 1,100 cfs 0300 hours Dec. 31.
1941 to October 1965: Discharge, 6,250 cfs Jan. 18, 1952 (gage height, 9.9 ft, at site 5 miles downstream at Show Low, at datum then in use).
1953 to October 1965: Discharge, 500 cfs Apr. 12, 1965.

Remarks. --Flow regulated by Show Low Lake since 1953.

Mean discharge, in cubic feet per second, 1965-66, of Show Low Creek below Jaques Dam, near Show Low, Ariz.

Day	November	December	January	Day	November	December	January
1	1.2	0.7	260	16	0.6	0.4	3.0
2	.9	.5	110	17	.6	.4	3.5
3	.7	.4	60	18	.6	.4	4
4	.7	.4	45	19	.6	.4	4.5
5	.6	.4	35	20	.7	.4	5.5
6	.6	.4	27	21	.7	.4	6
7	.6	.4	25	22	.7	.4	5.5
8	.6	.4	23	23	.7	.4	6.5
9	.6	.4	22	24	.7	.4	6
10	.6	.4	22	25	.7	.4	6
11	.6	.4	20	26	.7	.4	5.5
12	.6	.4	7	27	.7	.2	2
13	.6	.4	5	28	.7	0	1
14	.6	.4	3.5	29	.7	0	2
15	.6	.4	3.0	30	.7	15	9.5
				31	-------	740	12
Monthly mean discharge, in cubic feet per second					0.67	24.7	24.2
Runoff, in acre-feet					40	1,520	1,490

(4) 9-3928. Long Lake tributary near Show Low, Ariz.

(Crest-stage station)

Location. --Lat 34°15'40", long 109°59'45", in SE¼ sec. 15, T. 10 N., R. 22 E., at U.S. Highway 60, 1 mile east of Show Low.

Drainage area. --5.67 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 6,400 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 298 cfs Dec. 30 (gage height, 4.27 ft).
1964 to October 1965: Discharge, 231 cfs Jan. 7, 1965 (gage height, 3.83 ft).

(5) 9-3935. Silver Creek near Snowflake, Ariz.

Location. --Lat 34°40'00", long 110°02'30", in SW¼NW¼ sec. 29, T. 15 N., R. 22 E., on left bank 6 miles upstream from mouth, and 11 miles north of Snowflake.

Drainage area. --886 sq mi.

Gage-height record. --Water-stage recorder graph except Jan. 2-11. Datum of gage is 5,204.1 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 4,400 cfs and extended above on basis of peak discharge during flood of Jan. 19, 1952, at former station near Woodruff. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 6,800 cfs 1330 hours Dec. 30 (gage height, 14.29 ft).

1929 to October 1965: Discharge, 11,000 cfs July 26, 1940 (gage height, 12.37 ft, at site 9 miles downstream near Woodruff at datum then in use).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0.7	4.2	314	16	2.5	3.7	43
2	.7	4.6	200	17	2.4	2.9	42
3	1.0	3.3	80	18	2.2	2.9	43
4	1.1	3.1	50	19	2.7	2.9	44
5	1.2	4.6	50	20	2.5	2.4	42
6	.9	3.9	50	21	3.1	2.2	39
7	.8	2.5	50	22	3.3	2.4	31
8	.8	2.2	50	23	4.6	154	34
9	.9	2.4	50	24	3.7	135	41
10	.8	3.1	50	25	3.9	75	39
11	.7	167	50	26	3.5	59	38
12	1.4	47	48	27	4.2	49	23
13	2.9	26	46	28	3.9	39	23
14	3.1	14	45	29	3.5	39	22
15	2.9	8.9	44	30	4.4	2,820	23
				31	------	1,010	21
Monthly mean discharge, in cubic feet per second					2.34	151	55.6
Runoff, in acre-feet					139	9,310	3,420

(6) 9-3945. Little Colorado River at Woodruff, Ariz.

Location. --Lat 34°47', long 110°03', in NE¼SW¼ sec. 17, T. 16 N., R. 22 E., on left bank at county bridge in Woodruff, 3¾ miles downstream from Silver Creek.

Drainage area. --8,100 sq mi, approximately, of which about 2,100 sq mi is non-contributing except during years of high runoff.

Gage-height record. --Water-stage recorder graph except Dec. 10-14, 23-28, Jan. 1-12. Datum of gage is 5,130.3 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements. Stage-discharge relation affected by ice Jan. 24-27. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 5,320 cfs 1830 hours Dec. 30 (gage height, 18.50 ft).

1916-19, 1929 to October 1965: Discharge, 25,000 cfs Dec. 5, 1919 (gage height, 12.0 ft, at site 1½ miles downstream at different datum), from rating curve extended above 2,000 cfs.

Flood of Jan. 19, 1916, reached a stage of 12.7 ft at site 1½ miles downstream.

Remarks. --Considerable regulation by reservoirs above station (combined capacity about 73,000 acre-ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	5.1	11	350	16	5.5	21	53
2	4.6	11	150	17	5.5	16	53
3	5.1	11	100	18	5.5	17	55
4	5.5	11	80	19	5.1	14	59
5	5.5	10	80	20	5.1	9.9	55
6	6.8	10	80	21	5.5	10	48
7	6.8	10	70	22	5.5	13	43
8	6.8	9.9	70	23	6.0	82	44
9	6.8	9.9	70	24	6.4	150	40
10	6.8	127	60	25	7.7	100	35
11	6.4	150	60	26	9.2	70	37
12	5.5	50	61	27	12	60	30
13	5.1	40	53	28	14	50	33
14	5.1	34	52	29	14	49	31
15	5.5	25	52	30	11	1,980	32
				31	------	1,430	34
Monthly mean discharge, in cubic feet per second					6.85	148	66.8
Runoff, in acre-feet					407	9,110	4,110

(7) 9-3952. Decker Wash near Snowflake, Ariz.

(Crest-stage station)

Location. --Lat 34°27'40", long 110°24'15", in SW¼ sec. 2, T. 12 N., R. 18 E., at State Highway 277, 19 miles west of Snowflake.

Drainage area. --16.8 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 6,300 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 1,170 cfs Dec. 30 (gage height, 8.25 ft).
1963 to October 1965: Discharge, 135 cfs Jan. 7, 1965 (gage height, 6.82 ft).

(8) 9-3970. Little Colorado River at Holbrook, Ariz.

Location. --Lat 34°53'50", long 110°09'40", in SW¼SW¼ sec. 6, T. 17 N., R. 21 E., near right bank on downstream side of bridge on U.S. Highway 180 at Holbrook, 2½ miles downstream from Puerco River.

Drainage area. --11,300 sq mi, approximately.

Gage-height record. --Water-stage recorder graph except Nov. 25 to Dec. 10, Dec. 13-19, Dec. 31 to Jan. 11, Jan. 25-31. Datum of gage is 5,062.87 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements made in 1964. Shift adjustments during flood period based on current-meter measurements below 67 cfs. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 9,320 cfs 1200 hours Dec. 30 (gage height, 10.71 ft).
1905-9, 1949 to October 1965: Discharge, 21,800 cfs Aug. 5, 1957 (gage height, 10.96 ft).

Remarks. --Some regulation by reservoirs above station (combined capacity about 73,000 acre-ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	4.0	40	1,000	16	5.7	21	97
2	3.4	30	400	17	6.4	8.6	100
3	3.0	20	250	18	7.1	7.8	81
4	2.6	10	150	19	6.4	2.6	68
5	2.2	10	150	20	7.1	0	84
6	1.8	10	90	21	7.1	0	87
7	1.8	5	85	22	7.8	1,740	78
8	4	5	80	23	10	2,100	66
9	5	5	75	24	36	690	61
10	7.1	2,680	70	25	61	423	60
11	5.7	788	74	26	108	278	60
12	5.1	297	90	27	56	169	60
13	3.4	151	94	28	100	74	50
14	5.7	54	87	29	56	63	50
15	7.1	17	94	30	78	4,840	50
				31	------	1,860	40
Monthly mean discharge, in cubic feet per second					20.5	529	125
Runoff, in acre-feet					1,220	32,530	7,700

(9) 9-3975. Chevelon Creek below Wildcat Canyon, near Winslow, Ariz.

Location. --Lat 34°38', long 110°43', in SW¼ sec. 36, T. 15 N., R. 15 E., on right bank three-eighths of a mile downstream from Wildcat Canyon, and 25 miles south of Winslow.

Drainage area. --275 sq mi.

Gage-height record. --Water-stage recorder graph except 1200 hours Dec. 31 to Jan. 6. Gage height reconstructed 1200-2400 hours Dec. 31. Datum of gage is 5,905.16 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 6,300 cfs and extended above on basis of slope-area measurement at 18.2 ft. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 9,560 cfs 1500 hours Dec. 30 (gage height, 12.70 ft).
1947 to October 1965: Discharge, 19,800 cfs Jan. 18, 1952 (gage height, 18.2 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	84	500	16	0	87	29
2	0	77	200	17	0	86	29
3	0	72	150	18	0	76	28
4	0	72	120	19	0	66	23
5	0	72	100	20	0	59	20
6	0	71	90	21	0	65	18
7	0	70	84	22	0	77	14
8	0	70	76	23	0	81	14
9	0	72	75	24	0	84	11
10	0	202	70	25	589	84	11
11	0	206	68	26	351	81	12
12	0	237	35	27	168	80	18
13	0	201	24	28	121	77	31
14	0	143	22	29	96	77	30
15	0	114	26	30	86	4,280	30
				31	------	2,800	31
Monthly mean discharge, in cubic feet per second..					47.0	320	64.2
Runoff, in acre-feet					2,800	19,680	3,950

(10) 9-3978. Brookbank Canyon near Heber, Ariz.

(Crest-stage station)

Location. --Lat 34°28'20", long 110°38'50", in SE¼ sec. 33, T. 13 N., R. 16 E., at Heber-Winslow road, 4.0 miles northwest of Heber.

Drainage area. --27.6 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 6,600 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culverts.

Maxima. --November 1965 to January 1966: Discharge, 310 cfs Dec. 30 (gage height, 5.90 ft).
1964 to October 1965: Discharge, 666 cfs Aug. 1964 (gage height, 7.49 ft).

(11) 9-3980. Chevelon Creek near Winslow, Ariz.

Location. --Lat 34°56', long 110°31', in SE¼SW¼ sec. 27, T. 18 N., R. 17 E., on right bank 3 miles upstream from mouth, and 12 miles southeast of Winslow.

Drainage area. --1,010 sq mi, approximately, including some area which is probably noncontributing.

Gage-height record. --Water-stage recorder graph except Jan. 3-4. Datum of gage is 4,899.5 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 2,700 cfs and extended above on basis of slope-area measurement at 19.8 ft. Discharge for period of no gage-height record interpolated from adjoining record.

Maxima. --November 1965 to January 1966: Discharge, 13,300 cfs 0030 hours Dec. 31 (gage height, 18.52 ft).
1915-19, 1929 to October 1965: Discharge, 25,300 cfs Jan. 19, 1952 (gage height, 19.8 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	6.6	72	1,320	16	6.6	116	35
2	6.6	65	592	17	6.6	97	38
3	6.6	60	390	18	6.6	83	43
4	6.6	58	270	19	6.6	78	44
5	6.6	57	218	20	6.6	70	43
6	6.6	56	175	21	6.6	58	36
7	6.6	53	145	22	6.0	68	29
8	6.6	53	127	23	6.3	70	29
9	6.6	55	113	24	7.6	81	28
10	6.6	58	108	25	6.0	76	25
11	6.6	138	102	26	74	81	22
12	6.6	216	97	27	254	78	19
13	6.6	229	81	28	155	77	19
14	6.6	195	52	29	113	63	18
15	6.6	148	45	30	87	1,400	19
				31	------	6,750	36
Monthly mean discharge, in cubic feet per second					28.2	34.7	139
Runoff, in acre-feet					1,680	21,350	8,560

(12) 9-3985. Clear Creek below Willow Creek, near Winslow, Ariz.

Location. --Lat 34°40', long 111°00', in NW¼NE¼ sec. 30, T. 15 N., R. 13 E., in Sitgreaves National Forest, on right bank 2 miles downstream from Willow Creek, and 30 miles southwest of Winslow.

Drainage area. --321 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 24-29, Jan. 3-27 when float was frozen. Altitude of gage is 6,000 ft (from Forest Service map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 6,000 cfs and extended above by logarithmic plotting. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 13,100 cfs 1200 hours Dec. 30 (gage height, 19.10 ft).
1947 to October 1965: Discharge, 16,400 cfs Jan. 18, 1952 (gage height, 21.5 ft).

Remarks. --Some effect from storage in Blue Ridge Reservoir, which spilled during flood of Dec. 30, 1965.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	66	1,310	16	0	85	60
2	0	52	680	17	0	90	50
3	0	39	500	18	0	65	50
4	0	32	350	19	0	50	40
5	0	24	300	20	0	50	40
6	0	20	250	21	0	55	30
7	0	16	200	22	0	80	30
8	0	14	150	23	0	80	25
9	0	14	100	24	63	120	25
10	0	684	90	25	2,390	115	20
11	0	648	80	26	1,290	115	20
12	0	352	80	27	425	105	20
13	0	241	70	28	214	95	20
14	0	184	70	29	126	95	15
15	0	135	60	30	89	7,150	15
				31	------	2,970	15
Monthly mean discharge, in cubic feet per second					153	446	154
Runoff, in acre-feet					9,120	27,450	9,450

(13) 9-3990. Clear Creek near Winslow, Ariz.

Location. --Lat 34°58', long 110°38', in SE¼ sec. 9, T. 18 N., R. 16 E., on right bank 1½ miles upstream from mouth, and 5 miles southeast of Winslow.

Drainage area. --607 sq mi.

Gage-height record. --Water-stage recorder graph except Jan. 2-4. Datum of gage is 4,861.32 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 13,500 cfs and extended above on basis of velocity-area studies, verified by slope-area measurement at gage height 13.4 ft. Discharge for period of no gage-height record computed on basis of normal recession.

Maxima. --November 1965 to January 1966: Discharge, 18,500 cfs 2330 hours Dec. 30 (gage height, 13.41 ft).
1929 to October 1965: Discharge, 50,000 cfs Apr. 4, 1929 (gage height, 18.1 ft). An earlier flood reached a stage 3 ft higher than that of Apr. 4, 1929, at a site 1,850 ft downstream.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	3.5	88	2,400	16	0	166	62
2	3.5	58	1,180	17	0	132	62
3	3.5	44	650	18	0	111	58
4	3.5	30	427	19	0	111	48
5	3.5	26	366	20	0	77	44
6	4.2	20	309	21	0	71	34
7	4.2	19	232	22	0	65	26
8	3.5	15	201	23	0	77	28
9	3.5	13	166	24	0	94	22
10	2.6	11	149	25	0	106	19
11	1.3	300	117	26	1,570	123	17
12	.7	584	111	27	978	117	20
13	.4	402	100	28	455	111	22
14	.2	309	71	29	265	106	20
15	0	221	65	30	149	1,600	19
				31	------	8,620	17
Monthly mean discharge, in cubic feet per second					115	446	228
Runoff, in acre-feet					6,850	27,430	14,010

(14) 9-4009.1. Fay Canyon near Flagstaff, Ariz.

(Crest-stage station)

Location. --Lat 35°08'06", long 111°37'48", in NW¼NW¼ sec. 11, T. 20 N., R. 7 E., at Lake Mary Road within the city limits of Flagstaff.

Drainage area. --3.32 sq mi, of which 0.56 sq mi above Kellam Tank may be noncontributing.

Gage-height record. --Crest stages only. Altitude of gage is 6,850 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 87 cfs Dec. 30 (gage height, 3.09 ft).
1964 to October 1965: Discharge, 9 cfs Sept. 18, 1965 (gage height, 1.98 ft).

(15) 9-4020. Little Colorado River near Cameron, Ariz.

Location. --Lat 35°55'35", long 111°34'00", in NW¼ sec. 5, T. 29 N., R. 8 E. (unsurveyed), in Navajo Indian Reservation, on left bank 3 miles downstream from Coconino damsite, 9½ miles downstream from Moenkopi Wash, 9½ miles northwest of Cameron, and 45.5 miles upstream from mouth.

Drainage area. --26,500 sq mi, approximately.

Gage-height record. --Water-stage recorder graph except Dec. 15-24, 27-31, Jan. 4-5, 21-31. Datum of gage is 3,979.2 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 9,100 cfs 1300 hours Jan. 3 (gage height, 12.1 ft).
1947 to October 1965: Discharge, 24,900 cfs Jan. 21, 1952 (gage height, 20.7 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0.5	262	2,670	16	1.4	590	216
2	.5	183	4,620	17	1.8	450	171
3	.6	143	8,290	18	2.2	350	165
4	.4	110	4,430	19	2.4	300	162
5	.1	91	1,570	20	2.4	200	141
6	.2	75	912	21	2.2	150	135
7	.1	65	746	22	2.2	140	110
8	.6	56	608	23	2.8	130	110
9	.7	53	510	24	2.6	912	100
10	.8	270	415	25	5.0	1,460	95
11	.6	69	360	26	8.6	550	90
12	.8	1,440	324	27	34	350	90
13	1.0	1,480	279	28	839	300	85
14	1.0	800	254	29	674	275	85
15	1.0	620	238	30	385	250	80
				31	------	225	80
Monthly mean discharge, in cubic feet per second..					65.8	398	908
Runoff, in acre-feet					3,920	24,490	55,820

HAVASU CREEK BASIN

(16) 9-4039.3. West Cataract Creek near Williams, Ariz.

(Crest-stage station)

Location. --Lat 35°14'52", long 112°13'28", in NW¼ sec. 31, T. 22 N., R. 2 E., at Country Club Road a quarter of a mile upstream from Cataract Lake, and 1.2 miles west of Williams city limits.

Drainage area. --3.18 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 6,820 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert and over road.

Maxima. --November 1965 to January 1966: Discharge, 122 cfs Nov. 25 (gage height, 7.13 ft).
1964 to October 1965: Discharge, 99 cfs April 1965 (gage height, 6.68 ft).

(17) 9-4040.2. Dogtown Wash above Kaibab Reservoir, near Williams, Ariz.

Location. --Lat 35°17'10", long 112°08'35", in NE¼SE¼ sec. 14, T. 22 N., R. 2 E., in Kaibab National Forest, on left bank 1.1 miles upstream from dam on Kaibab Reservoir, 0.05 mile east of State Highway 64, and 3½ miles northeast of Williams.

Drainage area. --15.4 sq mi.

Gage-height record. --Digital recorder tape except Nov. 26 to Dec. 9, Dec. 13-24, Dec. 31 to Jan. 1.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 60 cfs and extended above on basis of slope-area measurement of peak flow. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 330 cfs 1400 hours Nov. 25 (gage height, 2.7 ft, from outside high-water marks).
1964 to October 1965: Discharge, 169 cfs Apr. 16, 1965 (gage height. 2.25 ft).

Remarks. --Flow partially regulated by Dogtown Reservoir (capacity 1,100 acre-ft), which spilled during flood periods.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0	10	16	0	0	0
2	0	0	5.0	17	0	0	0
3	0	0	0	18	0	0	0
4	0	0	0	19	0	0	0
5	0	0	0	20	0	0	0
6	0	0	0	21	0	0	0
7	0	0	0	22	0	0	0
8	0	0	0	23	16	0	0
9	0	8.0	0	24	16	0	0
10	0	96	0	25	172	0	0
11	0	37	0	26	24	0	0
12	0	20	0	27	5.0	0	0
13	0	5.0	0	28	0	0	0
14	0	2.0	0	29	0	0	0
15	0	1.0	0	30	0	120	0
				31	------	20	0
Monthly mean discharge, in cubic feet per second					7.77	9.97	0.484
Runoff, in acre-feet					462	613	30

(18) 9-4040.4. Cataract Creek near Williams, Ariz.

Location. --Lat 35°18'54", long 112°10'42", in NE¼SE¼ sec. 4, T. 22 N., R. 2 E., in Kaibab National Forest, on right abutment of abandoned bridge on county road, 0.3 mile downstream from Dogtown Wash, and 4½ miles north of Williams.

Drainage area. --46.4 sq mi.

Gage-height record. --Water-stage recorder graph except Nov. 7-26, Dec. 14-29, Jan. 1-7.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 620 cfs and extended above on basis of slope-area measurement of peak flow. Stage-discharge relation affected by backwater from ice Jan. 8-31. Discharge for periods of no gage-height record estimated.

Maximum. --November 1965 to January 1966: Discharge, 2,270 cfs 0700 hours Nov. 25 (gage height, 4.87 ft).

Remarks. --Flow partially regulated by several reservoirs (combined capacity, 2,750 acre-ft), all of which spilled during flood periods.
No flow from Kaibab Reservoir (drainage area, 16.6 sq mi) during flood of Nov. 25, 1965.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0.2	3.2	65	16	0.5	10	1.5
2	.4	2.2	45	17	.5	5	1.5
3	.6	1.1	35	18	.5	4	1.5
4	.8	.8	15	19	.5	3	1.5
5	.6	.6	8	20	.5	2	1.5
6	.4	.6	8	21	.5	2	1.0
7	5.7	.6	7	22	.5	10	1.0
8	5	.2	4	23	1.0	80	1.5
9	3	36	4	24	25	65	1.0
10	2	265	4	25	750	25	1.0
11	1	87	3	26	47	5	1.0
12	.5	46	2	27	22	4	1.0
13	.5	30	2	28	13	2	1.0
14	.5	25	2	29	10	30	.5
15	.5	20	1.5	30	5.7	746	1.0
				31	------	179	1.0
Monthly mean discharge, in cubic feet per second..					30.0	54.5	7.23
Runoff, in acre-feet					1,780	3,350	444

GILA RIVER BASIN

(19) 9-4299. Snow Creek near Mogollon, N. Mex.

(Crest-stage station)

Location. --Lat 33°24'50", long 108°29'40", 1,000 ft below Gila Wilderness boundary and 17.5 miles east of Mogollon.

Drainage area. --89.6 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 7,280 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 10 cfs and by slope-area measurements at 276 and 608 cfs.

Maxima. --November 1965 to January 1966: Discharge, 500 cfs Dec. 23 (gage height, 10.87 ft).
1958 to October 1965: Discharge, 608 cfs Aug. 15, 1964 (gage height, 11.44 ft).

(20) 9-4301.5. Sapillo Creek below Lake Roberts, near Silver City, N. Mex.

Location. --Lat 33°01'55", long 108°10'10", in SE¼SE¼ sec. 34, T. 14 S., R. 13 W., on left bank 1,400 ft below Lake Roberts Dam, about 1 mile upstream from former mining town of Meerschaum, and 18 miles north of Silver City.

Drainage area. --78 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 5,990 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 166 cfs and extended above on basis of slope-area measurement of peak flow.

Maxima. --November 1965 to January 1966: Discharge, 970 cfs 1730 hours Dec. 22 (gage height, 5.40 ft).
1964 to October 1965: Discharge, 1,210 cfs Sept. 23, 1965 (gage height, 5.58 ft).

Remarks. --Flow regulated by Lake Roberts.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	4.2	3.1	90	16	3.5	5.0	7.0
2	4.2	2.9	50	17	3.5	5.4	6.2
3	4.2	2.8	28	18	3.5	5.0	7.0
4	4.1	2.8	21	19	3.5	4.4	7.0
5	3.9	2.7	17	20	3.5	4.2	7.0
6	3.9	2.6	14	21	3.4	4.4	7.0
7	3.9	2.6	13	22	3.4	248	6.2
8	3.9	2.6	12	23	3.4	276	6.2
9	3.9	2.7	11	24	3.2	94	6.2
10	3.9	111	9.2	25	3.5	55	6.2
11	3.8	21	8.5	26	4.2	38	6.2
12	3.6	7.6	8.5	27	3.8	28	5.7
13	3.6	6.0	7.7	28	3.5	23	5.7
14	3.5	5.4	7.0	29	3.4	20	5.7
15	3.5	5.6	6.2	30	3.2	107	5.2
				31	------	188	5.2
Monthly mean discharge, in cubic feet per second					3.69	41.5	13.0
Runoff, in acre-feet					219	2,550	799

(21) 9-4305. Gila River near Gila, N. Mex.

Location. --Lat 33°03'45", long 108°32'20", in NW¼ sec. 30, T. 14 S., R. 16 W., on left bank at Hooker damsite, 1 mile upstream from Mogollon Creek, and 7 miles northeast of Gila.

Drainage area. --1,864 sq mi.

Gage-height record. --Water-stage recorder graph. Datum of gage is 4,655.8 ft above mean sea level (river-profile survey).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 3,900 cfs and extended above on basis of velocity-area studies and logarithmic plotting.

Maxima. --November 1965 to January 1966: Discharge, 6,240 cfs 0200 hours Dec. 23 (gage height, 8.77 ft).
1929 to October 1965: Discharge, 25,400 cfs Sept. 29, 1941 (gage height, 17.2 ft at site 200 ft upstream at present datum).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	57	79	1,880	16	59	342	184
2	55	75	1,090	17	55	358	178
3	55	75	716	18	55	350	202
4	55	77	538	19	57	298	217
5	55	75	450	20	55	259	193
6	57	72	386	21	55	259	205
7	59	72	338	22	55	1,390	175
8	57	70	301	23	55	4,020	151
9	55	77	286	24	55	1,720	139
10	55	1,410	262	25	55	1,060	136
11	55	1,960	247	26	80	788	130
12	55	900	235	27	90	645	125
13	55	538	223	28	90	554	133
14	55	438	214	29	85	498	136
15	61	386	199	30	82	855	136
				31	------	3,000	152
Monthly mean discharge, in cubic feet per second..					60.8	732	321
Runoff, in acre-feet					3,620	45,020	19,750

(22) 9-4309. Duck Creek at Cliff, N. Mex.

(Crest-stage station)

Location. --Lat 32°57'50", long 108°36'40", in SW¼SW¼ sec. 28, T. 15 S., R. 17 W., at Cliff, below bridge on State Highway 211, and 0.6 mile above mouth.

Drainage area. --228 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 4,490 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 3 cfs, by 4 slope-area measurements from 2,970 to 5,160 cfs, and by slope-conveyance study.

Maxima. --November 1965 to January 1966: Discharge, 2,970 cfs Dec. 23 (gage height, 5.87 ft).
1957 to October 1965: Discharge, 6,300 cfs Aug. 21, 1963 (gage height, 10.30 ft).
Senate Document 436 (facing p. 71, site 2) gives a discharge of 10,600 cfs for the flood of Oct. 16, 1916, and 41,800 cfs for an earlier flood.

(23) 9-4310. Gila River near Cliff, N. Mex.

(Gaging station, discontinued 1951; crest-stage station)

Location. --Lat 32°56'20", long 108°36'20", in S½ sec. 4, T. 16 S., R. 17 W., on downstream end of bridge pier on U.S. Highway 260, 1½ miles downstream from Bear Creek, 1½ miles south of Cliff, and 2½ miles southwest of Gila.

Drainage area. --2,438 sq mi.

Gage-height record. --Crest stages only. Datum of gage is 4,454.5 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 7,140 cfs and by slope-area measurement at 12.6 ft.

Maxima. --November 1965 to January 1966: Discharge, 13,500 cfs Dec. 23 (gage height, 12.18 ft).
1942 to October 1965: Discharge, 17,200 cfs Jan. 14, 1949 (gage height, 12.6 ft).

(24) 9-4315. Gila River near Redrock, N. Mex.

Location. --Lat 32°43'30", long 108°40'30", in W½ sec. 23, T. 18 S., R. 18 W., on left bank 0.2 mile downstream from Copper Canyon, a quarter of a mile upstream from lower end of box canyon, 4.7 miles northeast of Redrock, and 14 miles downstream from Mangas Creek.

Drainage area. --2,829 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 4,090 ft (from planetable survey).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 2,200 cfs and extended above on basis of logarithmic plotting.

Maxima. --November 1965 to January 1966: Discharge, 16,800 cfs 0200 hours Dec. 23 (gage height, 18.5 ft).
Probably 1892 to October 1965: Discharge, about 40,000 cfs Sept. 29, 1941 (gage height, 31 ft, from floodmark). Computed on basis of peak flow at Gila River below Blue Creek, near Virden, N. Mex.

Mean discharge, in cubic feet per second, 1965-66, of Gila River near Redrock, N. Mex.

Day	November	December	January	Day	November	December	January
1	59	98	2,880	16	67	525	340
2	57	96	1,480	17	64	590	331
3	60	90	1,120	18	61	626	340
4	57	87	952	19	60	530	337
5	57	87	805	20	65	466	316
6	58	88	715	21	68	470	304
7	59	84	620	22	72	3,130	280
8	60	86	558	23	73	12,400	255
9	57	88	514	24	74	3,270	235
10	57	1,410	462	25	77	1,540	225
11	59	3,320	426	26	106	1,260	218
12	60	1,280	402	27	99	1,170	208
13	62	722	378	28	97	1,090	205
14	68	614	361	29	98	988	200
15	69	565	352	30	97	1,010	198
				31	------	5,360	205
Monthly mean discharge, in cubic feet per second					69.2	1,392	523
Runoff, in acre-feet					4,120	85,570	32,160

(25) 9-4320. Gila River below Blue Creek, near Virden, N. Mex.

Location. --Lat 32°38'55", long 108°50'45", in SE¼SW¼ sec. 18, T. 19 S., R. 19 W., on left bank at head of canyon, 1¼ miles downstream from Blue Creek, 10 miles east of Virden, and 16 miles upstream from New Mexico-Arizona State line.

Drainage area. --3,203 sq mi, excluding Animas River basin.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 3,875 ft (from river-profile map).

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

Maxima. --November 1965 to January 1966: Discharge, 10,900 cfs 1000 hours Dec. 23 (gage height, 17.3 ft).
1892 to October 1965: Discharge, 41,700 cfs Sept. 29, 1941 (gage height, 25.78 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	60	99	3,040	16	69	670	334
2	61	98	1,860	17	67	730	324
3	65	95	1,270	18	67	838	320
4	58	93	998	19	66	688	320
5	57	93	838	20	66	515	312
6	58	95	746	21	69	503	308
7	61	88	662	22	73	2,920	302
8	65	89	590	23	79	8,180	288
9	63	94	527	24	80	4,870	276
10	58	718	472	25	88	1,980	266
11	57	2,910	442	26	100	1,320	260
12	58	1,640	412	27	120	1,080	254
13	58	842	390	28	106	990	248
14	65	663	368	29	109	938	244
15	69	688	352	30	102	906	242
				31	------	3,090	238
Monthly mean discharge, in cubic feet per second					72.5	1,243	568
Runoff, in acre-feet					4,310	76,410	34,720

(26) 9-4420. Gila River near Clifton, Ariz.

Location. --Lat 32°57'50", long 109°18'15", in SW¼SW¼ sec. 30, T. 5 S., R. 30 E., on left bank 1,100 ft upstream from bridge on county road, 6 miles upstream from San Francisco River, and 7 miles south of Clifton.

Drainage area. --4,010 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 26-28, Jan. 7-18, 28-31. Gage-height record reconstructed from normal recession and range in stage. Datum of gage is 3,339.50 ft above mean sea level, datum of 1929, supplementary adjustment of 1959.

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

Maxima. --November 1965 to January 1966: Discharge, 10,700 cfs 0900 hours Dec. 24 (gage height, 14.82 ft).

1892 to October 1965: Discharge, 28,200 cfs Sept. 29, 1941 (gage height, 20.12 ft, at site 1,100 ft downstream at datum 4.03 ft lower than present datum.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	20	81	2,960	16	35	668	420
2	33	75	2,160	17	38	863	380
3	34	75	1,420	18	40	961	356
4	34	73	1,080	19	39	680	352
5	35	70	885	20	33	530	342
6	34	73	718	21	32	490	328
7	34	72	610	22	33	1,340	330
8	35	58	550	23	39	4,050	310
9	34	60	530	24	44	7,170	300
10	32	160	510	25	52	3,590	290
11	31	2,180	480	26	55	1,800	280
12	29	2,040	470	27	73	1,400	280
13	29	1,020	470	28	87	1,120	280
14	29	662	460	29	81	950	260
15	31	668	450	30	81	890	250
				31	------	1,320	247
Monthly mean discharge, in cubic feet per second					41.2	1,135	605
Runoff, in acre-feet					2,450	69,800	37,210

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	4.80	500	Dec. 24	0600	9.93	4,990	Dec. 30	2400	4.65	905
					0700	11.37	6,444				
22	0900	4.80	500		0800	13.90	9,480	31	0900	4.60	880
	1300	4.96	584		0900	14.82	10,700		1200	4.88	1,020
	1500	6.50	1,630		1200	14.00	9,600		1800	6.26	1,850
	1700	7.20	2,250		1500	13.20	8,640		2400	7.00	2,380
	1900	7.55	2,580		1800	12.10	7,320				
	2100	7.91	3,030		2100	11.64	6,768	Jan. 1	0600	7.34	2,650
	2400	8.10	3,280		2400	10.76	5,820		1200	7.92	3,120
									1800	8.20	3,340
23	0100	8.20	3,410	25	0600	9.48	4,540		2400	7.80	3,020
	0300	8.10	3,280		1200	8.25	3,380				
	0700	8.55	3,860		1800	7.20	2,540	2	0600	6.98	2,360
	0900	8.55	3,860		2400	6.50	2,020		1200	6.58	2,080
	1100	8.95	4,420						1800	6.20	1,810
	1500	8.55	3,860	26	1200	5.8	1,550		2400	5.95	1,640
	1700	9.02	4,530		2400	5.6	1,430				
	1900	9.10	4,650					3	1200	5.56	1,410
	2400	9.05	4,580	27	1200	5.4	1,310		2400	5.25	1,220
					2400	5.25	1,220				
24	0100	8.98	4,040								

(27) 9-4426.8. San Francisco River near Reserve, N. Mex.

Location. --Lat 33°44'30", long 108°46'15", in SW¼NE¼ Sec. 35, T. 6 S., R. 19 W., on left bank 500 ft upstream from mouth of Rainbow Bridge Canyon, and 2 miles northwest of Reserve.

Drainage area. --350 sq mi, approximately.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 5,850 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 460 cfs and extended above on basis of slope-area measurements at gage heights 2.92 and 3.05 ft.

Maxima. --November 1965 to January 1966: Discharge, 520 cfs 1000 hours Dec. 30 (gage height, 2.40 ft).

1959 to October 1965: Discharge, 1,160 cfs July 26, 1965, estimated (gage height, 3.9 ft, inside, 4.9 ft, from floodmarks).

Old floodmarks, found in 1962, show a stage of 15 ft; date of flood unknown. According to Senate Document 436 (p. 85, site 194), the flood of Oct. 16, 1916 (discharge, 17,850 cfs, at site about 6 miles upstream) is the maximum known.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	6.0	6.5	248	16	6.0	23	29
2	6.0	6.3	153	17	6.1	23	29
3	6.0	5.5	72	18	5.9	22	31
4	6.0	5.3	60	19	5.9	16	32
5	6.0	5.2	55	20	5.6	12	28
6	6.0	5.3	52	21	5.6	13	27
7	6.3	5.7	46	22	5.6	19	21
8	6.2	5.9	46	23	5.9	156	22
9	6.0	15	42	24	6.0	43	21
10	5.9	138	41	25	11	29	19
11	5.9	52	42	26	8.3	27	18
12	5.5	32	36	27	5.9	26	18
13	6.0	27	32	28	5.4	25	19
14	6.1	23	31	29	4.5	29	18
15	6.2	23	30	30	5.1	332	22
				31	------	444	22
Monthly mean discharge, in cubic feet per second					6.10	51.4	44.0
Runoff, in acre-feet					363	3,160	2,710

(28) 9-4427.4. Tularosa River near Reserve, N. Mex.

(Crest-stage station)

Location. --Lat 33°44'00", long 108°42'10", in SE¼ sec. 33, T. 6 S., R. 18 W., 150 ft west of Eagle Peak Lookout Road and 3.3 miles northeast of Reserve.

Drainage area. --426 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 5,940 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 100 cfs and 5 slope-area measurements from 465 to 1,580 cfs.

Maxima. --November 1965 to January 1966: Discharge, 465 cfs Dec. 23 (gage height, 4.35 ft).

1956 to October 1965: Discharge, 2,280 cfs July 1956.

According to Senate Document 436 (following p. 64, site 45), the flood of Oct. 16, 1916 (discharge, 16,420 cfs, at site about 2 miles downstream) is the maximum known.

(29) 9-4430. San Francisco River near Alma, N. Mex.

Location. --Lat 33°21'50", long 108°54'50", in SE¼SW¼ sec. 4, T. 11 S., R. 20 W., on right bank 1¼ miles downstream from Alma, 4 miles northwest of Glenwood, and 6 miles upstream from Whitewater Creek.

Drainage area. --1,546 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 4,800 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 4,500 cfs and extended above by logarithmic plotting.

Maxima. --November 1965 to January 1966: Discharge, 7,500 cfs 1900 hours Dec. 30 (gage height, 7.45 ft).

1904-14, 1964 to October 1965: Discharge, 25,000 cfs Nov. 26, 1905 (gage height, 14 ft, at site three-quarters of a mile upstream at different datum), from float-area measurement of peak flow.

Senate Document 436 (following p. 64, site 27) gives a peak discharge of 31,800 cfs for the flood of Oct. 16, 1916, and 49,400 cfs for an earlier flood.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	12	1,170	16	6.2	85	69
2	.1	13	672	17	6.6	125	65
3	1.1	11	468	18	6.6	125	67
4	1.4	9.8	312	19	6.6	95	67
5	2.6	8.6	220	20	7.0	80	64
6	3.0	7.5	174	21	7.0	85	60
7	3.8	6.6	154	22	7.0	1,570	52
8	4.6	6.6	143	23	6.6	3,260	46
9	5.4	8.1	132	24	6.6	729	48
10	5.8	663	118	25	9.8	388	44
11	5.8	580	109	26	22	328	40
12	6.6	312	109	27	18	225	39
13	6.6	170	87	28	14	150	42
14	6.2	110	81	29	14	90	38
15	6.2	95	75	30	11	3,670	39
				31	------	3,380	42
Monthly mean discharge, in cubic feet per second..					6.94	529	156
Runoff, in acre-feet					413	32,530	9,610

(30) 9-4440. San Francisco River near Glenwood, N. Mex.

Location. --Lat 33°15'05", long 108°52'40", in NE¼NW¼ sec. 23, T. 12 S., R. 20 W., on left bank a quarter of a mile upstream from hot springs, 5 miles south of Glenwood, and 6 miles downstream from Whitewater Creek.

Drainage area. --1,653 sq mi.

Gage-height record. --Water-stage recorder graph. Datum of gage is 4,552.06 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 2,800 cfs and extended above on basis of slope-area measurement at gage height 10.74 ft.

Maxima. --November 1965 to January 1966: Discharge, 8,200 cfs 2230 hours Dec. 30 (gage height, 11.00 ft).

1927 to October 1965: Discharge, 7,800 cfs Jan. 13, 1949 (gage height, 10.74 ft).

Mean discharge, in cubic feet per second, 1965-66, of San Francisco River near Glenwood, N. Mex.

Day	November	December	January	Day	November	December	January
1	8.0	30	1,430	16	23	105	104
2	8.0	30	747	17	23	125	100
3	9.0	32	510	18	21	125	104
4	9.0	32	395	19	22	100	102
5	9.5	32	320	20	24	88	98
6	12	32	263	21	24	95	94
7	11	32	230	22	23	1,710	83
8	11	32	212	23	22	4,310	77
9	15	36	200	24	24	908	84
10	18	799	183	25	27	426	73
11	21	620	177	26	58	258	67
12	22	223	171	27	46	192	65
13	22	145	157	28	38	130	65
14	22	118	137	29	34	108	64
15	23	112	114	30	33	3,030	62
				31	------	4,350	69
Monthly mean discharge, in cubic feet per second					22.1	592	212
Runoff, in acre-feet					1,310	36,430	13,010

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.46	95	Dec. 23	1800	7.22	3,220	Dec. 30	2230	11.00	8,200
					2400	5.48	1,700		2400	10.72	7,840
22	0600	2.50	105								
	1000	2.58	125	24	0600	4.60	1,080	31	0600	9.05	5,820
	1200	3.00	280		1200	4.09	795		1200	7.34	4,020
	1400	3.96	730		2400	3.79	645		1800	5.91	2,680
	1500	5.35	1,600						2400	5.19	2,100
	1600	6.71	2,730	25	1200	3.24	388				
	1800	8.00	4,050		2400	3.13	338	Jan. 1	0800	4.39	1,540
	2000	8.63	4,810						1600	3.86	1,170
	2200	8.92	5,150	30	0100	2.47	106		2400	3.55	980
	2400	8.50	4,650		0600	2.71	147				
					1000	3.06	225	2	1200	3.10	720
23	0230	8.07	4,130		1130	5.90	2,510		2400	2.84	590
	0600	8.74	4,940		1230	5.85	2,470				
	0900	9.28	5,610		1600	7.56	4,240	3	1200	2.64	506
	1100	10.14	6,860		2030	10.70	7,810		2400	2.46	434
	1400	9.03	5,290		2100	10.55	7,620				

(31) 9-4442. Blue River near Clifton, Ariz.

(Miscellaneous site)

Location. --Lat 33°17'10", long 109°11'40"; in NW¼ sec. 6, T. 2 S., R. 31 E. (unsurveyed), in Apache National Forest, at county road, 7½ miles upstream from mouth, and 17 miles northeast of Clifton.

Drainage area. --505 sq mi.

Maxima. --November 1965 to January 1966: Discharge, 9,380 cfs Dec. 23 or 30, from slope-area measurement of peak flow.

According to Senate Document 436 the flood of Oct. 13, 1916 (discharge, 31,900 cfs at the mouth) is the maximum known.

Remarks. --Gaging station established Nov. 7, 1967.

(32) 9-4444. Chase Creek near Clifton, Ariz.
(Crest-stage station)

Location. --Lat 33°10'20", long 109°22'10", in NW¼ sec. 16, T. 3 S., R. 29 E., on U. S. Highway 666, 9 miles northwest of Clifton.

Drainage area. --1.37 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 6,050 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 29 cfs Dec. 22 (gage height, 5.64 ft).
1963 to October 1965: Discharge, 600 cfs July 25, 1964 (gage height, 13.9 ft), from computation of flow through culvert and over roadway.

(33) 9-4445. San Francisco River at Clifton, Ariz.

Location. --Lat 33°02'57", long 109°17'43", in SW¼SE¼ sec. 30, T. 4 S., R. 30 E., on downstream side of right pier at Railroad Boulevard Bridge (U. S. Highway 666) at Clifton, 9.9 miles upstream from mouth.

Drainage area. --2,766 sq mi.

Gage-height record. --Water-stage recorder graph. Datum of gage is 3,436.16 ft above mean sea level, datum of 1929.

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

Maxima. --November 1965 to January 1966: Discharge, 30,500 cfs 1000 hours Dec. 23 (gage height, 11.00 ft).
1927 to October 1965: Discharge, 24,100 cfs Jan. 13, 1949 (gage height, 10.9 ft, present datum).
Senate Document 436 lists the flood of Dec. 3, 1906, as the greatest known (discharge, 143,450 cfs), that of 1891 as the second highest (discharge not determined), and that of Oct. 14, 1916, as third highest (discharge, 107,870 cfs; gage height, 19.7 ft, at site 60 ft upstream at different datum). Methods used in computation of these discharge figures are not known. The flood of Jan. 19, 1916, reached a stage of 16.8 ft, from floodmarks, at site 60 ft upstream (discharge, 90,000 cfs, from slope-conveyance study).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	33	74	5,230	16	46	335	332
2	33	68	2,340	17	46	662	309
3	32	65	1,360	18	45	682	332
4	33	63	1,050	19	44	558	340
5	34	63	844	20	44	450	340
6	36	62	718	21	45	462	313
7	36	60	616	22	45	6,130	274
8	37	60	555	23	46	21,900	257
9	36	77	528	24	46	6,650	240
10	38	2,070	485	25	59	2,720	231
11	40	2,000	446	26	130	1,680	224
12	45	726	436	27	147	1,270	212
13	46	439	396	28	101	1,040	203
14	46	254	374	29	83	902	200
15	46	368	348	30	78	6,370	191
				31	------	13,200	197
Monthly mean discharge, in cubic feet per second					52.5	2,456	643
Runoff, in acre-feet					3,130	151,000	39,510

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of San Francisco River at Clifton, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.50	428	Dec. 24	0600	7.00	7,920	Dec. 30	2000	9.00	16,700
					1200	6.38	6,000		2400	8.55	14,400
22	0600	2.55	450		1800	5.82	4,590				
	1100	2.97	700		2400	5.32	3,620	31	0400	8.80	15,700
	1400	4.70	2,630						0700	9.10	17,300
	1500	5.18	3,480	25	1200	4.77	2,710		0900	8.82	15,800
	1800	7.60	10,400		2400	4.28	2,030		1000	8.85	16,000
	2400	9.60	21,500						1300	8.30	13,200
				26	1200	4.01	1,690		1800	7.62	10,300
23	0500	9.80	22,700		2400	3.70	1,370		2400	6.80	7,220
	0600	9.02	18,000								
	0700	9.02	18,000					Jan. 1	0600	6.50	6,270
	0900	10.80	29,100	29	2400	3.07	837		1200	6.10	5,290
	1000	11.00	30,500						1800	5.62	4,150
	1100	10.75	28,800	30	0400	3.04	816		2400	5.15	3,350
	1200	10.20	25,100		0900	3.20	943				
	1300	9.80	22,700		1100	3.40	1,090	2	1200	4.42	2,220
	1700	9.20	19,100		1200	5.20	3,320		2400	3.98	1,680
	1900	9.18	19,000		1400	6.38	5,660				
	2400	8.20	13,400		1600	7.85	10,900				

(34) 9-4455. Willow Creek near Point of Pines, near Morenci, Ariz.

Location. --Lat 33°22'45", long 109°39'00", in NW¼ sec. 2, T. 1 S., R. 26 E. (unsurveyed), in San Carlos Indian Reservation, on right bank at head of box canyon, 4 miles east of Point of Pines, 10 miles west of Double Circle Ranch, and 23 miles northwest of Morenci.

Drainage area. --102 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 19 to 1030 hours Dec. 21, Jan. 4-11, and about half of each day Dec. 24-29 for which missing portions were reconstructed. Altitude of gage is 5,804 ft (by barometer).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 80 cfs and extended above on basis of slope-area measurements at gage heights 7.96, 8.72, and 10.1 ft. Discharge for Dec. 19-20 and Jan. 4-11 estimated on basis of records for nearby streams.

Maxima. --November 1965 to January 1966: Discharge, 3,710 cfs 1200 hours Dec. 30 (gage height, 11.7 ft).
1944 to October 1965: Discharge, 2,590 cfs Jan. 13, 1952 (gage height, 10.1 ft).

Remarks. --Pumpage from Black River into Willow Creek above station for industrial and municipal use equaled 336 acre-ft in November and 319 acre-ft in December.

Mean discharge, in cubic feet per second, 1965-66, of Willow Creek near Point of Pines, near Morenci, Ariz.

Day	November	December	January	Day	November	December	January
1	0	4.2	213	16	12.0	12.0	5.5
2	0	4.8	103	17	9.2	10.8	3.6
3	0	8.3	83	18	8.7	9.7	4.8
4	0	9.2	60	19	5.8	10	6.2
5	0	9.2	40	20	.2	10	4.5
6	0	6.4	30	21	.3	15.9	3.4
7	0	10.2	30	22	4.2	279	2.4
8	0	10.6	20	23	4.5	683	3.0
9	0	9.6	20	24	4.5	223	3.0
10	8.1	155	15	25	4.8	112	2.6
11	13.6	152	13.6	26	3.9	77	2.2
12	13.6	55	10.6	27	3.4	59	2.2
13	13.6	23.1	8.3	28	3.4	50	2.1
14	13.6	15.3	7.4	29	4.4	41	2.6
15	13.6	10.5	7.0	30	3.9	2,130	2.6
				31	------	647	3.0
Monthly mean discharge, in cubic feet per second..					4.98	156.5	23.1
Runoff, in acre-feet					296	9,630	1,420

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.66	21.7	Dec. 24	1500	4.37	240	Dec. 30	0600	8.60	1,710
					1700	4.47	258		1000	10.5	2,870
22	0400	2.57	15.9		2100	4.07	187		1200	11.7	3,710
	0800	2.66	21.7		2400	3.69	131		1300	11.4	3,500
	1000	2.83	33.7						1500	11.6	3,640
	1200	3.23	75.3	25	0200	3.50	107		1700	10.5	2,870
	1400	4.02	179		0800	3.3	83		2000	9.30	2,100
	1500	4.14	199		1300	3.69	131		2400	7.90	1,360
	1530	6.18	684		1600	3.80	146				
	1730	6.21	693		2100	3.24	76	31	0600	6.50	790
	2100	5.90	600						1200	5.71	493
	2400	6.0	630						1800	5.46	480
				28	2400	2.85	38.7		2400	4.97	347
23	0200	6.58	818								
	0400	6.93	947	29	0200	2.79	33.7	Jan. 1	0600	4.47	258
	0530	7.23	1,070		0600	2.7	27.1		1200	4.10	192
	0800	6.80	895		1000	2.72	28.4		1800	3.93	165
	1200	6.31	724		1400	3.00	52.3		2400	3.50	107
	1800	5.65	530		1600	2.92	44.8				
	2400	4.80	325		2200	3.04	55.9	2	0800	3.4	95
					2400	3.37	91.4		1600	3.60	119
24	0500	4.19	207						2100	3.37	91
	0800	4.1	192	30	0200	4.07	187		2400	3.34	87
	1300	4.34	234		0400	6.50	790				

(35) 9-4460. Willow Creek near Double Circle Ranch, near Morenci, Ariz.

Location. --Lat 33°21'15", long 109°31'30", in NE¼ sec. 13, T. 1 S., R. 27 E. (unsurveyed), in San Carlos Indian Reservation, on left bank 1 mile upstream from lower end of box canyon, 2¼ miles northwest of Double Circle Ranch, 2½ miles upstream from mouth, and 19 miles northwest of Morenci.

Drainage area. --149 sq mi.

Gage-height record. --Water-stage recorder graph except Jan. 2-6, 17-18. Altitude of gage is 4,969 ft (by barometer).

Discharge record. --Stage-discharge relation Nov. 1 to Dec. 29 defined by current-meter measurements below 50 cfs and extended above on basis of slope-area measurement at gage height 9.42 ft. Stage-discharge relation Dec. 30 to Jan. 31 defined by current-meter measurements below 80 cfs and extended above on basis of slope-area measurement of peak flow. Discharge for periods of no gage-height record estimated on basis of records at other stations on Willow and Eagle Creeks.

Maxima. --November 1965 to January 1966: Discharge, 7,500 cfs 1000 hours Dec. 30 (gage height, 9.00 ft); outside stage, 12.65 ft (result of pileup on bank).
1944 to October 1965: Discharge, 4,880 cfs Aug. 1, 1965 (gage height, 9.47 ft).

Remarks. --Pumpage from Black River into Willow Creek above station for industrial and municipal use equaled 336 acre-ft in November and 319 acre-ft in December.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	1.2	7.4	239	16	15.1	12.7	7.7
2	1.4	7.1	100	17	11.5	14.3	7
3	1.5	8.6	50	18	10.7	16.0	7
4	1.5	11.5	30	19	10.7	11.7	8.3
5	1.5	12.7	30	20	7.1	10.7	6.7
6	1.6	12.1	25	21	3.6	13.9	5.7
7	1.6	9.3	25.9	22	3.0	535	4.5
8	1.9	16.3	22.8	23	6.8	1,340	3.4
9	2.1	17.8	19.3	24	8.2	418	3.8
10	2.2	156	16.8	25	9.9	237	3.8
11	8.9	199	15.3	26	11.1	161	3.6
12	14.5	82	13.9	27	8.2	121	3.8
13	14.5	25.9	12.3	28	7.1	96	3.6
14	15.1	18.2	10.7	29	7.1	87	3.6
15	15.1	11.5	8.6	30	7.4	3,870	3.8
				31	------	923	4.3
Monthly mean discharge, in cubic feet per second..					7.07	273	22.6
Runoff, in acre-feet					421	16,790	1,390

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Willow Creek near Double Circle Ranch, near Morenci, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	4.78	7.7	Dec. 23	2400	6.85	725	Dec. 30	0700	8.35	3,670
									0900	8.75	5,580
22	0600	4.84	13.9	24	0600	6.52	450		1000	9.00	7,500
	0800	4.94	20.5		1200	6.28	332		1200	8.70	6,700
	1000	5.30	57		2000	6.45	415		1300	8.95	7,350
	1200	6.12	268		2400	6.33	355		1800	8.20	4,320
	1300	6.77	669						2400	7.10	2,570
	1730	7.13	951	25	0600	6.02	228				
	1800	7.65	1,500		1400	5.83	169	31	0600	6.00	1,390
	1900	7.48	1,300		1800	6.13	272		0800	5.30	850
	2400	7.45	1,260		2400	6.02	228		1200	4.60	720
									1800	4.20	515
23	0300	7.79	1,570	29	2400	5.76	134		2400	3.90	390
	0430	8.10	2,100								
	0900	7.75	1,620	30	0300	6.06	285	Jan. 1	0800	3.47	246
	1200	7.55	1,380		0400	6.70	720		1600	3.25	187
	1800	7.23	1,050		0600	8.55	3,200		2400	3.15	164

(36) 9-4465. Eagle Creek near Double Circle Ranch, near Morenci, Ariz.

Location. --Lat 33°18'00", long 109°29'30", in SW¼ sec. 32, T. 1 S., R. 28 E. (unsurveyed), on left bank half a mile upstream from head of box canyon, 2¾ miles downstream from Willow Creek, 3¼ miles downstream from Double Circle Ranch, and 17 miles northwest of Morenci.

Drainage area. --377 sq mi.

Gage-height record. --Water-stage recorder graph except Jan. 2-6. Altitude of gage is 4,722 ft (by barometer).

Discharge record. --Stage-discharge relation Nov. 1 to Dec. 21 defined by current-meter measurements below 100 cfs and extended above on basis of slope-area measurements at gage heights 7.44 and 8.51 ft. Stage-discharge relation Dec. 30 to Jan. 31 defined by current-meter measurements. Stage-discharge relation Dec. 22-29 estimated on basis of shape of ratings before and after. Discharge for Jan. 2-6 estimated on basis of records for other stations on Willow and Eagle Creek.

Maxima. --November 1965 to January 1966: Discharge, 13,600 cfs 1400 hours Dec. 30 (gage height, 9.20 ft).

1944 to October 1965: Discharge, 7,270 cfs Sept. 10, 1958 (gage height, 8.7 ft), from rating curve extended above 900 cfs on basis of slope-area measurement at gage height 8.51 ft.

Remarks. --Pumpage from Black River and Eagle Creek Wells into Eagle Creek above station equaled 651 acre-ft in November and 319 acre-ft in December.

Mean discharge, in cubic feet per second, 1965-66, of Eagle Creek near Double Circle Ranch, near Morenci, Ariz.

Day	November	December	January	Day	November	December	January
1	18.0	8.4	795	16	18.0	45	45
2	20.5	8.4	377	17	16.0	56	41
3	20.5	8.6	230	18	14.2	60	42
4	19.0	9.6	150	19	13.8	49	41
5	17.0	10.1	120	20	11.9	43	38
6	16.5	10.4	100	21	9.4	50	34.0
7	17.0	9.4	90	22	8.1	1,180	30.1
8	19.5	10.6	82	23	8.8	2,710	28.3
9	21.5	12.7	76	24	9.8	804	28.3
10	21.0	122	74	25	10.6	427	27.4
11	21.5	219	69	26	10.8	316	26.5
12	24.0	112	68	27	9.4	249	26.5
13	19.0	62	60	28	8.6	211	25.6
14	19.0	55	54	29	8.1	197	25.6
15	18.5	50	50	30	8.4	6,350	24.7
				31	------	2,100	21.4
Monthly mean discharge, in cubic feet per second					15.3	502	93.6
Runoff, in acre-feet					909	30,650	5,750

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	3.41	50	Dec. 23	2100	5.30	1,760	Dec. 30	0400	3.88	297
					2400	5.12	1,540		0500	4.17	447
22	0300	3.48	57						0600	5.30	1,460
	0600	3.65	74	24	0600	4.70	1,690		0800	7.20	6,750
	0900	4.22	185		1400	4.33	661		1000	7.75	8,350
	1200	5.67	1,320		2100	4.42	737		1200	8.73	11,700
	1400	6.45	2,640		2400	4.37	612		1300	8.90	12,400
	1600	6.17	2,060						1400	9.20	13,600
	1800	6.03	917	25	0600	4.18	483		1500	8.90	12,400
	2000	6.10	980		1200	3.98	370		1700	8.00	9,100
	2400	5.80	1,750		1700	3.94	349		2000	7.32	7,060
					2000	4.08	424		2400	6.25	4,500
23	0100	5.80	1,900		2400	4.05	408				
	0300	6.38	2,790					31	0600	5.14	2,410
	0500	6.80	3,600	26	1800	3.75	262		1200	4.78	1,870
	0630	7.13	5,060		2100	3.87	315		1600	4.44	1,450
	0800	6.80	4,400		2400	3.86	359		2400	4.23	1,230
	1000	6.15	3,100								
	1200	5.80	2,500	29	2400	3.65	204	Jan. 1	1200	3.74	754
	1500	5.67	2,300						2400	3.42	508
	1800	5.52	2,080	30	0200	3.72	229				

(37) 9-4470. Eagle Creek above pumping plant, near Morenci, Ariz.

Location. --Lat 33°04'12", long 109°27'05", in SE¼NE¼ sec. 22, T. 4 S., R. 28 E., on right bank 2½ miles upstream from Phelps Dodge Corp. pumping plant, 5 miles west of Morenci, and 13 miles upstream from mouth.

Drainage area. --613 sq mi.

Gage-height record. --Water-stage recorder graph of stage in Parshall flume except Dec. 20-28 and 0500 hours Dec. 31 to Jan. 10; water-stage recorder graph of stage at auxiliary gage 80 ft upstream from flume except Dec. 20 to Jan. 31. Datum of base gage at flume is 3,695 ft above mean sea level. Gage heights shown are for base gage.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 15,000 cfs and extended above on basis of slope-area measurement of peak flow. Discharge for 2400 hours Dec. 9 to 1000 hours Dec. 13, 0830 hours Dec. 17 to 1730 hours Dec. 19 computed from stage at auxiliary gage. Discharge for periods of no gage-height record estimated on basis of range in stage and record for Eagle Creek near Double Circle Ranch near Morenci.

Maxima. --November 1965 to January 1966: Discharge, 21,000 cfs 1700 hours Dec. 30 (gage height, 8.9 ft at base gage, 12.8 ft at auxiliary gage).

1932 to October 1965: Discharge, 13,000 cfs Feb. 10, 1932 (gage height not determined), by slope-area measurement of peak flow.

Senate Document 436 (p. 77) gives a discharge of 36,000 cfs, probably during the flood of January 1916; other data indicate that August 1915 is a more likely date for this peak.

Remarks. --Records above 250 cfs are poor. Pumpage from Black River and Eagle Creek Wells into Eagle Creek above station equaled 651 acre-ft in November and 319 acre-ft in December.

Mean discharge, in cubic feet per second, 1965-66, of Eagle Creek above pumping plant, near Morenci, Ariz.

Day	November	December	January	Day	November	December	January
1	19.7	14.8	2,500	16	21.9	106	74
2	22.8	14.8	1,000	17	21.9	218	67
3	24.6	14.8	750	18	20.1	261	72
4	25.1	14.8	300	19	18.9	197	72
5	22.4	17.2	250	20	18.9	137	65
6	21.5	17.6	200	21	17.2	140	61
7	21.0	17.6	150	22	14.1	a6,000	52
8	21.0	16.8	140	23	13.7	a7,000	47
9	23.3	30.0	120	24	15.6	a2,500	43
10	25.1	453	110	25	18.4	900	41
11	23.7	1,880	104	26	19.7	400	40
12	27.0	344	101	27	18.4	300	40
13	27.0	156	94	28	16.4	260	39
14	22.4	110	86	29	15.2	260	38
15	22.4	125	81	30	14.8	8,000	37
				31	------	4,000	44
Monthly mean discharge, in cubic feet per second..					20.5	1,094	220
Runoff, in acre-feet					1,220	67,250	13,520

a Revised.

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	-	150	Dec. 23	1200	-	7,000	Dec. 30	1400	5.4	5,800
					1800	-	4,300		1600	8.2	18,000
22	0400	-	150		2400	-	3,000		1700	8.9	21,000
	0900	-	600						1800	8.6	20,000
	1200	-	3,500	24	0900	-	3,000		2000	8.1	18,000
	1500	-	12,000		2400	-	1,400		2200	7.4	14,000
	1700	7.6	15,000						2400	6.7	11,000
	2400	-	9,000	29	2400	2.68	155				
								31	0500	5.2	5,000
23	0200	6.4	8,800	30	0400	2.72	162		1200	-	3,400
	0600	-	9,500		0800	2.87	175		2400	-	2,500
	0900	6.85	11,000		1000	5.6	6,200				

(38) Bonita Creek near Solomon, Ariz.

(Miscellaneous site)

Location. --Lat 32°56'30", long 109°30'20", in NW¼ sec. 5, T. 28 E., R. 6 S., at city of Safford water-supply galleries, 4 miles upstream from mouth, and 11½ miles northeast of Solomon.

Drainage area. --310 sq mi.

Maxima. --November 1965 to January 1966: Discharge, approximately 6,200 cfs Dec. 30, from slope-area measurement of peak flow. Field data furnished by City of Safford Municipal Utilities.

According to Senate Document 436, the maximum flood known prior to 1919 occurred in August 1915 (discharge, 16,640 cfs at mouth). The peak of Oct. 13, 1916, was estimated as 8,960 cfs. The peak of January 1916 was less than that of Oct. 13, 1916.

(39) 9-4485. Gila River at head of Safford Valley, near Solomon, Ariz.

Location. --Lat 32°52'10", long 109°30'40", in SE¼NE¼ sec. 31, T. 6 S., R. 28 E., on left bank 0.6 mile downstream from intake of Brown Canal, 8 miles northeast of Solomon, and 17 miles downstream from San Francisco River. Records include flow of Brown Canal, which is measured 2,000 ft downstream from intake.

Drainage area. --7,896 sq mi.

Gage-height record. --Water-stage recorder graph. Datum of gage is 3,064.88 ft above mean sea level, datum of 1929, supplementary adjustment of 1959.

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

Maxima. --November 1965 to January 1966: Discharge, 43,000 cfs 2400 hours Dec. 22 (gage height, 13.7 ft).

1914 to October 1965: Discharge, about 100,000 cfs Jan. 19, 1916 (gage height, 14.0 ft, datum then in use), from rating curve extended above 18,000 cfs on basis of velocity-area study.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	51	181	7,950	16	87	1,150	886
2	55	169	5,310	17	94	1,450	820
3	65	151	3,380	18	96	1,880	842
4	63	146	2,420	19	89	1,540	864
5	67	135	1,920	20	83	1,220	864
6	69	132	1,610	21	83	1,110	800
7	67	125	1,410	22	92	7,690	730
8	69	115	1,310	23	91	30,800	675
9	74	115	1,270	24	95	14,600	622
10	74	2,120	1,210	25	116	6,640	570
11	74	5,630	1,150	26	154	3,200	545
12	74	3,160	1,110	27	224	2,580	497
13	75	1,450	1,070	28	241	2,120	489
14	77	1,110	990	29	204	1,890	473
15	85	1,120	942	30	190	6,420	458
				31	-------	14,100	465
Monthly mean discharge, in cubic feet per second..					99.3	3,685	1,408
Runoff, in acre-feet					5,910	226,600	86,580

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	5.30	1,050	Dec. 24	0500	9.35	15,000	Dec. 30	1600	6.90	5,400
					1000	8.85	12,500		1800	8.20	9,800
22	1200	5.42	1,200		1400	9.80	17,300		2100	10.35	20,200
	1430	6.65	2,800		1800	9.25	14,600		2300	10.72	22,300
	1600	9.42	10,500		2400	8.60	11,400		2400	10.60	21,600
	1900	10.3	15,800								
	2100	11.4	23,400	25	1200	7.25	6,450	31	0600	9.60	16,300
	2400	13.7	43,000		2400	6.35	3,840		1200	9.25	14,600
									1800	8.55	11,200
23	0400	13.1	38,500	26	1200	6.00	3,100		2400	8.08	9,320
	1200	12.1	31,200		2400	5.70	2,500				
	1500	12.8	36,200					Jan. 1	1200	7.63	7,700
	1800	11.35	26,000						2400	7.45	7,080
	2400	10.3	20,000	29	2400	4.87	693				
								2	1200	6.85	5,250
24	0200	10.0	18,300	30	1400	4.80	630		2400	6.40	3,960

(40) 9-4570. San Simon River near Solomon, Ariz.

Location. --Lat 32°48'06", long 109°38'19", in NW¼NE¼ sec. 25, T. 7 S., R. 29 E., 1 mile southwest of Solomon, and 2¼ miles upstream from mouth.

Drainage area. --2,192 sq mi.

Gage-height record. --Water-stage recorder graph except during short periods during recessions of Dec. 10, 11, 15, 17, 23. Graph reconstructed. Datum of gage is 2,960.15 ft above mean sea level, datum of 1929.

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

Maxima. --November 1965 to January 1966: Discharge, 428 cfs 1400 hours Dec. 22 (gage height, 5.08 ft).

1931 to October 1965: Discharge, 27,500 cfs Aug. 9, 1931 (gage height, 19.0 ft), by slope-area measurement of peak flow.

Flood of Aug. 9, 1931, is the maximum since at least the early 1880's. Senate Document 436 gives a peak discharge of 7,548 cfs for the flood of October 1916 and 11,980 cfs for the maximum flood known prior to 1919.

Mean discharge, in cubic feet per second, 1965

Day	December	Day	December	Day	December	Day	December	Day	December
1...	0	7...	0	13...	0	19...	0	25...	0
2...	0	8...	0	14...	0	20...	0	26...	0
3...	0	9...	71	15...	42	21...	0	27...	0
4...	0	10...	191	16...	0	22...	136	28...	0
5...	0	11...	163	17...	139	23...	40	29...	0
6...	0	12...	2.0	18...	0	24...	0	30...	0
								31...	0
Monthly mean discharge, in cubic feet per second									25.3
Runoff, in acre-feet									1,550

(41) 9-4585. Gila River at Safford, Ariz.

Location. --Lat 32°50'50", long 109°42'55", in SW¼SW¼ sec. 5, T. 7 S., R. 26 E., on downstream side of highway bridge 1 mile north of Safford, and 4½ miles downstream from San Simon River.

Drainage area. --10,459 sq mi.

Gage-height record. --Water-stage recorder graph prior to Jan. 6 except for part of Dec. 31. Digital recorder tape Jan. 6-31.

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge computed for Dec. 22-27 only.

Maxima. --November 1965 to January 1966: Discharge, 42,000 cfs 0600 hours Dec. 23 (gage height, 14.2 ft).

1940 to October 1965: Discharge, 33,000 cfs Sept. 30, 1941; gage height, 13.1 ft Jan. 14, 1949.

Remarks. --Publication of records discontinued Sept. 30, 1965.

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of Gila River at Safford, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	7.38	522	Dec. 23	1600	13.75	32,500	Dec. 25	1200	10.3	7,900
					1800	13.95	36,500		1800	9.25	5,400
22	1300	7.35	502		2100	13.40	26,500		2400	8.58	4,170
	1600	8.02	1,060		2400	12.70	19,300				
	1800	9.50	3,030					26	1200	8.02	3,350
	2100	11.31	6,690	24	0600	12.5	17,500		2400	7.60	2,840
	2400	12.16	13,400		1300	11.85	13,800				
					1900	12.5	17,500	27	1200	7.31	2,520
23	0300	13.36	25,900		2400	12.2	15,700		2400	7.05	2,270
	0600	14.2	42,000								
	1200	13.7	31,500	25	0600	11.4	11,600				

(42) 9-4665. Gila River at Calva, Ariz.

Location. --Lat 33°11'10", long 110°13'10", in SW¼ sec. 8, T. 3 S., R. 21 E. (unsurveyed), in San Carlos Indian Reservation, on left bank 530 ft downstream from Southern Pacific Railroad bridge at head of San Carlos Reservoir, 1½ miles northwest of Calva.

Drainage area. --11,470 sq mi.

Gage-height record. --From digital tape or analog recorder graph except 1200 hours Dec. 24 to 1220 hours Dec. 27, which was reconstructed on basis of unpublished records collected at sites 7 miles upstream ("near Bylas") and 4 miles downstream ("near Calva") and from high-water marks. Datum of gage is 2,513.64 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurement below 5,900 cfs and extended above on basis of current-meter measurement of peak at site 7 miles upstream. Stage-discharge relation unstable during flood periods; discharges were computed from detailed study of records for "near Bylas" and "near Calva" stations.

Maxima. --November 1965 to January 1966: Discharge, 39,000 cfs about 1900 hours Dec. 24 (gage height, 15.5 ft).

1929 to October 1965: Discharge, 27,900 cfs Oct. 1, 1941 (gage height, 11.82 ft, site and datum then in use).

Flood of Jan. 20, 1916, probably exceeded 100,000 cfs, determined on basis of peak discharge at stations near Solomon and at Kelvin.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	39	106	15,500	16	36	1,100	919
2	36	90	10,200	17	38	1,430	867
3	27	89	7,920	18	41	2,190	840
4	35	85	4,310	19	46	1,740	836
5	40	85	2,570	20	46	1,270	821
6	41	88	2,000	21	45	1,100	807
7	41	78	1,700	22	40	1,780	774
8	42	64	1,460	23	43	3,130	735
9	38	62	1,340	24	46	17,600	715
10	32	646	1,210	25	49	14,900	685
11	37	2,800	1,130	26	50	8,900	655
12	35	3,050	1,100	27	73	5,290	625
13	36	2,800	1,070	28	127	3,070	590
14	34	1,400	1,020	29	149	2,090	563
15	36	1,160	976	30	112	1,930	544
				31	------	3,240	539
Monthly mean discharge, in cubic feet per second					49.7	2,688	2,385
Runoff, in acre-feet					2,960	165,300	146,600

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Gila River at Calva, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	3.82	1,080	Dec. 25	1200	11.6	12,500	Dec. 31	2400	8.75	6,500
					1400	11.25	11,800				
22	0200	3.87	1,110		1600	11.0	11,200	Jan. 1	0100	10.75	10,000
	1200	3.85	1,100		1800	10.95	10,800		0200	12.00	15,000
	1330	4.65	1,640		2200	11.0	10,100		0230	13.05	16,500
	1430	4.55	1,580		2400	10.9	9,900		0300	13.35	18,000
	1600	5.05	1,980						0400	13.65	19,000
	1800	5.50	2,400	26	0400	10.8	9,800		0430	13.73	19,500
	2000	6.15	2,890		0800	10.5	9,700		0500	13.72	19,800
	2100	6.34	3,120		1200	10.25	9,400		0530	13.74	20,000
	2350	6.40	3,130		1600	9.95	8,600		0630	13.70	19,500
	2400	6.95	3,880		2000	9.6	7,700		0800	13.55	18,500
					2400	9.2	6,900		1000	13.30	17,500
23	0030	7.02	3,980						1200	13.05	16,000
	0200	6.82	3,230	27	0600	8.6	6,000		1500	12.65	14,500
	0400	7.04	3,560		1230	7.95	5,200		1800	12.25	13,500
	0800	6.85	2,990		1800	7.40	4,700		2400	11.32	12,000
	1300	6.90	3,060		2200	6.98	3,890				
	1800	7.15	3,130		2400	6.82	3,660	2	0600	10.62	10,800
	2400	7.40	3,350						0900	10.37	10,400
				28	0300	6.60	3,420		1200	10.20	10,000
24	0200	7.48	3,620		0600	6.42	3,300		1800	9.93	9,600
	0400	7.65	4,200		1200	6.14	3,050		2400	9.71	9,000
	0600	7.95	5,200		1800	5.85	2,760				
	0800	8.35	6,100		2400	5.58	2,760	3	0300	9.53	8,800
	1000	8.90	6,800						0600	9.32	8,700
	1250	9.84	8,700	29	1200	5.25	2,070		1200	8.72	8,000
	1400	13.0	17,000		2400	4.98	1,780		1800	8.27	7,300
	1600	15.1	28,000						2400	7.79	6,400
	1700	15.4	37,000	30	0600	4.91	1,750				
	1800	15.55	38,000		1500	5.00	1,860	4	1200	7.00	4,100
	1900	15.57	39,000		2400	5.4	2,210		2400	6.13	2,850
	2100	15.50	37,500								
	2200	15.3	35,500	31	0900	5.85	2,700	5	0600	5.89	2,700
	2400	14.7	32,000		1200	6.15	2,930		1200	5.70	2,600
					1800	6.73	3,550		2400	5.30	2,200
25	0200	14.1	25,000		2000	7.03	3,840				
	0400	13.5	19,500		2200	7.50	4,500	6	1200	5.06	2,000
	0600	12.9	17,500		2300	7.90	5,100		2400	4.88	1,800
	0800	12.4	15,500								

(43) 9-4671.2. Salt Creek near Peridot, Ariz.
(Crest-stage station)

Location. --Lat 33°16'15", long 110°18'15", at U.S. Highway 70, 4 miles above mouth, and 9.5 miles southeast of Peridot.

Drainage area. --34.2 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 2,800 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culverts.

Maxima. --November 1965 to January 1966: Discharge, 1,270 cfs Dec. 22 (gage height, 15.71 ft).
1964 to October 1965: Discharge, 604 cfs Aug. 13, 1964 (gage height, 13.11 ft).

(44) 9-4685. San Carlos River near Peridot, Ariz.

Location. --Lat 33°19'20", long 110°26'50", in NW¼ sec. 30, T. 1 S., R. 19 E. (unsurveyed), in San Carlos Indian Reservation, at downstream side of concrete pier near right end of highway bridge, 2 miles downstream from San Carlos, and 2 miles upstream from Peridot.

Drainage area. --1,027 sq mi.

Gage-height record. --Water-stage recorder graph except Nov. 27-29, Dec. 20, 25-26, and short periods Dec. 12, 22-24, 30 which were reconstructed from adjoining record. Datum of gage is 2,579.49 ft above mean sea level. Prior to Dec. 22, datum of gage was 2.22 ft higher.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 11,000 cfs and extended above on basis of contracted-opening measurement of peak flow.

Maxima. --November 1965 to January 1966: Discharge, 36,300 cfs 1400 hours Dec. 22 (gage height, 14.8 ft).

1929 to October 1965: Discharge, 40,600 cfs Mar. 14, 1941 (gage height, 11.4 ft, at site 4 miles downstream at different datum), from rating extended above 23,000 cfs on basis of rate of change in storage in San Carlos Reservoir and verified by contracted-opening measurement of the Dec. 22, 1965, peak.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	3.2	8.5	732	16	4.0	547	26
2	3.2	8.2	380	17	4.2	1,100	24
3	3.2	8.0	230	18	4.2	909	29
4	3.2	8.0	182	19	4.2	528	34
5	3.4	8.0	138	20	4.2	340	34
6	3.4	8.2	105	21	4.4	308	37
7	3.5	8.2	85	22	4.7	14,700	37
8	3.4	8.2	69	23	6.0	12,200	31
9	3.5	12	56	24	8.0	1,080	28
10	3.5	2,810	48	25	269	380	26
11	3.7	2,470	43	26	453	270	24
12	3.7	389	38	27	80	234	22
13	4.0	296	32	28	30	185	22
14	3.9	482	30	29	15	146	21
15	4.0	726	28	30	10	4,980	20
				31	------	3,850	23
Monthly mean discharge, in cubic feet per second					31.8	1,581	85.0
Runoff, in acre-feet					1,890	97,200	5,220

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of San Carlos River near Peridot, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	5.26	250	Dec. 23	2400	5.64	2,260	Dec. 30	2400	8.3	7,400
22	0300	5.23	238	24	0600	4.84	1,340	31	0200	9.6	11,200
	0930	5.34	282		1200	4.31	888		0500	8.7	8,500
	1000	5.67	430		1800	3.97	652		0800	7.3	5,100
	1200	11.39	9,910		2400	3.64	470		1000	5.76	2,440
	1330	14.47	34,000						1200	5.62	2,230
	1400	14.80	36,300	29	2400	2.60	109		1500	5.04	1,540
	1630	14.52	34,300						1800	4.80	1,290
	1800	14.31	32,900	30	0830	.77	5		2400	4.69	1,160
	2400	14.07	31,400		0930	2.70	123				
					1030	4.79	1,290	Jan. 1	0500	4.46	944
23	0300	13.64	28,800		1130	8.5	7,900		0900	4.09	652
	0915	9.84	11,900		1230	11.00	16,500		1200	3.96	556
	1300	7.94	6,500		1330	10.7	15,300		2400	3.79	455
	1600	6.89	4,280		1500	9.6	11,200				
	1800	6.14	3,010		2000	7.7	5,900	2	1200	3.60	342
	2000	6.09	2,940		2200	7.3	5,100		2400	3.41	250

(45) 9-4690. San Carlos Reservoir at Coolidge Dam, Ariz.

Location. --Lat 33°10'30", long 110°31'45", in NW¼ sec. 17, T. 3 S., R. 18 E. (unsurveyed), in San Carlos Indian Reservation, at right intake tower of Coolidge Dam on Gila River.

Drainage area. --12,886 sq mi.

Gage-height record. --Water-stage recorder graph except Nov. 15-17 which was reconstructed. Datum of gage is mean sea level, datum of 1929.

Contents. --Contents computed from capacity table based on 1947 survey by Corps of Engineers and Soil Conservation Service.

Maxima. --November 1965 to January 1966: Contents, 374,300 acre-ft Jan. 31 (elevation, 2,465.00 ft).
1928 to October 1965: Contents, 819,200 acre-ft Mar. 18, 1942 (elevation, 2,501.62 ft).

Remarks. --Reservoir is formed by concrete multiple-dome dam completed Oct. 25, 1928. Storage began Nov. 15, 1928. Usable capacity, 1,206,000 acre-ft between elevations 2,382.63 (sill of outlet gate) and 2,523.0 ft (top of automatic spillway gates in raised position). Dead storage below elevation 2,382.63 ft, 3,834 acre-ft. Figures given herein represent usable contents.

Contents, in acre-feet, at 2400 hours, 1965-66, of San Carlos Reservoir at Coolidge Dam, Ariz.

Day	November	December	January	Day	November	December	January
1	4,640	9,400	275,600	16	5,940	51,750	356,500
2	4,730	9,490	300,900	17	6,030	56,280	357,700
3	4,800	9,540	316,000	18	6,120	62,180	359,400
4	4,880	9,530	324,900	19	6,220	67,300	360,900
5	4,960	9,460	330,400	20	6,340	71,120	362,300
6	5,040	9,380	334,400	21	6,440	73,760	363,700
7	5,140	9,310	337,600	22	6,610	90,080	364,900
8	5,230	9,200	340,300	23	6,790	123,100	366,200
9	5,330	9,200	342,700	24	6,950	133,000	367,400
10	5,430	11,840	345,200	25	7,310	172,100	368,400
11	5,500	24,540	347,300	26	8,220	199,400	369,500
12	5,560	31,890	349,200	27	8,540	214,400	370,400
13	5,660	38,800	351,000	28	8,740	222,200	371,400
14	5,750	44,160	352,900	29	9,050	227,500	372,400
15	5,850	48,050	354,600	30	9,290	241,000	373,500
				31	-------	253,400	374,300
Change in contents, in acre-feet					+4,720	+244,110	+120,900

(46) 9-4695. Gila River below Coolidge Dam, Ariz.

Location. --Lat 33°10'15", long 110°31'45", in SW¼ sec. 17, T. 3 S., R. 18 E. (unsurveyed), on left bank 2,200 ft downstream from Coolidge Dam.

Drainage area. --12,886 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 29 to Jan. 4; graph was reconstructed. Datum of gage is 2,309.33 ft above mean sea level, datum of 1929.

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

Maxima. --November 1965 to January 1966: Discharge, 5 cfs 0830 hours Dec. 22 (gage height, 0.18 ft).

1914-27: Discharge, 130,000 cfs Jan. 20, 1916, estimated on basis of peak discharge near Solomon and at Kelvin.

1928 to October 1965: Discharge, 1,350 cfs July 28, 1952 (gage height, 4.64 ft).

Remarks. --Flow regulated by San Carlos Reservoir at Coolidge Dam since 1928.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	1.6	72	2	16	1.6	3.2	3.7
2	1.6	51	2	17	1.6	3.2	3.2
3	1.6	55	1	18	1.6	3.2	2.4
4	1.6	85	1.0	19	1.6	3.2	3.7
5	1.6	102	1.0	20	1.6	3.2	2.8
6	1.6	102	1.6	21	1.6	3.2	3.2
7	1.6	102	1.4	22	1.6	4.2	9.5
8	1.6	102	1.4	23	1.6	3.7	4.8
9	1.6	102	1.4	24	1.6	3.7	8.0
10	1.6	41	2.0	25	1.6	3.7	3.7
11	1.6	3.2	2.4	26	1.6	3.7	2.4
12	1.6	3.2	2.4	27	1.6	3.2	3.7
13	1.6	3.2	2.0	28	1.6	3.7	3.7
14	1.6	3.2	2.0	29	1.6	2.4	2.8
15	1.6	3.7	2.8	30	37	2	2.8
				31	------	2	3.2
Monthly mean discharge, in cubic feet per second..					2.78	28.4	2.92
Runoff, in acre-feet					165	1,750	179

(47) 9-4700. Gila River at Winkelman, Ariz.

Location. --Lat 32°59'05", long 110°46'20", in SW¼NW¼ sec. 24, T. 5 S., R. 15 E., on bridge on State Highway 77 at Winkelman, half a mile upstream from San Pedro River, and 30 miles downstream from Coolidge Dam.

Drainage area. --13,268 sq mi, of which 382 sq mi is below Coolidge Dam.

Gage-height record. --Water-stage recorder graph except 0600 hours Dec. 29 to 0300 hours Dec. 30 and Jan. 2-10, supplemented by once-daily staff-gage readings except on weekends. Datum of gage is 1,907.00 ft above mean sea level, datum of 1927.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 1,600 cfs and extended above on basis of slope-area measurement of peak flow. Stage-discharge relation was affected by backwater from the San Pedro River Dec. 10-11, 15-18, 2000 hours Dec. 22 to Dec. 25. Discharge computed by correcting for an estimated amount of backwater.

Maxima. --November 1965 to January 1966: Discharge, 6,200 cfs 0330 hours Dec. 23 (gage height, 12.06 ft), from slope-area measurement of peak flow.
1917-18, 1928 to October 1965: Discharge, 55,000 cfs, of which 500 cfs was released by Coolidge Dam, Aug. 9, 1944 (gage height, 18.40 ft, at base gage 1½ miles upstream), from rating curve extended above 2,900 cfs on basis of slope-area measurement of peak flow.

Remarks. --Gage used during flood period is that shown as a supplementary gage in annual publication of surface-water records.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	3.7	31	246	16	5.0	200	64
2	3.7	69	184	17	5.0	300	60
3	3.7	57	140	18	5.0	200	74
4	3.7	61	120	19	5.0	156	84
5	3.0	91	110	20	5.8	109	76
6	3.0	103	100	21	6.6	86	76
7	3.7	103	90	22	7.4	1,270	71
8	3.7	101	85	23	11	1,500	71
9	3.7	105	82	24	12	600	65
10	3.7	300	78	25	20	450	64
11	4.3	800	76	26	61	285	59
12	3.7	159	74	27	24	256	55
13	4.3	74	71	28	16	211	52
14	5.0	103	69	29	11	171	52
15	5.8	350	65	30	8.3	536	52
				31	------	485	59
Monthly mean discharge, in cubic feet per second					8.73	301	84.6
Runoff, in acre-feet					519	18,490	5,200

(48) 9-4705. San Pedro River at Palominas, Ariz.

Location. --Lat 31°22'48", long 110°06'38", on section line between sec. 33, T. 23 S., R. 22 E. and sec. 4, T. 24 S., R. 22 E., near left bank on downstream side of State Highway 92, 0.7 mile east of Palominas, $2\frac{1}{2}$ miles upstream from Green Brush Draw, $4\frac{1}{2}$ miles downstream from international boundary, and 12 miles southwest of Bisbee.

Drainage area. --741 sq mi, of which 649 sq mi is in Mexico.

Gage-height record. --Water-stage recorder graph except Dec. 24 to Jan. 10. Datum of gage is 4,187.62 ft above mean sea level (from Arizona Highway Department bench mark).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 798 cfs 1600 hours Dec. 23 (gage height, 5.05 ft).

1927 to October 1965: Discharge, 22,000 cfs Aug. 14, 1940 (gage height, 16.16 ft, present datum), from rating curve extended above 5,600 cfs on basis of slope-area measurement.

Greatest flood known occurred Sept. 28, 1926 (gage height, about 23.9 ft, present datum, from floodmarks; discharge not determined).

Mean discharge, in cubic feet per second, 1965-66

Day	December	January	Day	December	January	Day	December	January
1	0	16	11	22	8.0	21	30	12
2	0	18	12	13	8.0	22	103	10
3	0	15	13	10	8.0	23	698	9.6
4	0	14	14	13	8.0	24	350	9.6
5	0	13	15	29	7.0	25	140	9.1
6	0	13	16	27	7.0	26	80	8.6
7	0	12	17	147	7.0	27	45	9.6
8	0	11	18	88	13	28	30	10
9	4.8	10	19	52	13	29	25	8.6
10	32	9.0	20	38	13	30	18	8.2
						31	15	8.2
Monthly mean discharge, in cubic feet per second							64.8	10.5
Runoff, in acre-feet							3,990	648

(49) 9-4710. San Pedro River at Charleston, Ariz.

Location. --Lat 31°37'40", long 110°10'30", in NE¼NE¼ sec. 11, T. 21 S., R. 21 E., in Spanish land grant of San Juan de las Boquillas y Nogales, at downstream side of pier near center of highway bridge, a quarter of a mile south of Charleston, $1\frac{1}{2}$ miles upstream from Charleston damsite, $8\frac{1}{2}$ miles upstream from Babocomari River, and 29 miles upstream from Benson.

Drainage area. --1,219 sq mi, of which 696 sq mi is in Mexico.

Gage-height record. --Water-stage recorder graph. Datum of gage is 3,954.01 ft above mean sea level, datum of 1929, supplementary adjustment of 1958.

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

Maxima. --November 1965 to January 1966: Discharge, 690 cfs 0830 hours Dec. 23 (gage height, 4.47 ft).

1904 to October 1965: Discharge, 98,000 cfs Sept. 28, 1926 (gage height, 21.9 ft, site and datum then in use), by slope-area measurement of peak flow.

Mean discharge, in cubic feet per second, 1965-66, of San Pedro River at Charleston, Ariz.

Day	November	December	January	Day	November	December	January
1	4.2	8.0	32	16	6.5	25	17
2	4.2	7.7	34	17	6.5	92	18
3	4.2	7.4	29	18	6.8	129	24
4	4.4	7.1	26	19	6.8	66	24
5	4.6	7.1	25	20	6.8	40	24
6	4.8	7.7	25	21	6.8	30	26
7	5.0	8.0	24	22	7.4	33	25
8	5.0	9.5	23	23	8.0	508	25
9	5.3	30	22	24	8.0	382	23
10	5.3	26	19	25	7.7	152	23
11	5.3	26	18	26	7.4	97	22
12	5.6	18	19	27	7.1	58	21
13	5.9	16	19	28	7.4	45	22
14	5.9	16	18	29	7.7	37	22
15	6.2	19	17	30	8.0	30	21
				31	------	28	21
Monthly mean discharge, in cubic feet per second..					6.16	63.4	22.8
Runoff, in acre-feet					367	3,900	1,400

(50) 9-4720. San Pedro River near Redington, Ariz.

Location. --Lat 32°22'50", long 110°26'45", in NE¼NW¼ sec. 19, T. 12 S., R. 19 E., on left bank, a quarter of a mile upstream from Cochise-Pima County line, 4½ miles upstream from Redington, and 30 miles north of Benson.

Drainage area. --2,939 sq mi, of which 696 sq mi is in Mexico.

Gage-height record. --Water-stage recorder graph except Dec. 18 to 0800 hours Dec. 22, Dec. 25-28. Datum of gage is 2,930.04 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 5,020 cfs 1500 hours Dec. 22 (gage height, 13.45 ft).

1943 to October 1965: Discharge, 28,600 cfs Aug. 2, 1951 (gage height, 20.2 ft, present datum).

Greatest discharge known, about 90,000 cfs Sept. 28, 1926 (gage height, 29.0 ft, present datum, from floodmark), computed on basis of records for San Pedro River at Charleston and Gila River at Kelvin.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0.1	0.6	14	16	0.3	33	1.1
2	.1	.6	4.2	17	.3	274	1.1
3	.1	.6	3.2	18	.2	83	1.4
4	.1	.6	2.9	19	.3	103	1.4
5	.1	.6	2.9	20	.3	40	1.2
6	.2	.6	2.9	21	.3	30	1.1
7	.1	.6	2.9	22	.4	1,580	.8
8	.2	.7	2.6	23	.5	1,490	.8
9	.2	2.2	2.6	24	.6	936	.8
10	.2	276	2.2	25	.8	640	.7
11	.3	972	2.0	26	.6	300	.8
12	.3	110	1.8	27	.6	125	.8
13	.3	75	1.6	28	.6	50	1.0
14	.3	55	1.4	29	.6	26	1.0
15	.3	52	1.2	30	.6	85	1.0
				31	------	83	5.1
Monthly mean discharge, in cubic feet per second..					0.33	240	2.21
Runoff, in acre-feet					20	14,730	136

(51) 9-4730. Aravaipa Creek near Mammoth, Ariz.

(Discontinued gaging station, previously published as "near Feldman")

Location. --Lat 32°50'40", long 110°37'45", in NW¼NE¼ sec. 8, T. 7 S., R. 17 E., 2 miles downstream from Holy Joe Canyon, 6 miles upstream from mouth, and 8½ miles north of Mammoth (half a mile downstream from former gaging station).

Drainage area. --538 sq mi at former gaging station half a mile upstream.

Maxima. --November 1965 to January 1966: Discharge, 6,340 cfs Dec. 22, from slope-area measurement of peak flow.
1919-21, 1931-42, 1965: Discharge, 20,000 cfs Aug. 2, 1919 (gage height, 6.3 ft, at site 6 miles downstream at different datum), from rating curve extended above 5,100 cfs on basis of velocity-area study.

(52) 9-4734. San Pedro River near Winkelman, Ariz.

Location. --Lat 32°56'35", long 110°44'55", in SW¼NE¼ sec. 6, T. 6 S., R. 16 E., on right bank, 3½ miles southeast of Winkelman, and 4 miles upstream from mouth.

Drainage area. --4,449 sq mi, of which 696 sq mi is in Mexico.

Gage-height record. --Water-stage recorder graph until Dec. 13. Altitude of gage is 1,990 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for period Dec. 13-31 estimated.

Maxima. --November 1965 to January 1966: Discharge, 16,800 cfs about 2400 hours Dec. 22 (gage height unknown), from slope-area measurement of peak flow.
1962 to October 1965: Discharge, 6,460 cfs Aug. 15, 1964 (gage height, 7.7 ft).

Remarks. --Gage was destroyed by flood of Dec. 22, 1965.

Mean discharge, in cubic feet per second, 1965

Day	November	December	Day	November	December	Day	November	December
1	2.2	8.0	11	2.4	2,590	21	3.5	100
2	2.2	7.0	12	2.4	188	22	3.5	8,000
3	2.2	6.5	13	2.4	20	23	3.5	10,000
4	2.2	6.0	14	2.4	15	24	4.0	2,000
5	2.2	5.5	15	2.6	800	25	5.0	1,000
6	2.4	5.5	16	2.6	700	26	26	450
7	2.4	5.5	17	2.6	1,200	27	6.0	200
8	2.4	5.5	18	2.6	1,200	28	6.5	100
9	2.4	6.5	19	2.8	500	29	7.0	100
10	2.4	1,150	20	3.0	150	30	7.5	350
						31	------	1,300
Monthly mean discharge, in cubic feet per second							4.04	1,038
Runoff, in acre-feet							241	63,810

(53) 9-4736. Tam O'Shanter Wash near Hayden, Ariz.

(Crest-stage station)

Location. --Lat 33°01'46", long 110°52'22", in SE¼NW¼ sec. 1, T. 5 S., R. 14 E., at State Highway 177, 6 miles west of Hayden.

Drainage area. --4.37 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 1,900 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 145 cfs Dec. 22 (gage height, 7.45 ft).
1963 to October 1965: Discharge, 412 cfs July 1965 (gage height, 9.18 ft).

(54) 9-4740. Gila River at Kelvin, Ariz.

Location. --Lat 33°06'10", long 110°58'33", in NE¼NW¼ sec. 12, T. 4 S., R. 13 E., on left bank at Kelvin, 500 ft downstream from Mineral Creek, 17 miles downstream from San Pedro River, and 19½ miles upstream from Ashurst-Hayden Dam.

Drainage area. --18,011 sq mi, of which 5,125 sq mi is below Coolidge Dam.

Gage-height record. --Water-stage recorder graph except Nov. 28 to Dec. 2, 2400 hours Dec. 10 to 1700 hours Dec. 11, and 2000 hours Dec. 22 to 1300 hours Dec. 25 when stage was above the operating range of recorder. Record for Dec. 11 and 22-25 reconstructed on basis of floodmarks and occasional staff-gage readings. Datum of gage is 1,745.02 ft above mean sea level, datum of 1929, supplementary adjustment of 1949.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 13,000 cfs and extended above on basis of slope-area measurement of peak flow. Discharge estimated Nov. 28 to Dec. 2.

Maxima. --November 1965 to January 1966: Discharge, 26,300 cfs 1800 hours Dec. 23 (gage height, 18.5 ft, from floodmarks; gage height at former site, 17.5 ft, from from high-water mark in well).
1911-27: Discharge, about 132,000 cfs Jan. 20, 1916 (gage height, 19.5 ft, at site 900 ft downstream at datum 1.80 ft lower than present datum), from rating curve extended above slope-area measurement at gage height 16.2 ft.
1928 to October 1965: Discharge, 42,800 cfs Aug. 8, 1930 (gage height, 12.6 ft, at site 900 ft downstream at datum 1.80 ft lower than present datum).

Remarks. --Records for flood period represent flow from area below Coolidge Dam (completed in 1928).

Mean discharge, in cubic feet per second, 1965-66, of Gila River at Kelvin, Ariz.

Day	November	December	January	Day	November	December	January
1	12	20	751	16	11	1,150	155
2	13	57	443	17	11	2,130	144
3	14	72	341	18	11	2,040	158
4	11	70	276	19	12	738	180
5	10	75	246	20	12	369	174
6	11	96	218	21	11	251	168
7	10	100	206	22	13	3,350	158
8	9.4	100	197	23	18	14,600	151
9	10	140	184	24	21	8,100	142
10	11	3,670	178	25	311	1,710	136
11	9.4	4,490	170	26	224	892	130
12	11	1,000	164	27	100	565	124
13	12	307	155	28	45	412	121
14	9.7	407	155	29	30	331	120
15	11	1,540	155	30	25	1,470	120
				31	------	1,980	136
Monthly mean discharge, in cubic feet per second..					34.0	1,685	199
Runoff, in acre-feet					2,020	103,600	12,210

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	5.48	216	Dec. 22	2100	13.68	8,560	Dec. 24	1500	11.50	5,200
					2400	13.96	9,120		1700	10.19	3,510
22	0400	5.48	216						2000	9.80	3,120
	0800	5.81	300	23	0530	14.09	9,380		2400	9.21	2,450
	0900	6.16	421		1230	13.99	9,180				
	1000	8.61	1,870		1600	18.00	23,100	25	0100	8.91	2,170
	1100	11.02	4,520		1800	18.50	26,300		1000	8.13	1,740
	1230	11.57	5,220		1930	18.35	25,200		1330	8.37	1,730
	1400	10.80	4,250		2100	17.81	22,000		2000	7.97	1,390
	1630	8.87	2,140		2400	16.92	17,900		2400	7.66	1,180
	1800	11.00	4,550								
	1930	12.66	6,840	24	0600	15.11	11,700	26	1200	7.08	850
	2000	13.25	7,720		1200	13.19	7,640		2400	6.73	686

(55) 9-4795. Gila River near Laveen, Ariz.

Location. --Lat 33°15'25", long 112°09'59", in SW¼NW¼ sec. 16, T. 2 S., R. 2 E., in Gila River Indian Reservation, on left abutment of highway bridge, 2.1 miles upstream from Santa Cruz River, 2.6 miles south of Komatke, and 7.3 miles south of Laveen.

Drainage area. --20,615 sq mi, of which 7,729 sq mi is below Coolidge Dam.

Gage-height record. --Water-stage recorder graph for main channel. Auxiliary graph for overflow channel except 2200 hours Dec. 9 to 1400 hours Dec. 24; record for 2400 hours Dec. 22 to 1400 hours Dec. 24 reconstructed on basis of records for main channel. Datum of gage on main channel is 1,018.90 ft above mean sea level, datum of 1929, supplementary adjustment of 1949. Gage heights are for main channel gage.

Discharge record. --Stage-discharge relation for both channels defined by current-meter measurements below 1,800 cfs and extended above on basis of contracted-opening measurements of peak flows.

Maxima. --November 1965 to January 1966: Discharge, 10,900 cfs, of which 5,720 cfs flowed in overflow channel, 0300 hours Dec. 26 (gage height, 10.08 ft).
1940 to October 1965: Discharge, 11,900 cfs Jan. 2, 1941 (gage height, 9.33 ft).

Remarks. --Records include flow in main and overflow channels. Discharge represents runoff from drainage area below Coolidge Dam. No releases to Gila River at Coolidge Dam.

Mean discharge, in cubic feet per second, 1965-66

Day	December	January	Day	December	January	Day	December	January
1	0	573	11	15	0	21	145	0
2	0	627	12	431	0	22	115	0
3	0	133	13	537	0	23	233	0
4	0	11	14	351	0	24	775	0
5	0	0	15	23	0	25	2,120	0
6	0	0	16	143	0	26	7,040	0
7	0	0	17	357	0	27	1,580	0
8	0	0	18	128	0	28	288	0
9	0	0	19	599	0	29	32	0
10	.2	0	20	512	0	30	6.6	0
						31	13	0
Monthly mean discharge, in cubic feet per second							498	43.4
Runoff, in acre-feet							30,630	2,670

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 23	2400	6.96	505	Dec. 27	1200	7.89	1,320	Jan. 1	2400	7.57	828
					1800	7.71	1,030				
24	1200	7.66	764		2400	7.54	765	2	0300	7.58	864
	2400	7.89	1,050						0600	7.56	837
				30	2400	3.85	2.6		1200	7.46	721
25	0600	8.05	1,270						1500	7.24	634
	1930	8.35	1,920	31	1400	3.81	.1		1700	6.87	502
	2200	9.28	4,880		2200	3.80	0		1900	6.02	335
	2400	9.84	6,880		2300	4.04	172		2000	5.57	292
					2400	5.10	255		2400	4.52	218
26	0300	10.08	7,560								
	0800	9.87	6,830	Jan. 1	0100	6.20	351	3	0200	4.21	203
	1400	9.37	5,630		0200	6.60	413		0400	4.08	183
	1800	9.02	4,200		0400	6.85	468		2400	3.97	55
	2400	8.53	2,850		1300	7.28	588				
					1800	7.41	638	4	1400	3.87	5.3
27	0600	8.15	1,800		2100	7.50	727		2400	3.82	.4

(56) 9-4800. Santa Cruz River near Lochiel, Ariz.

Location. --Lat 31°21'20", long 110°35'25", in SW¼ sec. 11, T. 24 S., R. 17 E. (unsurveyed), on southern border of Spanish land grant of San Rafael, near left bank on downstream side of county road, 1½ miles upstream from international boundary, and 2½ miles northeast of Lochiel.

Drainage area. --82.2 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 4,620 ft (from topographic map).

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

Maxima. --November 1965 to January 1966: Discharge, 97 cfs 2200 hours Dec. 22 (gage height, 2.56 ft).

1949 to October 1965: Discharge, 4,810 cfs Sept. 12, 1965 (gage height, 8.90 ft), from rating curve extended above 2,300 cfs on basis of slope-area measurement of peak flow.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0.1	0	1.3	16	0	0.7	3.9
2	0	0	1.5	17	0	1.7	3.7
3	0	0	2.4	18	0	.7	5.6
4	0	0	2.6	19	0	.7	5.4
5	0	0	2.8	20	0	.6	4.6
6	0	0	3.0	21	0	.6	4.6
7	0	0	3.0	22	0	26	4.6
8	0	0	3.2	23	0	40	4.4
9	0	.4	3.5	24	0	5.5	4.1
10	0	4.7	3.7	25	0	2.1	3.9
11	0	1.0	3.7	26	0	1.4	3.7
12	0	.4	3.7	27	0	1.3	3.9
13	0	.4	3.7	28	0	1.2	4.2
14	0	.5	3.7	29	0	1.2	3.7
15	0	.7	3.9	30	0	1.4	3.7
				31	------	1.4	4.1
Monthly mean discharge, in cubic feet per second..					0.003	3.05	3.67
Runoff, in acre-feet					0.2	183	226

(57) 9-4805. Santa Cruz River near Nogales, Ariz.

Location. --Lat 31°20'40", long 110°51'05", in NW¼ sec. 18, T. 24 S., R. 15 E. (unsurveyed), in Spanish land grant of Maria Santisima del Carmen, on left bank three-quarters of a mile downstream from international boundary, 5¼ miles upstream from Yerba Buena damsite, and 5½ miles east of Nogales.

Drainage area. --533 sq mi, of which 348 sq mi is in Mexico.

Gage-height record. --Water-stage recorder graph. Datum of gage is 3,702.54 ft above mean sea level, datum of 1929 (levels by International Boundary and Water Commission).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 3,700 cfs and extended above on basis of slope-area measurements at 10.38 and 12.03 ft.

Maxima. --November 1965 to January 1966: Discharge, 3,840 cfs 0700 hours Dec. 23 (gage height, 8.84 ft).

1930 to October 1965: Discharge, 12,000 cfs Aug. 31, 1935 (gage height, 12.3 ft), from rating curve extended above 2,300 cfs on basis of slope-area measurements at 9.5 and 10.9 ft; gage height, 13.71 ft Aug. 20, 1955.

Mean discharge, in cubic feet per second, 1965-66, of Santa Cruz River near Nogales, Ariz.

Day	November	December	January	Day	November	December	January
1	0	0.2	102	16	0	489	25
2	0	.2	74	17	0	1,340	27
3	0	.2	59	18	0	471	228
4	0	.2	48	19	0	250	370
5	0	.2	42	20	0	171	203
6	0	.2	36	21	0	126	182
7	0	.2	33	22	0	1,580	140
8	0	.3	31	23	0	2,640	110
9	0	.6	31	24	0	722	85
10	0	643	27	25	.1	341	72
11	0	472	28	26	.1	184	63
12	0	40	27	27	.1	118	59
13	0	19	27	28	.1	88	83
14	0	32	26	29	.1	63	81
15	0	729	26	30	.1	58	74
				31	------	110	69
Monthly mean discharge, in cubic feet per second					0.02	345	80.3
Runoff, in acre-feet					1.2	21,200	4,930

(58) 9-4815. Sonoita Creek near Patagonia, Ariz.

Location. --Lat 31°30'00", long 110°49'00", in SE¼SW¼ sec. 21, T. 22 S., R. 15 E., on left abutment of former railroad bridge, 5 miles downstream from Patagonia.

Drainage area. --209 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 25 to Jan. 20. Datum of gage is 3,818.09 ft above mean sea level, datum of 1929, supplementary adjustment of 1959.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 900 cfs and extended above on basis of slope-area measurements at 8.70 and 10.15 ft. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 2,240 cfs 1430 hours Dec. 22 (gage height, 6.39 ft).

1930 to October 1965: Discharge, 14,000 cfs Sept. 30, 1946 (gage height, 13.0 ft), from rating curve extended above 1,500 cfs on basis of slope-area measurement of peak flow.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0.9	2.5	45	16	1.8	66	10
2	1.2	2.1	35	17	1.8	142	12
3	1.2	2.1	30	18	1.8	72	50
4	1.5	1.8	27	19	1.8	40	60
5	1.5	1.8	25	20	1.4	28	50
6	1.5	2.1	22	21	1.8	21	41
7	1.8	2.1	20	22	2.1	876	35
8	1.8	2.5	20	23	2.5	740	26
9	1.8	9	16	24	2.1	209	22
10	1.8	238	15	25	3.4	130	17
11	1.4	246	14	26	3.4	80	12
12	1.6	14	13	27	3.4	60	12
13	1.8	19	12	28	3.8	45	15
14	1.8	52	11	29	2.9	35	12
15	1.8	86	10	30	2.5	40	12
				31	------	50	18
Monthly mean discharge, in cubic feet per second					2.00	107	23.2
Runoff, in acre-feet					119	6,580	1,430

(59) 9-4820. Santa Cruz River at Continental, Ariz.

Location. --Lat 31°51'10", long 110°58'40", in NE¼NE¼ sec. 23, T. 18 S., R. 13 E. (unsurveyed), in Spanish land grant of San Ignacio de la Canoa, near left bank on downstream side of pier of highway bridge at Continental.

Drainage area. --1,662 sq mi, of which 395 sq mi is in Mexico.

Gage-height record. --Water-stage recorder graph except Dec. 12-15, Dec. 19 to 1300 hours Dec. 22, Jan. 23-31. Datum of gage is 2,836.35 ft above mean sea level, datum of 1929, supplementary adjustment of 1958.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 5,500 cfs and extended above on basis of indirect measurement at gage height 10.13 ft. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 5,990 cfs 0900 hours Dec. 23 (gage height, 9.34 ft).

1940-46, 1951 to October 1965: Discharge, 17,500 cfs Aug. 19, 1955 (gage height, 11.34 ft), from rating extended above 4,600 cfs on basis of float-area measurements at gage heights 7.90 and 8.85 ft.

Mean discharge, in cubic feet per second, 1965-66

Day	December	January	Day	December	January	Day	December	January
1	0	0	11	598	0	21	0	106
2	0	0	12	39	0	22	1,930	84
3	0	0	13	0	0	23	5,190	30
4	0	0	14	0	0	24	1,710	5
5	0	0	15	361	0	25	477	0
6	0	0	16	337	0	26	84	0
7	0	0	17	1,390	0	27	.8	0
8	0	0	18	619	9.5	28	0	0
9	0	0	19	80	208	29	0	0
10	202	0	20	0	123	30	0	0
						31	0	0
Monthly mean discharge, in cubic feet per second							422	18.2
Runoff, in acre-feet							25,920	1,120

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 22	1330	4.75	32	Dec. 23	0600	9.36	5,860	Dec. 24	1500	5.54	1,010
	1440	7.77	2,230		0900	9.34	5,990		1800	5.46	927
	1500	8.08	2,700		1100	9.20	5,880		2400	5.20	640
	1700	8.76	4,720		1200	8.92	5,450				
	1730	9.41	5,310		1230	9.18	5,860	25	1100	5.15	691
	1800	9.53	5,430		1430	9.23	5,930		1800	4.83	325
	1930	9.16	5,060		1700	8.60	5,000		2400	4.57	165
	2200	9.41	5,310		1830	8.32	4,600				
	2400	9.35	5,250		2400	7.46	3,410	26	0700	4.45	109
									1200	4.36	79
23	0230	9.57	5,470	24	0600	6.81	2,560		1800	4.26	49
	0400	9.68	5,580		1200	5.97	1,520		2400	4.12	18

(60) 9-4825. Santa Cruz River at Tucson, Ariz.

Location. --Lat 32°13'15", long 110°58'50", in NE¼NE¼ sec. 14, T. 14 S., R. 13 E., on downstream side of pier of Congress Street Bridge in Tucson.

Drainage area. --2,222 sq mi, of which 395 sq mi is in Mexico.

Gage-height record. --Water-stage recorder graph except part of each day Dec. 10-12, 16-18, 22, 25-28, Jan. 18-20 which was reconstructed, and Dec. 19-21. Datum of gage is 2,317.20 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 4,200 cfs and extended above on basis of slope-area measurement at gage height 21.30 ft and a partial measurement at 19.0 ft, present datum. Discharge for Dec. 19-21 estimated.

Maxima. --November 1965 to January 1966: Discharge, 4,830 cfs 1330 hours Dec. 23 (gage height, 11.82 ft).
1905 to October 1965: Discharge, 16,600 cfs Aug. 23, 1961 (gage height, 21.30 ft, present datum).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0	0	16	0	197	0
2	0	0	0	17	0	712	2.4
3	0	0	0	18	0	329	15
4	0	0	0	19	0	50	62
5	0	0	0	20	0	10	73
6	0	0	0	21	0	0	0
7	0	0	0	22	0	1,300	0
8	0	0	0	23	0	3,680	0
9	0	17	0	24	2.7	1,460	0
10	0	139	0	25	2.1	242	0
11	0	861	0	26	0	24	0
12	0	32	0	27	0	0	0
13	0	0	0	28	0	0	0
14	0	45	0	29	0	0	0
15	0	144	0	30	0	1.9	0
				31	------	0	2.8
Monthly mean discharge, in cubic feet per second..					16	298	5.0
Runoff, in acre-feet					9.5	18,340	308

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 22	0000	6.48	53	Dec. 22	1900	10.77	3,530	Dec. 23	1330	11.82	4,830
	0900	6.40	42		2100	11.12	4,440		1800	11.50	4,310
	1000	7.36	266		2300	10.72	3,440		2200	11.12	3,740
	1200	7.57	348		2400	10.42	2,920		2400	10.92	3,470
	1400	6.41	43								
	1430	9.22	1,400	23	0200	10.73	3,460	24	0600	9.55	1,980
	1530	10.47	3,000		0400	10.02	2,330		1200	8.52	1,120
	1600	10.32	2,760		0600	10.10	2,440		1800	7.87	700
	1730	8.98	1,190		0900	10.92	3,260		2400	7.44	460
	1800	10.02	2,330		1100	11.62	4,170				

(61) 9-4830. Tucson Arroyo at Vine Avenue, Tucson, Ariz.

Location. --Lat 32°13'00", long 110°57'00", in SW¼NE¼ sec. 18, T. 14 S., R. 14 E., on right bank at Vine Avenue in Tucson, a quarter of a mile downstream from Arroyo Chico, and 2½ miles upstream from mouth.

Drainage area. --Original area prior to August 1945, 27.0 sq mi; subsequently reduced to the following areas by flood-control diversion structures: August 1945 to June 1953, 23.4 sq mi; June 1953 to June 1954, 18.1 sq mi; June 1954 to June 1956, 15.9 sq mi; since June 1956, 6.2 sq mi.

Gage-height record. --Water-stage recorder graph. Datum of gage is 2,411.9 ft above mean sea level (city of Tucson bench mark).

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

Maxima. --November 1965 to January 1966: Discharge, 517 cfs 1030 hours Dec. 22 (gage height, 5.76 ft).

1944 to October 1965: Discharge, 5,000 cfs Aug. 22, 1961 (gage height, 10.35 ft), from rating curve extended above 2,100 cfs on basis of slope-area measurements at gage heights 10.13 and 10.35 ft.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0.5	0	16	0	5.4	0
2	0	0	0	17	0	17	15
3	0	0	0	18	0	3.5	17
4	0	0	0	19	0	0	0
5	0	0	0	20	0	0	6
6	0	0	0	21	0	0	0
7	0	0	0	22	0	60	0
8	0	.4	0	23	0	18	0
9	0	48	0	24	3.8	.1	0
10	0	60	0	25	7.2	0	0
11	0	6.4	0	26	0	0	0
12	0	0	0	27	0	0	1
13	0	0	0	28	0	0	0
14	0	27	0	29	0	0	0
15	0	16	0	30	.6	1.7	3
				31	------	0	6
Monthly mean discharge, in cubic feet per second					0.39	8.52	1.55
Runoff, in acre-feet					23	524	95

(62) 9-4831. Tanque Verde Creek near Tucson, Ariz.

Location. --Lat 32°14'48", long 110°40'46", in NE¼NW¼ sec. 2, T. 14 S., R. 16 E., on right bank, 4.4 miles east of Tanque Verde School, 7.4 miles upstream from Agua Caliente Wash, 7.8 miles northwest of Spud Rock, and 17.5 miles east of Tucson.

Drainage area. --43.0 sq mi.

Gage-height record. --Water-stage recorder graph except 1200 hours Dec. 27 to 1600 hours Dec. 30. Altitude of gage is 2,720 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 690 cfs and extended above on basis of slope-area measurements at gage heights 3.85 and 4.86 ft. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 2,760 cfs 1200 hours Dec. 22 (gage height, 4.93 ft).

1959 to October 1965: Discharge, 2,630 cfs Sept. 10, 1964 (gage height, 4.86, from floodmark).

Mean discharge, in cubic feet per second, 1965-66

Day	December	January	Day	December	January	Day	December	January
1	0	78	11	655	11	21	58	81
2	0	52	12	125	11	22	890	51
3	0	39	13	70	10	23	747	32
4	0	29	14	93	7.2	24	333	24
5	0	24	15	244	6.8	25	192	19
6	0	20	16	179	5.8	26	124	16
7	0	18	17	424	5.4	27	78	14
8	0	15	18	234	56	28	65	18
9	143	13	19	112	102	29	60	15
10	880	13	20	72	58	30	199	14
						31	156	178
Monthly mean discharge, in cubic feet per second							198	33.4
Runoff, in acre-feet							12,160	2,060

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	1.66	60.1	Dec. 22	1800	2.95	628	Dec. 23	1700	2.70	440
					2000	2.83	544		1800	2.85	537
22	0200	1.83	92		2300	2.85	558		2400	2.69	434
	0500	2.40	291		2400	3.99	1,540				
	0600	2.68	446					24	1200	2.43	286
	0900	2.85	551	23	0100	4.30	1,890		1600	2.65	410
	1000	4.35	1,960		0200	4.45	2,080		2400	2.37	260
	1200	4.93	2,760		0300	4.13	1,690				
	1300	4.43	2,060		0400	3.95	1,500	25	1200	2.17	176
	1400	4.00	1,550		0700	2.83	524		2400	2.12	160
	1600	3.60	1,150								

(63) 9-4832. Agua Caliente Wash tributary near Tucson, Ariz.

(Crest-stage station)

Location. --Lat 32°16'07", long 110°44'15", in SW¼SW¼ sec. 29, T. 13 S., R. 16 E., at Soldier Trail, 1.4 miles north of Tanque Verde Road, and 5 miles northeast of Tucson city limits.

Drainage area. --2.18 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 2,700 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computation of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 40 cfs Dec. 22 (gage height, 4.30 ft).
August to October 1965: Discharge, 86 cfs August 1965 (gage height, 5.48 ft).

(64) 9-4840. Sabino Creek near Tucson, Ariz.

Location. --Lat 32°19'00", long 110° 48'35", in SE¼NE¼ sec. 9, T. 13 S., R. 15 E., on right bank, half a mile north of Coronado National Forest boundary, and 12 miles northeast of Tucson.

Drainage area. --35.5 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 2,720 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 3,000 cfs and extended above on basis of slope-area measurement of peak of Aug. 10, 1966, at gage height 9.65 ft.

Maxima. --November 1965 to January 1966: Discharge, 3,920 cfs 1130 hours Dec. 22 (gage height, 8.00 ft).
1904-12, 1932 to October 1965: Discharge, 5,100 cfs Mar. 23, 1954 (gage height, 8.43 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	3.3	138	16	0	95	28
2	0	3.1	94	17	0	197	28
3	0	2.9	71	18	0	115	34
4	0	2.8	58	19	0	78	38
5	0	2.6	50	20	0	95	36
6	0	2.5	45	21	0	101	36
7	0	2.5	45	22	0	1,570	32
8	0	2.3	47	23	0	1,050	32
9	0	139	44	24	11	277	31
10	0	941	43	25	145	184	30
11	0	417	43	26	53	141	29
12	0	136	38	27	16	112	28
13	0	70	36	28	7.8	105	27
14	0	84	33	29	4.6	111	28
15	0	135	30	30	3.5	338	30
				31	------	214	39
Monthly mean discharge, in cubic feet per second					8.03	217	42.6
Runoff, in acre-feet					478	13,340	2,620

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of Sabino Creek near Tucson, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	3.22	196	Dec. 22	2000	5.96	1,240	Dec. 23	2400	4.69	382
					2200	7.27	2,770				
22	0200	3.28	103		2230	7.31	2,820	24	0600	4.48	300
	0400	3.52	134		2400	7.17	2,640		1200	4.32	248
	0600	3.94	201						1400	4.31	242
	0800	4.57	347	23	0100	7.27	2,770		1800	4.37	254
	0900	5.40	742		0200	7.12	2,560		2000	4.38	256
	1000	7.46	2,950		0300	6.82	2,170		2400	4.30	232
	1100	7.93	3,780		0400	6.50	1,780				
	1130	8.00	3,920		0600	6.06	1,330	25	1500	4.02	163
	1230	7.84	3,670		0800	5.72	1,040		1700	4.02	163
	1400	7.27	2,760		1000	5.56	917		2100	4.11	176
	1600	6.65	1,970		1200	5.35	768		2400	4.09	171
	1800	6.22	1,500		1800	4.92	495				

(65) 9-4842. Bear Creek near Tucson, Ariz.

Location. --Lat 32°18'20", long 110°48'03", in NW¼ sec. 15, T. 13 S., R. 15 E., on left bank 0.8 mile upstream from mouth, and 15 miles northeast of Tucson.

Drainage area. --16.3 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 2,670 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 300 cfs and extended above on basis of computation of peak flow over dam.

Maxima. --November 1965 to January 1966: Discharge, 1,150 cfs 1200 hours Dec. 22 (gage height, recorded 4.1 ft, affected by drawdown; 4.90 ft outside, from floodmark). 1959 to October 1965: Discharge, 575 cfs Jan. 11, 1960 (gage height, 2.30 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	1.6	68	16	0	47	6.6
2	0	1.4	41	17	0	90	5.3
3	0	1.2	28	18	0	54	15
4	0	1.0	21	19	0	40	20
5	0	.7	18	20	0	49	17
6	0	.6	15	21	0	54	18
7	0	.5	13	22	0	468	14
8	0	.6	13	23	0	374	12
9	0	2.3	13	24	0	122	12
10	0	414	13	25	31	88	9.5
11	0	218	13	26	40	69	9.0
12	0	72	12	27	10	55	8.5
13	0	35	12	28	4.4	49	10
14	0	38	9.0	29	2.6	45	11
15	0	54	7.7	30	1.5	179	12
				31	------	129	20
Monthly mean discharge, in cubic feet per second..					2.98	88.8	16.0
Runoff, in acre-feet					178	5,460	985

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of Bear Creek near Tucson, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	1.52	55	Dec. 22	1800	3.09	492	Dec. 23	0800	2.76	423
					2030	2.86	423		1200	2.48	339
22	0400	1.69	83		2200	3.54	649		1800	2.16	244
	0800	2.02	155		2300	3.84	754		2400	1.96	190
	0900	2.49	288		2400	3.71	709				
	1000	3.15	495					24	0600	1.82	130
	1100	3.84	754	23	0100	3.85	792		1400	1.73	111
	1200	4.14	1,150		0230	3.77	764		1700	1.78	120
	1400	3.94	789		0300	3.82	782		2400	1.72	107
	1600	3.44	614		0500	3.17	554				

(66) 9-4845. Tanque Verde Creek at Tucson, Ariz.

(Crest-stage station)

Location. --Lat 32°15'57", long 110°50'27", in $SE\frac{1}{4}SE\frac{1}{4}$ sec. 30, T. 13 S., R. 15 E., at Sabino Canyon Road, 1.0 mile downstream from Sabino Creek, and $1\frac{1}{4}$ miles northeast of Tucson city limits.

Drainage area. --221 sq mi.

Gage-height record. --Flood-hydrograph recorder graph 2300 hours Dec. 9 to 2000 hours Dec. 12, 1000 hours Dec. 15 to 1000 hours Dec. 19, 2400 hours Dec. 21 to 2000 hours Dec. 26, 0600 hours Dec. 30 to 1000 hours Dec. 31. Datum of gage is 2,464.33 ft above mean sea level (from Pima County bench mark).

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

Maxima. --November 1965 to January 1966: Discharge, 12,200 cfs 1430 hours Dec. 22 (gage height, 7.89 ft).
1940 to October 1965: Discharge, 9,000 cfs Dec. 30, 1940 (gage height, 7.85 ft, at different datum).

Remarks. --Operated as continuous-record station 1940-45; published as Fillito Creek near Wrightstown.

Mean discharge, in cubic feet per second, December 1965

Dec. 10	1,270	Dec. 19	300
11	1,800	22	2,830
12	250	23	4,220
15	370	24	1,150
16	420	25	580
17	1,120	26	250
18	640		

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of Tanque Verde Creek at Tucson, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.20	220	Dec. 22	2000	4.79	2,270	Dec. 24	0400	4.29	1,490
					2200	4.57	1,800		0800	4.03	1,140
22	0300	2.20	220		2400	5.97	4,880		1200	3.89	960
	0500	2.40	335						1600	3.76	820
	0800	2.40	335	23	0100	5.51	3,740		2000	3.89	960
	1000	2.75	575		0200	6.75	7,280		2400	3.96	1,050
	1100	3.30	1,070		0300	7.07	8,480				
	1200	5.00	3,900		0400	6.96	8,040	25	0300	3.69	750
	1300	6.54	7,650		0600	6.75	7,280		0700	3.69	750
	1400	7.49	10,200		0800	5.97	4,880		1500	3.34	416
	1430	7.89	12,200		1000	5.51	3,740		2400	3.27	348
	1500	7.49	10,200		1200	5.27	3,220				
	1600	6.64	6,890		1600	5.15	2,960	26	1200	3.19	266
	1700	5.97	4,870		2000	4.91	2,490		1800	3.19	266
	1800	5.63	4,020		2400	4.61	1,970				
	1900	4.97	3,600								

(67) 9-4845.1. Ventana Canyon Wash near Tucson, Ariz.

(Crest-stage station)

Location. --Lat 32°18'33", long 110°50'20", in SW¼SW¼ sec. 8, T. 13 S., R. 15 E., at Sunrise Drive, half a mile upstream from Esperero Wash, and 4 miles northeast of Tucson city limits.

Drainage area. --6.46 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 2,720 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 260 cfs Dec. 22 (gage height, 11.34 ft).
July to October 1965: Discharge, 93 cfs Sept. 8 (gage height, 7.63 ft).

(68) 9-4846. Pantano Wash near Vail, Ariz.

Location. --Lat 32°02'09", long 110°40'37", in SW¼SE¼ sec. 14, T. 16 S., R. 16 E., on right bank 60 ft upstream from dam, 2.2 miles southeast of Vail, 2.4 miles southwest of Pistol Hill, and 20 miles southeast of Tucson.

Drainage area. --457 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 13-15, 19-21, 24-26, and part of each day Dec. 12, 16, 22, 23, and 27. Graph reconstructed for missing periods. Altitude of gage is 3,205 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 2,000 cfs and extended above on basis of slope-area measurements at gage height 10.9.

Maxima. --November 1965 to January 1966: Discharge, 1,120 cfs 2300 hours Dec. 22 (gage height, 3.52 ft).
1958 to October 1965: Discharge, 38,000 cfs Aug. 11, 1958 (gage height, about 24 ft, from floodmarks).

Mean discharge, in cubic feet per second, 1965-66, of Pantano Wash near Vail, Ariz.

Day	November	December	January	Day	November	December	January
1	0.3	1.7	7.2	16	0.4	2.0	1.7
2	.3	1.7	5.9	17	.4	9.6	1.7
3	.3	1.2	4.8	18	.4	26	2.6
4	.3	1.2	4.3	19	.4	1.7	2.3
5	.2	1.2	3.4	20	.7	1.5	1.7
6	.2	1.2	3.0	21	.7	1.5	2.3
7	.2	1.2	3.0	22	1.7	502	2.3
8	.2	1.2	3.0	23	2.3	550	2.0
9	.3	18	3.0	24	2.3	92	2.0
10	.3	31	2.6	25	3.0	50	2.0
11	.3	154	2.6	26	2.3	30	2.0
12	.3	9.9	2.6	27	2.3	14	2.0
13	.2	1.7	2.6	28	2.3	10	2.3
14	.2	1.7	2.0	29	2.3	7.2	2.3
15	.3	1.7	1.7	30	1.7	19	2.6
				31	------	13	3.0
Monthly mean discharge, in cubic feet per second..					0.90	50.3	2.79
Runoff, in acre-feet					54	3,090	172

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	1.61	1.5	Dec. 22	1645	2.77	507	Dec. 23	0700	2.80	646
					1700	3.22	871		0930	3.07	824
22	0500	1.61	1.5		1730	3.51	1,120		1100	2.71	590
	0600	2.14	127		1800	3.40	1,020		1500	2.34	381
	0630	2.09	106		1900	3.50	1,110		1600	2.41	418
	0800	2.23	168		2030	3.33	960		1630	2.31	356
	0900	2.16	138		2100	3.51	1,120		1800	2.39	407
	1100	2.49	307		2300	3.52	1,120		2000	2.28	331
	1230	2.90	602		2400	3.28	967		2200	2.19	247
	1300	2.68	434						2400	2.22	274
	1400	3.25	898	23	0130	2.90	711				
	1500	3.22	871		0400	3.15	877				

(69) 9-4850. Rincon Creek near Tucson, Ariz.

Location. --Lat 32°07'50", long 110°37'30", in NE¼ sec. 17, T. 15 S., R. 17 E., on left bank, a quarter of a mile north of Sentinel Butte, 9 miles upstream from mouth, and 20 miles southeast of Tucson.

Drainage area. --44.8 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 3,120 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 1,800 cfs and extended above on basis of slope-area measurement of peak flow.

Maxima. --November 1965 to January 1966: Discharge, 3,100 cfs 1230 hours Dec. 22 (gage height, 7.25 ft).

1952 to October 1965: Discharge, 8,250 cfs Aug. 3, 1955 (gage height, 9.90 ft, from floodmarks).

Mean discharge, in cubic feet per second, 1965-66, of Rincon Creek near Tucson, Ariz.

Day	December	January	Day	December	January	Day	December	January
1	0	134	11	374	27	21	55	40
2	0	80	12	74	25	22	977	34
3	0	62	13	46	22	23	658	30
4	0	50	14	48	20	24	136	25
5	0	44	15	55	19	25	90	22
6	0	40	16	51	19	26	77	21
7	0	36	17	70	19	27	72	22
8	0	34	18	70	27	28	68	33
9	12	30	19	58	42	29	66	33
10	405	27	20	58	40	30	251	32
						31	252	35
Monthly mean discharge, in cubic feet per second							130	36.3
Runoff, in acre-feet							7,980	2,230

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	3.57	61	Dec. 22	1900	5.68	832	Dec. 23	1900	4.74	281
					1930	5.44	640		2400	4.45	197
22	0200	4.02	105		2100	5.56	724				
	0400	4.45	180		2200	5.38	598	24	0000	4.45	197
	0500	4.85	313		2400	5.79	936		0700	4.11	133
	0600	4.86	317						1300	3.95	113
	0730	4.71	260	23	0100	6.64	2,180		1500	4.03	123
	0900	5.01	383		0130	6.66	2,210		1700	4.13	135
	1000	6.89	2,560		0200	6.42	1,790		1900	4.14	137
	1100	6.95	2,670		0400	6.04	1,220		2400	3.92	109
	1230	7.25	3,100		0530	5.62	768				
	1300	7.11	2,900		0730	5.42	628	25	0700	3.77	91
	1400	6.40	1,760		0900	5.34	574		1500	3.67	81
	1500	6.24	1,500		1200	5.20	482		2000	3.74	88
	1700	5.83	976		1600	4.93	352		2400	3.70	85

(70) 9-4855. Pantano Wash at Tucson, Ariz.

(Crest-stage station)

Location. --Lat 32°14'57", long 110°50'53", in NW¼NE¼ sec. 6, T. 14 S., R. 15 E., at Tanque Verde Road, 0.7 mile northeast of Tucson city limits, and 1¾ miles above mouth.

Drainage area. --602 sq mi.

Gage-height record. --Flood-hydrograph recorder graph 1500-1900 hours Dec. 22.

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for periods of no gage-height record estimated on basis of records for nearby gaging stations.

Maxima. --November 1965 to January 1966: Discharge, 2,830 cfs 1700 hours Dec. 22 (gage height, 1.9 ft).
1940-41, 1958 to October 1965: Discharge, 20,000 cfs Aug. 11 or 12, 1958 (gage height, 7.5 ft).

Remarks. --Operated as continuous-record station 1940-41; published as "near Tucson."

Mean discharge, in cubic feet per second, December 1965, of Pantano Wash at Tucson, Ariz.

Dec. 22	848
23	1,190
24	75

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	-	0	Dec. 22	1700	1.89	2,830	Dec. 23	0600	-	2,200
					1800	1.84	2,730		1200	-	1,400
22	0900	-	0		1900	1.54	2,180		1800	-	600
	1400	-	200		2200	-	1,200		2400	-	300
	1500	1.24	1,710		2400	-	1,500				
	1530	1.84	2,360					24	1200	-	0
	1600	1.74	2,530	23	0500	-	1,400		2400	-	0

(71) 9-4859. Pima Wash near Tucson, Ariz.

(Crest-stage station)

Location. --Lat 32°20'15", long 110°57'35", in SW¼SW¼ sec. 31, T. 12 S., R. 14 E., at Ina Road, 4 miles north of Tucson city limits.

Drainage area. --4.93 sq mi.

Gage-height record. --Flood-hydrograph recorder graph. Altitude of gage is 2,650 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 125 cfs Dec. 22 (gage height, 9.93 ft).
1964 to October 1965: Discharge, 195 cfs Sept. 6, 1964 (gage height, 11.12 ft).

(72) 9-4859.5. Geronimo Wash near Tucson, Ariz.

(Crest-stage station)

Location. --Lat 32°19'56", long 110°56'37", in SE¼NE¼ sec. 6, T. 13 S., R. 14 E., at Skyline Drive, 0.4 mile southeast of Ina Road, and 3½ miles north of Tucson city limits.

Drainage area. --2.08 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 2,700 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 65 cfs Dec. 22 (gage height, 5.04 ft).
1964 to October 1965: Discharge, 445 cfs Sept. 6, 1964 (gage height, 11.9 ft).

(73) 9-4860. Rillito Creek near Tucson, Ariz.

Location. --Lat 32°17'40", long 110°59'05", in SW¼SE¼ sec. 14, T. 13 S., R. 13 E., on right bank 1,100 ft downstream from Pima Wash, 2,300 ft downstream from bridge on U.S. Highway 89, 4¾ miles upstream from mouth, and 5.4 miles north of Tucson city hall.

Drainage area. --918 sq mi.

Gage-height record. --Water-stage recorder graph of stage at described location to 1600 hours Dec. 22. Flood-hydrograph recorder graph of stage 4½ miles upstream at Dodge Boulevard used as supplementary gage 1600 hours Dec. 22 to 1200 hours Dec. 24 and 1400 hours Dec. 30 to 2200 hours Dec. 31. Wire-weight gage readings made at U.S. Highway 89 on Jan. 4, 7, 21, and 31. Datum of base gage is 2,281.98 ft above mean sea level, datum of 1929, supplementary adjustment of 1954.

Discharge record. --Stage-discharge relation defined by current-meter measurements. Records for Dec. 25-27 and Dec. 31 to Jan. 31 estimated on basis of fragmentary gage-height record, discharge measurements, field estimates, observations of no flow, and records from other stations.

Maxima. --November 1965 to January 1966: Discharge, 12,400 cfs 1600 hours Dec. 22 (gage height, 10.36 ft).

1908 to October 1965: Discharge, 24,000 cfs Sept. 23, 1929 (gage height, 24 ft, from floodmark, at site 1,800 ft upstream at different datum).

Mean discharge, in cubic feet per second, 1965-66

Day	December	January	Day	December	January	Day	December	January
1	0	200	11	1,990	0	21	126	15
2	0	80	12	163	0	22	3,520	5
3	0	20	13	1.0	0	23	3,320	0
4	0	0	14	51	0	24	1,160	0
5	0	0	15	366	0	25	700	0
6	0	0	16	348	0	26	400	0
7	0	0	17	953	0	27	250	0
8	0	0	18	499	0	28	350	0
9	47	0	19	166	50	29	200	0
10	1,130	0	20	109	50	30	600	0
						31	800	6
Monthly mean discharge, in cubic feet per second							556	13.7
Runoff, in acre-feet							34,210	845

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.89	81	Dec. 22	1830	-	6,400	Dec. 23	0730	-	6,000
					1930	-	5,000		0900	-	4,600
22	0800	3.39	194		2100	-	4,200		1200	-	3,800
	0930	4.27	525		2300	-	2,700		1800	-	2,400
	1030	5.40	1,230		2400	-	4,400		2400	-	2,000
	1130	6.03	1,770								
	1200	7.24	3,280	23	0100	-	5,600	24	0400	-	1,450
	1400	9.89	10,800		0200	-	5,800		0600	-	1,350
	1430	9.86	10,700		0400	-	7,600		0800	-	1,160
	1500	9.93	10,900		0430	-	7,900		1000	-	1,120
	1600	10.36	12,400		0500	-	8,200		1200	-	1,080
	1730	-	9,100		0600	-	7,900		2400	-	900

(74) 9-4863. Canada del Oro near Tucson, Ariz.

Location. --Lat 32°22'25", long 111°00'30", in SW¼NW¼ sec. 22, T. 12 S., R. 13 E., near right bank at upstream side of Overton Road, 5 miles upstream from mouth, and 10½ miles north of Tucson city hall.

Drainage area. --250 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 2,380 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 210 cfs and extended above on basis of slope-area measurement of peak flow.

Maximum. --November 1965 to January 1966: Discharge, 2,290 cfs 0100 hours Dec. 23 (gage height, 4.53 ft).

Remarks. --Flow occurred on Dec. 10-11 and 22-24 only.

Mean discharge, in cubic feet per second, December 1965

Dec. 10	36	Dec. 22	585
11	111	23	487

(75) 9-4865. Santa Cruz River at Cortaro, Ariz.

Location. --Lat 32°21'10", long 111°05'45", in SW¼SW¼ sec. 26, T. 12 S., R. 12 E., on downstream side of bridge pier half a mile southwest of Cortaro, 3 miles downstream from Canada del Oro, and 4 miles downstream from Rillito Creek.

Drainage area. --3,503 sq mi.

Gage-height record. --Water-stage recorder graph except Nov. 1-20, Dec. 13-14, 19-21, Dec. 24 to Jan. 20. Graph reconstructed for Dec. 13-14, 19-21. Fragmentary record for Jan. 20-21. Datum of gage is 2,137.13 ft above mean sea level (Arizona Highway Department bench mark).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for periods of no gage-height record estimated on basis of records for upstream stations.

Maxima. --November 1965 to January 1966: Discharge, 16,800 cfs 1800 hours Dec. 22 (gage height, 8.60 ft).
1936 to October 1965: Discharge, 17,000 cfs Aug. 14, 1940 (gage height, 9.9 ft, at site 4¾ miles downstream at different datum).

Mean discharge, in cubic feet per second, 1965

Day	December	January	Day	December	January	Day	December	January
1	0	0	11	2,230	0	21	10	1.4
2	0	0	12	110	0	22	5,420	0
3	0	0	13	0	0	23	8,460	0
4	0	0	14	45	0	24	3,300	0
5	0	0	15	328	0	25	1,000	0
6	0	0	16	536	0	26	100	0
7	0	0	17	1,440	0	27	9	0
8	0	0	18	1,500	0	28	2	0
9	116	0	19	206	1.0	29	0	0
10	1,290	0	20	50	16	30	0	0
						31	200	0
Monthly mean discharge, in cubic feet per second							850	0.59
Runoff, in acre-feet							52,270	36

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of Santa Cruz River at Cortaro, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	(98.99)	2	Dec. 22	2100	6.13	9,300	Dec. 23	0900	4.83	6,300
					2200	5.81	8,500		0930	4.77	6,100
22	1130	(98.91)	2		2300	5.55	7,800		1030	5.02	6,700
	1200	3.27	2,620		2400	5.36	7,350		1400	5.65	8,300
	1300	5.50	7,800						1600	5.51	8,000
	1400	6.68	10,800	23	0130	6.62	10,700		1800	5.29	7,400
	1500	6.91	11,500		0200	6.70	10,900		2000	4.90	6,430
	1600	7.22	12,400		0300	7.16	12,400		2200	4.72	6,000
	1700	8.02	14,900		0330	7.21	12,500		2400	4.56	5,620
	1730	8.44	16,300		0400	6.94	11,700				
	1800	8.60	16,800		0500	7.39	13,100	24	0100	4.56	5,620
	1830	8.39	16,100		0600	7.31	12,900		0600	-	4,200
	1900	7.70	14,500		0630	7.22	12,600		1200	-	2,800
	2000	6.74	10,900		0800	5.69	8,400		2400	-	1,700

(76) 9-4866. Arivaca Creek near Arivaca, Ariz.

(Miscellaneous site)

Location. --Lat 31°36'15", long 111°23'00", in SW¼NW¼ sec. 13, T. 21 S., R. 9 E., at county road 4 miles northwest of Arivaca.

Drainage area. --78.4 sq mi.

Maximum. --November 1965 to January 1966: Discharge, 15,900 cfs Dec. 24 (result of dam failure), from slope-area measurement of peak flow (outside stage at gage, 13.3 ft, from profile of floodmarks).

Remarks. --Gaging station established Mar. 23, 1967.

(77) 9-4872.5. Los Robles Wash near Marana, Ariz.

(Miscellaneous site)

Location. --Lat 32°26'16", long 111°18'13", in SE¼SE¼ sec. 27, T. 11 S., R. 10 E., at Trico Road, three-quarters of a mile downstream from confluence of Brawley Wash and China Draw, 3 miles upstream from Blanco Wash, and 5 miles southwest of Marana.

Drainage area. --1,170 sq mi.

Maxima. --November 1965 to January 1966: Discharge, 2,040 cfs probably Dec. 24 (gage height, 7.0 ft).
1962 to October 1965: Discharge, about 32,000 cfs Sept. 26, 1962, from slope-area measurements at sites upstream and downstream from this site.

Remarks. --Crest-stage station established June 1967.

(78) 9-4890. Santa Cruz River near Laveen, Ariz.

Location. --Lat 33°13'56", long 112°10'08", in NE¼NE¼ sec. 29, T. 2 S., R. 2 E., in the Gila River Indian Reservation, on downstream side of highway bridge, 3.4 miles upstream from mouth, 4.3 miles south of Komatke, and 9 miles south of Laveen.

Drainage area. --8,581 sq mi.

Gage-height record. --Water-stage recorder graph, except 0800 hours Dec. 31 to 0800 hours Jan. 3, Jan. 5-10, for which graph was reconstructed on basis of indicated recession for an adjacent peak. Datum of gage is 1,020.86 ft above mean sea level, datum of 1929, Phoenix-Picacho supplementary adjustment of 1949.

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

Maxima. --November 1965 to January 1966: Discharge, 2,940 cfs 1100 hours Dec. 26 (gage height, 15.50 ft).
1940 to October 1965: Discharge, 9,200 cfs Sept. 29, 1962 (gage height, 17.50 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0	0.4	16	0	172	0
2	0	0	.1	17	0	280	0
3	0	0	4.5	18	0	262	4.3
4	0	0	1.8	19	0	270	2.0
5	0	0	.6	20	0	681	.6
6	0	0	.3	21	0	186	.2
7	0	0	.1	22	0	218	.1
8	0	0	0	23	0	348	.1
9	0	.3	0	24	0	641	0
10	0	5.3	0	25	2.6	2,170	0
11	0	28	0	26	0	2,730	0
12	0	77	0	27	0	1,250	0
13	0	181	0	28	0	327	0
14	0	290	0	29	0	30	0
15	0	163	0	30	0	3.1	0
				31	------	.8	0
Monthly mean discharge, in cubic feet per second					0.09	333	0.49
Runoff, in acre-feet					5.2	20,460	30

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	8.50	136	Dec. 24	0500	11.50	566	Dec. 27	0700	13.73	1,440
					1200	11.45	554		1500	12.87	1,020
22	0600	8.00	110		1600	11.65	600		2400	12.00	699
	0900	9.20	188		2400	13.00	1,080				
	1230	9.30	198					28	0600	11.15	486
	1600	9.80	255	25	0600	14.15	1,660		1200	10.00	284
	1730	10.22	314		1330	15.28	2,660		1800	8.70	148
	1930	10.44	344		2400	15.25	2,630		2400	7.50	80
	2400	10.23	316								
				26	0500	15.45	2,870	29	0500	6.70	47
23	0630	10.40	339		1100	15.50	2,940		1200	5.98	23
	1400	10.52	360		1700	15.40	2,800		2000	5.25	9.2
	1830	10.37	334		2400	14.73	2,090		2200	5.25	9.2
	2400	10.77	406						2400	5.10	6.9

(79) 9-4890.7. North Fork of East Fork Black River near Alpine, Ariz.

Location. --Lat 33°54'10", long 109°19'20", in SW¼NE¼ sec. 19, T. 6 N., R. 29 E. (unsurveyed), in Apache National Forest, on right bank 1½ miles downstream from Crosby Crossing, and 12 miles northwest of Alpine.

Drainage area. --38.1 sq mi.

Gage-height record. --Water-stage recorder graph except Jan. 3-27. Altitude of gage is 8,650 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 76 cfs 2230 hours Nov. 25 (gage height, 2.12 ft).
June to October 1965: Discharge, 126 cfs July 27 (gage height, 2.47 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	1.5	3.6	10	16	1.3	2	1
2	1.5	3.0	8	17	1.2	2	1
3	1.6	2.2	6	18	.9	2	1
4	1.6	2.2	5	19	.9	2	1
5	1.6	2.2	4.5	20	1.0	2	1
6	1.6	2.2	4	21	1.2	2	1
7	1.8	2.6	3.5	22	1.2	2	1
8	1.8	2.2	3	23	4.5	3	1
9	1.8	7.4	2.5	24	5.0	4	1
10	1.7	6.4	2	25	22	3	1
11	1.6	9.8	1.5	26	28	2	1
12	1.4	11	1	27	11	2	1
13	1.4	10	1	28	7.3	2	1
14	1.3	6	1	29	4.2	2	1
15	1.2	3	1	30	3.4	2	1
				31	------	10	1
Monthly mean discharge, in cubic feet per second					3.88	3.80	2.26
Runoff, in acre-feet					231	234	139

(80) 9-4890.8. Hannagan Creek near Hannagan Meadow, Ariz.

(Crest-stage station)

Location. --Lat 33°38'50", long 109°17'20", at U.S. Highway 666, 2.5 miles northeast of Hannagan Meadow.

Drainage area. --1.61 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 8,800 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computation of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, not determined, known to have been less than 20 cfs.
1964 to October 1965: Discharge, 20 cfs Apr. 22, 1965 (gage height, 4.79 ft).

(81) 9-4891. Black River near Maverick, Ariz.

Location. --Lat 33°42'30", long 109°26'50", in SW¼ sec. 30, T. 4 N., R. 28 E., in Apache National Forest, on right bank 1.1 miles upstream from Conklin Creek, 1.2 miles downstream from Fish Creek, and 6 miles southwest of Maverick.

Drainage area. --315 sq mi.

Gage-height record. --Water-stage recorder graph except Jan. 25-26 and part of each day Jan. 2-24, when float was frozen. Graph reconstructed for missing periods. Altitude of gage is 6,850 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Stage-discharge relation affected by backwater from ice part of each day Dec. 19-21.

Maxima. --November 1965 to January 1966: Discharge, 1,290 cfs 2300 hours Dec. 30 (gage height, 3.55 ft).
1962 to October 1965: Discharge, 2,010 cfs Apr. 21, 1965 (gage height, 4.20 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	23	95	742	16	21	127	150
2	23	80	525	17	21	129	147
3	22	69	400	18	21	122	139
4	22	69	380	19	21	103	129
5	22	64	315	20	20	110	115
6	21	58	275	21	21	112	100
7	22	61	240	22	22	142	80
8	22	59	240	23	77	150	80
9	22	90	240	24	113	122	90
10	22	140	220	25	264	129	80
11	22	157	220	26	550	134	70
12	20	169	190	27	224	132	77
13	21	177	180	28	154	129	78
14	21	147	180	29	107	147	69
15	21	127	150	30	99	713	77
				31	------	1,130	73
Monthly mean discharge, in cubic feet per second..					68.7	168	195
Runoff, in acre-feet					4,090	10,300	12,000

(82) 9-4892. Pachete Creek at Maverick, Ariz.

Location. --Lat 33°44'25", long 109°32'25", at corner of secs. 28, 29, 32, 33, T. 4½ N., R. 27 E., in Fort Apache Indian Reservation, on left bank, half a mile south of Maverick.

Drainage area. --14.8 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 19-27 and Jan. 1-13 when only range in stage was recorded. Altitude of gage is 7,850 ft (by barometer).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 78 cfs (time unknown) Dec. 31 (gage height, 3.36 ft).
1957 to October 1965: Discharge, 312 cfs Apr. 22, 1958 (gage height, 4.33 ft).

Mean discharge, in cubic feet per second, 1965-66, of Pachete Creek at Maverick, Ariz.

Day	November	December	January	Day	November	December	January
1	1.1	3.5	40	16	1.1	10	12
2	1.1	3.1	30	17	1.1	10	12
3	1.1	2.7	25	18	1.1	8.4	13
4	1.1	3.3	23	19	1.0	8	12
5	1.1	3.5	22	20	1.0	8	11
6	1.1	3.8	21	21	1.1	8	9.9
7	1.1	4.2	20	22	1.2	25	9
8	1.0	4.2	20	23	4.0	35	9
9	1.0	12	19	24	2.4	15	10
10	1.0	15	18	25	19	10	10
11	1.0	11	17	26	13	9	11
12	1.0	10	16	27	6.2	8	10
13	1.0	13	15	28	4.4	7.7	9
14	1.0	13	14	29	3.6	7.0	8
15	1.0	12	13	30	3.3	38	8
				31	------	53	7
Monthly mean discharge, in cubic feet per second					2.64	12.1	15.3
Runoff, in acre-feet					157	741	940

(83) 9-4895. Black River below pumping plant, near Point of Pines, Ariz.

Location. --Lat 33°28'30", long 109°46'00", in W½ sec. 32, T. 2 N., R. 25 E. (unsurveyed), in San Carlos Indian Reservation, on left bank 1 mile downstream from Phelps Dodge Corp. pumping plant, 1½ miles downstream from Freezeout Creek, 7 miles northwest of Point of Pines, and 63 miles upstream from confluence with White River.

Drainage area. --560 sq mi.

Gage-height record. --Water-stage recorder graph Nov. 1-11; digital recorder tape thereafter. Altitude of gage is 5,742 ft (from river-profile map).

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

Maxima. --November 1965 to January 1966: Discharge, 6,380 cfs 1130 hours Dec. 30 (gage height, 10.86 ft).
1953 to October 1965: Discharge, 5,000 cfs Mar. 23, 1954 (gage height, 9.35 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	42	150	1,760	16	23	249	265
2	42	137	1,130	17	24	259	260
3	41	115	874	18	24	240	255
4	41	102	711	19	32	197	244
5	41	94	586	20	37	207	219
6	41	91	514	21	31	215	211
7	41	80	461	22	30	557	186
8	42	81	441	23	48	1,060	185
9	38	91	409	24	146	442	188
10	27	497	377	25	150	322	183
11	22	600	357	26	811	270	175
12	20	446	349	27	420	251	174
13	20	386	314	28	274	235	201
14	19	330	287	29	202	245	195
15	19	295	279	30	158	3,360	187
				31	------	3,040	167
Monthly mean discharge, in cubic feet per second					96.9	473	392
Runoff, in acre-feet					5,760	29,060	24,090

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Black River below pumping plant, near Point of Pines, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	3.18	208	Dec. 23	2400	4.21	595	Dec. 30	2000	9.11	4,390
									2200	9.12	4,400
22	0600	3.21	214	24	1200	3.81	412		2400	8.83	4,110
	1000	3.44	286		2400	3.65	350				
	1200	3.71	384					31	0600	8.23	3,490
	1400	4.72	930	29	2400	3.56	290		1200	7.64	2,910
	1600	4.94	998						1800	7.22	2,540
	2000	4.81	925	30	0200	4.09	492		2400	7.02	2,380
	2200	4.83	936		0400	5.73	1,410				
	2400	5.39	1,270		0600	7.53	2,830	Jan. 1	1200	6.17	1,690
					0800	7.60	2,890		2400	5.77	1,410
23	0200	5.84	1,560		1000	8.68	3,910				
	0415	5.96	1,640		1130	10.86	6,380	2	0800	5.39	1,170
	0600	5.71	1,470		1200	9.52	4,850		1600	5.11	998
	0800	5.36	1,200		1400	9.02	4,300		2000	5.13	1,010
	1200	4.86	942		1600	8.69	3,970		2400	5.30	1,110
	1800	4.57	782		1800	8.76	4,040				

(84) 9-4897. Big Bonita Creek near Fort Apache, Ariz.

Location. --Lat 33°40'10", long 109°50'45", in NE¼ sec. 28, T. 4 N., R. 24 E. (unsurveyed), in Fort Apache Indian Reservation, near right bank on downstream side of highway bridge, 1¾ miles upstream from Tonto Creek, 3½ miles southeast of Chino Springs, and 11½ miles southeast of Fort Apache.

Drainage area. --119 sq mi.

Gage-height record. --Water-stage recorder graph except 0400 hours Nov. 25 to 1200 hours Nov. 30 and 0700 hours Dec. 31 to Jan. 5. Gage heights estimated 0700-2400 hours Dec. 31. Altitude of gage is 5,910 ft (by barometer).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 1,640 cfs 1230 hours Dec. 30 (gage height, 6.25 ft).
1957 to October 1965: Discharge, 1,200 cfs Aug. 15, 1959 (gage height, 6.20 ft, from floodmark).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	10	70	320	16	11	97	90
2	10	60	320	17	11	91	82
3	11	55	230	18	11	91	81
4	10	49	180	19	11	77	76
5	10	45	160	20	11	93	70
6	10	42	137	21	10	93	59
7	11	41	128	22	12	204	48
8	12	39	130	23	77	250	55
9	13	50	124	24	89	147	55
10	12	305	121	25	308	132	59
11	11	219	121	26	450	121	65
12	11	156	114	27	150	114	70
13	10	145	103	28	120	102	65
14	11	118	96	29	85	114	60
15	11	104	94	30	79	1,030	55
				31	------	756	52
Monthly mean discharge, in cubic feet per second..					53.3	162	110
Runoff, in acre-feet					3,170	9,950	6,780

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of Big Bonita Creek near Fort Apache, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 28	2400	2.93	114	Dec. 30	0500	4.27	489	Dec. 31	0100	5.76	1,282
					0700	4.58	612		0200	5.88	1,370
29	1500	2.88	106		0900	5.25	950		0300	5.82	1,320
	2300	3.00	126		1100	5.96	1,420		0800	5.25	950
	2400	3.12	149		1230	6.25	1,640		1200	4.7	665
					1600	6.08	1,500		2400	3.9	360
30	0300	3.83	339		2000	5.66	1,210				

(85) 9-4905. Black River near Fort Apache, Ariz.

Location. --Lat 33°42'45", long 110°12'40", in NW¼ sec. 12, T. 4 N., R. 20 E. (unsurveyed), on downstream side of highway bridge, 5 miles upstream from confluence with White River, and 14 miles west of Fort Apache.

Drainage area. --1,232 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 4,345 ft (from river-profile map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 8,900 cfs and extended above on basis of slope-area measurement at gage height 14.70 ft and logarithmic plotting.

Maxima. --November 1965 to January 1966: Discharge, 24,800 cfs 1430 hours Dec. 30 (gage height, 20.05 ft).

1912-18, 1957 to October 1965: Recorded discharge, 18,000 cfs Dec. 20, 1914 (gage height, 15.9 ft, from floodmarks, at site 1 mile downstream at different datum), from rating curve extended above 1,000 cfs.

Floods of Jan. 28, 1915, Jan. 19, 1916, and Jan. 29, 1916, exceeded that of Dec. 20, 1914, by unknown amounts; that of Jan. 19, 1916, probably was greatest.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	56	251	4,130	16	42	875	477
2	54	231	2,370	17	42	845	454
3	53	212	1,730	18	44	895	444
4	53	183	1,400	19	47	710	431
5	54	166	1,130	20	47	550	395
6	54	158	955	21	50	577	355
7	54	150	845	22	57	7,770	302
8	56	140	811	23	53	12,900	238
9	57	144	788	24	105	2,770	238
10	58	3,960	730	25	347	1,600	253
11	57	3,760	685	26	1,130	1,170	238
12	49	1,960	658	27	1,110	900	238
13	45	1,450	604	28	616	766	251
14	44	1,500	530	29	427	762	241
15	42	1,120	491	30	308	14,800	241
				31	------	10,600	266
Monthly mean discharge, in cubic feet per second					174	2,383	739
Runoff, in acre-feet					10,340	146,500	45,460

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Black River near Fort Apache, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	4.10	600	Dec. 25	0200	7.24	2,100	Dec. 30	1100	17.98	19,600
					0600	7.04	1,900		1300	19.54	23,500
22	0800	4.45	752		1200	6.48	1,510		1430	20.05	24,800
	0900	4.92	980		1800	6.14	1,670		1600	19.74	24,000
	1100	8.04	3,290		2400	6.27	1,360		1800	18.44	20,800
	1300	10.84	6,490						2100	16.80	17,000
	1500	14.14	11,600	26	0400	6.40	1,440		2400	15.95	15,100
	1700	16.70	16,700		0800	6.30	1,380				
	1830	17.10	17,600		1700	5.59	940	31	0100	16.42	16,100
	2100	16.50	16,300		2400	5.60	945		0200	16.74	16,800
	2400	17.22	17,900						0300	16.66	16,600
				27	0700	5.84	1,070		0500	15.94	15,100
23	0200	18.14	20,000		1800	5.20	739		0800	14.80	12,800
	0300	18.18	20,100		2400	5.22	748		1200	13.10	9,860
	0400	19.30	22,900						1800	11.44	7,180
	0500	19.04	22,200	28	0900	5.50	880		2400	10.30	5,640
	0700	18.54	21,000		1900	5.03	658				
	0800	18.08	19,900		2400	5.04	662	Jan. 1	1200	8.94	4,040
	0900	17.30	18,100						2400	7.98	3,040
	1100	15.64	14,500	29	1000	5.40	830				
	1300	14.10	11,500		1900	5.19	730	2	1200	7.21	2,380
	1600	12.20	8,300		2400	5.26	762		2000	6.74	2,010
	1900	11.20	6,800						2400	6.66	1,950
	2400	9.80	4,800	30	0100	5.34	802				
					0300	6.69	1,690	3	1300	6.44	1,790
24	0600	8.48	3,280		0400	7.28	2,210		2200	6.06	1,510
	1200	7.69	2,970		0600	12.24	8,510		2400	6.09	1,540
	1800	7.18	2,050		0800	15.46	14,100				
	2400	7.24	2,100		1000	17.84	19,300				

(86) 9-4908. North Fork White River near Greer, Ariz.

Location. --Lat 34°00'50", long 109°38'30", in SW¼ sec. 7, T. 7 N., R. 26 E. (unsurveyed), in Fort Apache Indian Reservation, on right bank 300 ft upstream from Bear Cienega Creek, and 11 miles west of Greer.

Drainage area. --39 sq mi, approximately.

Gage-height record. --Water-stage recorder graph except Nov. 9-13, Dec. 26-29, Dec. 31 to Jan. 31. Altitude of gage is 8,400 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 85 cfs and extended above by logarithmic plotting. Stage-discharge relation affected by ice Dec. 12-25, 30. Discharge for Nov. 9-13 and Dec. 12 to Jan. 31 estimated.

Maxima. --November 1965 to January 1966: Discharge, 191 cfs 1600 hours Nov. 25 (gage height, 2.94 ft).
June to October 1965: Discharge, 125 cfs Aug. 1, 16, 1965 (gage height, 1.18 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	12	27	25	16	12	15	13
2	12	24	20	17	12	15	13
3	11	23	18	18	12	15	13
4	12	22	17	19	12	15	13
5	11	20	16	20	12	15	13
6	12	19	15	21	13	15	13
7	12	18	14	22	17	30	13
8	12	16	14	23	77	25	13
9	12	19	14	24	53	18	13
10	12	19	13	25	109	16	13
11	12	15	13	26	84	15	13
12	12	15	13	27	58	15	13
13	13	15	13	28	44	15	13
14	12	15	13	29	34	15	13
15	12	15	13	30	35	50	13
				31	------	40	13
Monthly mean discharge, in cubic feet per second					25.4	19.7	14.2
Runoff, in acre-feet					1,510	1,210	871

(87) 9-4910. North Fork White River near McNary, Ariz.

Location. --Lat 34°02'45", long 109°44'15", in E½ sec. 31, T. 8 N., R. 25 E. (unsurveyed), in Fort Apache Indian Reservation, on left bank 2 miles downstream from Paradise Creek, and 6⅞ miles southeast of McNary.

Drainage area. --66 sq mi, approximately.

Gage-height record. --Water-stage recorder graph except Jan. 10-22. Altitude of gage is 7,750 ft (from Indian Irrigation Services river-profile map).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 250 cfs 1200 hours Dec. 30 (gage height, 2.77 ft).
1945 to October 1965: Discharge, 1,290 cfs Sept. 19, 1946 (gage height, 5.36 ft), from rating curve extended above 350 cfs by logarithmic plotting.

Mean discharge, in cubic feet per second, 1965-66, of North Fork White River near McNary, Ariz.

Day	November	December	January	Day	November	December	January
1	16	51	96	16	16	40	30
2	16	46	86	17	16	40	28
3	15	45	75	18	16	40	28
4	15	41	65	19	16	43	28
5	15	39	55	20	16	45	25
6	15	38	50	21	16	45	25
7	17	37	45	22	17	90	25
8	17	34	40	23	117	75	25
9	17	43	37	24	88	50	25
10	16	46	35	25	226	45	25
11	16	45	35	26	176	45	22
12	16	46	35	27	107	43	22
13	16	43	30	28	78	42	22
14	16	40	30	29	68	45	22
15	15	37	30	30	62	180	20
				31	------	150	20
Monthly mean discharge, in cubic feet per second					42.4	53.2	36.6
Runoff, in acre-feet					2,520	3,270	2,250

(88) 9-4918. North Fork White River tributary near White River, Ariz. (Crest-stage station)

Location. --Lat 33°55'45", long 109°56'30", in SE¼ sec. 8, T. 6 N., R. 23 E. (unsurveyed), at State Highway 73, 6.5 miles north of White River.

Drainage area. --About 2.7 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 5,700 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 24 cfs Dec. 22 (gage height, 5.40 ft).

1964 to October 1965: Discharge, not determined; no known flow occurred during the period, but a peak discharge of less than 24 cfs could have occurred in August or September 1965.

(89) 9-4924. East Fork White River near Fort Apache, Ariz.

Location. --Lat 33°49'20", long 109°48'50", in SE¼ sec. 16, T. 5 N., R. 24 E. (unsurveyed), in Fort Apache Indian Reservation, on left bank 600 ft downstream from highway bridge, 0.1 mile upstream from Rock Creek, and 10¼ miles east of Fort Apache.

Drainage area. --38.8 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 6,050 ft (by barometer).

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

Maxima. --November 1965 to January 1966: Discharge, 256 cfs 1630 hours Nov. 25 (gage height, 2.62 ft).

1957 to October 1965: Discharge, 663 cfs Aug. 17, 1961 (gage height, 4.82 ft, present site and datum, from floodmark), from rating curve extended above 170 cfs on basis of slope-area measurement of peak flow.

Mean discharge, in cubic feet per second, 1965-66, of East Fork White River near Fort Apache, Ariz.

Day	November	December	January	Day	November	December	January
1	8.4	37	71	16	7.9	24	27
2	8.4	31	50	17	8.2	24	25
3	8.2	29	46	18	8.2	22	24
4	8.2	27	40	19	7.9	22	24
5	8.2	25	37	20	8.2	27	21
6	8.2	24	35	21	8.4	27	19
7	9.0	24	34	22	9.0	54	21
8	9.0	24	35	23	79	45	26
9	8.7	28	34	24	99	29	22
10	8.4	42	34	25	155	28	22
11	8.2	34	34	26	180	27	24
12	7.3	28	32	27	91	25	22
13	7.9	29	31	28	66	24	19
14	8.7	27	29	29	50	27	20
15	8.2	24	29	30	42	173	18
				31	------	109	18
Monthly mean discharge, in cubic feet per second					31.5	36.1	29.8
Runoff, in acre-feet					1,870	2,220	1,830

(90) 9-4940. White River near Fort Apache, Ariz.

Location. --Lat 33°44'10", long 110°09'55", in SE¼ sec. 32, T. 4½ N., R. 21 E. (unsurveyed), in Fort Apache Indian Reservation, on right bank 2,200 ft downstream from road crossing, 5 miles upstream from mouth, and 11 miles west of Fort Apache.

Drainage area. --632 sq mi.

Gage-height record. --Water-stage recorder graph. Datum of gage is 4,365.99 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 3,300 cfs and extended above on basis of slope-area measurement of peak flow.

Maxima. --November 1965 to January 1966: Discharge, 4,360 cfs 1530 hours Dec. 30 (gage height, 8.71 ft).

1917-18, 1957 to October 1965: Discharge, 4,900 cfs July 28, 1959 (gage height, 9.2 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	41	242	994	16	43	208	224
2	42	205	656	17	43	216	216
3	42	178	525	18	45	199	219
4	41	162	450	19	45	146	210
5	41	152	398	20	43	158	180
6	42	138	378	21	41	165	170
7	42	136	346	22	45	1,070	127
8	45	129	334	23	102	1,690	134
9	48	141	320	24	428	405	143
10	45	780	302	25	502	309	134
11	43	504	298	26	1,350	274	127
12	43	330	284	27	638	242	136
13	41	288	251	28	414	224	138
14	43	254	227	29	302	233	125
15	45	236	236	30	257	2,400	134
				31	------	1,820	136
Monthly mean discharge, in cubic feet per second					165	440	276
Runoff, in acre-feet					9,800	27,040	16,960

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of White River near Fort Apache, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	3.70	180	Dec. 23	0700	7.45	2,980	Dec. 30	0600	5.50	1,120
					0900	6.55	2,020		0900	6.74	2,210
22	0830	3.80	213		1200	5.67	1,220		1100	7.00	2,480
	0930	4.25	370		1800	4.98	754		1300	7.75	3,300
	1130	5.00	760		2400	4.67	580		1500	8.63	4,270
	1230	5.55	1,140						1530	8.71	4,360
	1400	5.32	968	24	1200	4.25	378		1630	8.63	4,270
	1500	5.92	1,460		1800	4.10	316		1800	8.10	3,690
	1600	6.22	1,720		2200	4.25	378		2400	7.26	2,770
	1700	6.92	2,390		2400	4.26	378				
	1800	7.02	2,500					31	0500	6.75	2,220
	1900	6.74	2,210	25	0200	4.26	370		0630	6.74	2,210
	2000	6.84	2,310		1700	3.98	267		1200	6.25	1,740
	2200	6.92	2,390		2400	4.08	302		1800	5.88	1,430
	2400	6.60	2,070						2400	5.70	1,290
23	0300	7.87	3,440	29	2400	3.89	239	Jan. 1	1200	5.24	968
	0430	8.00	3,580						2400	4.98	808
	0530	7.92	3,490	30	0300	4.20	346				

(91) 9-4943. Carrizo Creek above Corduroy Creek, near Show Low, Ariz.

Location. --Lat 34°00'00", long 110°17'20", in sec. 13, T. 7 N., R. 19 E. (unsurveyed), in Fort Apache Indian Reservation, on left bank half a mile upstream from Corduroy Creek, and 23 miles southwest of Show Low.

Drainage area. --225 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 24-29, Jan. 1-5. Record for Dec. 30-31 uncertain because gage settled 1.36 ft and tilted. Gage heights corrected to datum in use prior to settlement of gage. Altitude of gage is 4,800 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 10,000 cfs 1000 hours Dec. 30; gage height, 9.85 ft inside 0730 hours Dec. 30, 10.3 ft outside, from floodmark.
1953 to October 1965: Discharge, 3,260 cfs Jan. 11, 1960 (gage height, 6.95 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	2.7	6.3	590	16	4.7	25	33
2	2.7	5.1	285	17	4.7	25	31
3	3.0	4.3	165	18	4.7	21	30
4	3.0	4.3	110	19	4.7	17	29
5	3.0	4.3	65	20	4.7	15	27
6	3.3	4.3	58	21	4.7	15	25
7	3.6	4.3	56	22	5.1	297	25
8	3.6	4.3	53	23	10	847	22
9	3.6	16	50	24	9.3	160	20
10	3.9	167	45	25	21	80	19
11	3.9	174	43	26	12	50	19
12	3.9	56	43	27	7.8	40	19
13	4.3	35	39	28	6.8	35	18
14	4.3	30	35	29	5.9	45	18
15	4.3	28	34	30	5.9	5,360	18
				31	------	1,750	17
Monthly mean discharge, in cubic feet per second..					5.50	301	65.8
Runoff, in acre-feet					327	18,500	4,050

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Carrizo Creek above Corduroy Creek, near Show Low, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	5.57	17	Dec. 23	0700	5.67	1,240	Dec. 30	0900	8.85	9,060
					1200	5.02	762		0930	8.0	8,650
22	0600	2.57	17		1800	4.35	450		1000	7.05	10,000
	0800	2.65	24		2400	3.95	318		1300	6.38	7,990
	1100	3.28	115						1330	6.26	7,540
	1330	3.52	169						1600	5.75	5,640
	1400	4.30	425	28	2400	-	45		1900	5.45	4,540
	1500	4.80	643						2000	5.48	4,600
	1600	4.92	700	29	1800	-	45		2400	5.12	3,540
	1800	4.67	589		2400	3.5	160				
	2000	4.53	525					31	0600	4.57	2,300
	2200	4.74	619	30	0100	4.15	362		1200	4.02	1,320
	2400	5.45	507		0300	5.50	1,180		1800	3.82	1,040
					0500	6.90	2,900		2400	3.52	823
23	0130	5.92	1,480		0700	7.75	4,460				
	0230	5.99	1,550		0730	9.85	9,600	Jan. 1	1200	3.37	571
	0500	5.87	1,430		0800	9.1	9,730		2400	3.04	382

(92) 9-4960. Corduroy Creek near mouth, near Show Low, Ariz.

Location. --Lat 34°01'06", long 110°14'30", in sec. 8, T. 7 N., R. 20 E. (unsurveyed), in Fort Apache Indian Reservation, on right bank 4 miles upstream from mouth, and 20 miles southwest of Show Low.

Drainage area. --203 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 24-29, Dec. 31 to Jan. 4, Jan. 26-31. Record for Dec. 30 is poor. Altitude of gage is 5,000 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 10,900 cfs 1100 hours Dec. 30 (gage height, 11.75 ft inside; approximately 12.5 ft outside, from floodmark).
1951 to October 1965: Discharge, 10,900 cfs Jan. 18, 1952 (gage height, 11.1 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	2.0	4.5	270	16	2.2	68	23
2	2.0	4.1	160	17	2.2	57	22
3	2.0	3.4	130	18	2.2	50	23
4	2.0	3.1	114	19	2.2	51	26
5	1.7	3.1	89	20	2.2	53	23
6	1.7	2.8	75	21	2.2	55	21
7	1.7	2.8	66	22	2.2	1,320	19
8	2.0	2.8	59	23	3.1	1,860	19
9	2.0	5.3	56	24	3.1	300	19
10	2.0	567	46	25	4.9	150	19
11	2.2	324	43	26	7.8	80	18
12	2.2	123	37	27	12	50	16
13	2.2	57	30	28	11	40	15
14	2.2	48	27	29	6.6	50	14
15	2.2	50	25	30	5.3	4,760	14
				31	------	600	15
Monthly mean discharge, in cubic feet per second..					3.31	347	49.5
Runoff, in acre-feet					197	21,310	3,040

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of Corduroy Creek near mouth, near Show Low, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.70	65	Dec. 22	2200	7.10	2,600	Dec. 29	2400	5.0	960
					2400	8.45	4,040				
22	0600	2.75	73					30	0200	6.3	1,860
	0900	2.86	91	23	0030	8.68	4,300		0400	8.0	3,540
	1030	3.25	199		0200	8.42	4,000		0600	10.75	7,150
	1100	3.75	384		0400	8.15	3,700		0800	10.20	6,300
	1200	5.50	1,280		0500	7.90	3,430		1100	11.75	10,900
	1300	6.90	2,400		0600	7.35	2,850		1300	9.65	7,120
	1430	7.38	2,880		0800	6.34	1,890		1400	8.65	5,620
	1600	7.15	2,650		1100	5.58	1,340		1500	7.90	4,500
	1800	6.65	2,160		1600	5.04	984		1700	7.10	3,420
	2030	6.30	1,860		2400	4.5	696		2000	6.00	2,300
	2100	6.40	1,940						2400	5.12	1,550

(93) 9-4965. Carrizo Creek near Show Low, Ariz.
(Gaging station, discontinued 1960)

Location. --Lat 33°59'15", long 110°17'00", in sec. 24, T. 7 N., R. 19 E., at U. S. Highway 60, 1 mile downstream from Cordoroy Creek, and 23½ miles southwest of Show Low.

Drainage area. --459 sq mi.

Gage-height record. --Crest stages only, from high-water mark in old well.

Discharge record. --Discharge obtained from rating curve in use prior to discontinuance of station in 1960; stage-discharge relation was defined by current-meter measurements below 2,000 cfs and extended above on basis of slope-area measurement at gage height 12.08 ft.

Maxima. --November 1965 to January 1966: Discharge, approximately 23,000 cfs (gage height, 13.0 ft, estimated mean of surge, based on high-water mark in well).
1951 to October 1965: Discharge, 20,500 cfs Jan. 18, 1952 (gage height, 12.08 ft).

(94) 9-4967. Cibecue No. 2, tributary to Carrizo Creek, near Show Low, Ariz.

Location. --Lat 34°00', long 110°19', in NE¼ sec. 22, T. 7 N., R. 19 E. (unsurveyed), in Fort Apache Indian Reservation, on an unnamed tributary to Carrizo Creek, on Cibecue Ridge, 1.9 miles upstream from mouth of main stem, and 25 miles southwest of Show Low.

Drainage area. --0.065 sq mi (41.7 acres).

Gage-height record. --Digital recorder tape. Altitude of gage is 5,200 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by laboratory rating of full-scale model of flume.

Maxima. --November 1965 to January 1966: Discharge, 3 cfs 1130 hours Dec. 22 (gage height, 1.67 ft).
1958 to October 1965: Discharge, about 120 cfs Aug. 20, 1963 (gage height not determined).

Mean discharge, in cubic feet per second, 1965

Nov. 25	0.27	Dec. 22	1.17
Dec. 9	.33	23	.02
10	.45	29	.07
17	.01	30	.74

No flow during remainder of flood period.

(95) 9-4968. Carrizo Creek tributary near Show Low, Ariz.

(Crest-stage station)

Location. --Lat 33°57'30", long 110°20'00", at U.S. Highway 60, 28 miles southwest of Show Low.

Drainage area. --4.63 sq mi, of which 2.08 sq mi above Wild Steer Tank is generally noncontributing.

Gage-height record. --Crest stages only. Altitude of gage is 5,400 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, not determined, less than 80 cfs (minimum that will record on gage).
1963 to October 1965: Discharge, 1,260 cfs July 31, 1964 (gage height, 20.94 ft).

(96) 9-4975. Salt River near Chrysotile, Ariz.

Location. --Lat 33°48', long 110°30', in sec. 25, T. 5 N., R. 17 E. (unsurveyed), in San Carlos Indian Reservation, on left bank 1,200 ft upstream from U.S. Highway 60, $5\frac{1}{2}$ miles northeast of Chrysotile, 8 miles upstream from Cibecue Creek, and 33 miles downstream from confluence of Black and White Rivers.

Drainage area. --2,849 sq mi.

Gage-height record. --Water-stage recorder graph except Jan. 24-31. Datum of gage is 3,354.57 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 41,100 cfs 1700 hours Dec. 30 (gage height, 14.32 ft).
1906 to October 1965: Discharge, 74,000 cfs probably Jan. 19, 1916 (gage height, 18.0 ft, from floodmark), from rating curve extended above 52,000 cfs by logarithmic plotting.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	144	599	7,820	16	134	1,390	802
2	144	537	4,410	17	134	1,300	770
3	144	491	2,870	18	134	1,320	730
4	144	441	2,230	19	137	1,180	715
5	144	412	1,780	20	137	882	685
6	144	383	1,490	21	140	858	613
7	144	366	1,360	22	144	9,480	565
8	144	350	1,300	23	164	24,600	498
9	147	356	1,250	24	376	5,520	500
10	153	5,280	1,180	25	571	2,720	495
11	153	7,020	1,110	26	2,420	2,060	490
12	150	3,280	1,070	27	2,060	1,600	490
13	140	1,810	989	28	1,300	1,360	485
14	134	2,170	882	29	899	1,260	485
15	130	1,650	818	30	715	23,000	485
				31	------	19,800	485
Monthly mean discharge, in cubic feet per second					387	3,983	1,286
Runoff, in acre-feet					23,060	244,900	79,050

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Salt River near Chrysotile, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.78	858	Dec. 24	0800	6.51	6,120	Dec. 30	1400	13.70	37,400
					1600	5.49	4,080		1600	14.30	41,000
22	0600	2.71	802		2400	4.78	3,030		1700	14.32	41,100
	1000	2.86	926						1800	14.30	41,000
	1100	4.88	3,110	25	0700	4.80	3,060		2100	13.65	38,300
	1200	6.28	5,550		1200	4.65	2,900		2400	12.40	31,400
	1330	7.38	8,190		2400	3.91	2,070				
	1500	7.58	8,640					31	0430	11.20	25,000
	1600	8.83	12,500	26	1100	4.09	2,330		0700	11.30	25,500
	1900	10.24	17,600		2400	3.55	1,600		1000	10.80	23,000
	2100	12.13	26,400						1200	10.12	19,600
	2200	12.91	30,600	29	2400	3.26	1,300		1630	9.00	15,000
	2400	12.98	31,000						2000	8.18	12,100
				30	0130	3.27	1,300		2400	7.71	10,500
23	0400	13.03	31,300		0430	4.62	2,930				
	0730	13.68	35,200		0630	4.57	2,860	Jan. 1	0800	7.00	8,400
	1100	13.08	31,600		0730	5.34	4,080		1600	6.45	6,980
	1400	11.53	23,600		0900	7.99	10,500		2400	5.92	5,650
	1700	9.96	16,600		1000	10.30	18,600				
	1930	9.00	13,100		1200	12.75	31,100	2	1200	5.35	4,400
	2400	7.93	9,690		1300	14.16	40,200		2400	4.68	3,190

(97) 9-4978. Cibecue Creek near Chrysotile, Ariz.

Location. --Lat 33°50'25", long 110°33'25", in E½ sec. 8, T. 5 N., R. 17 E. (unsurveyed), in Fort Apache Indian Reservation, on right bank half a mile upstream from mouth, and 7 miles north of Chrysotile.

Drainage area. --295 sq mi.

Gage-height record. --Water-stage recorder graph except 2000-2400 hours Dec. 22 for which graph was reconstructed. Altitude of gage is 3,200 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 2,200 cfs and extended above on basis of slope-area measuremerts at gage heights 7.7 and 10.50 ft.

Maxima. --November 1965 to January 1966: Discharge, 8,800 cfs 0800 hours Dec. 30 (gage height, 10.70 ft).

1959 to October 1965: Discharge, 8,480 cfs July 29, 1964 (gage height, 10.04 ft); gage height, 10.5 ft Aug. 31, 1963.

Mean discharge, in cubic feet per second, 1965-66, of Cibecue Creek near Chrysotile, Ariz.

Day	November	December	January	Day	November	December	January
1	12	26	379	16	12	65	48
2	12	23	275	17	13	89	45
3	12	19	221	18	13	65	48
4	12	18	185	19	13	43	48
5	12	17	136	20	13	36	43
6	12	16	116	21	13	34	38
7	12	15	100	22	14	2,130	38
8	12	15	93	23	30	1,340	36
9	12	90	82	24	26	275	32
10	12	1,130	65	25	200	185	30
11	12	253	56	26	59	149	30
12	12	62	56	27	43	132	30
13	12	59	53	28	56	124	28
14	12	72	50	29	43	150	28
15	12	93	50	30	32	3,890	30
				31	------	800	32
Monthly mean discharge, in cubic feet per second					25.3	368	80.7
Runoff, in acre-feet					1,510	22,640	4,960

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.65	32.0	Dec. 23	1500	4.05	685	Dec. 30	0600	7.9	4,900
					1800	3.90	580		0800	10.7	8,800
22	0500	2.65	32.0		2400	3.65	420		0900	9.85	7,350
	0700	2.75	56.0						1000	9.0	6,200
	0800	3.83	601	24	1200	3.33	245		1300	8.25	5,320
	0900	5.00	1,540		2400	3.30	230		1600	7.04	3,720
	1100	6.4	2,950						2100	5.52	1,980
	1300	7.6	4,460						2400	5.00	1,490
	1400	6.8	3,430	28	2400	3.06	124				
	1700	5.6	2,070					31	0230	4.70	1,220
	2000	7.2	3,930	29	1600	3.06	124		0300	4.75	1,260
	2100	9.3	6,800		2000	3.14	158		0600	4.52	1,060
	2300	8.5	5,580		2030	3.38	270		1200	4.05	685
	2400	8.00	5,050		2200	3.28	221		1800	3.74	476
					2300	3.40	280				
23	0400	5.80	2,290		2400	3.98	636	Jan. 1	1200	3.60	390
	0700	4.70	1,220						2400	3.47	318
	1100	4.35	920	30	0300	5.60	2,070				

(98) 9-4979. Cherry Creek near Young, Ariz.

Location. --Lat 34°05'00", long 110°55'25", in SE¼NE¼ sec. 32, T. 9 N., R. 14 E., on left bank 0.3 mile downstream from Deadman Canyon, and 2 miles southeast of Young.

Drainage area. --62.1 sq mi.

Gage-height record. --Water-stage recorder graph except Jan. 2-11. Altitude of gage is 4,950 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 22 cfs and extended above on basis of slope-area measurement at gage height 5.90 ft. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 3,400 cfs 2100 hours Dec. 22 (gage height, 6.6 ft).

1963 to October 1965: Discharge, 3,280 cfs Aug. 17, 1965 (gage height, 6.48 ft), from rating extended above 150 cfs on basis of slope-area measurement at gage height 5.90 ft.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0.8	1.8	87	16	1.1	57	13
2	.8	1.8	55	17	1.2	60	13
3	.9	1.6	45	18	1.4	55	14
4	.9	1.6	40	19	1.4	47	13
5	.9	1.6	35	20	1.2	44	14
6	.9	1.6	30	21	1.2	44	13
7	.9	1.6	25	22	1.4	1,080	13
8	.9	1.8	25	23	2.4	618	13
9	.9	28	25	24	1.6	188	13
10	.9	712	20	25	54	135	13
11	.9	221	20	26	49	107	12
12	.9	120	18	27	12	90	12
13	.9	80	15	28	4.9	85	11
14	.9	70	14	29	2.8	118	11
15	1.1	68	14	30	1.8	1,070	11
				31	------	168	11
Monthly mean discharge, in cubic feet per second					5.03	170	21.5
Runoff, in acre-feet					299	10,470	1,320

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of Cherry Creek near Young, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	1.61	46	Dec. 22	2300	4.95	1,600	Dec. 29	2200	2.19	282
					2400	4.64	1,550		2400	2.73	472
22	0700	1.67	55								
	0900	3.05	478	23	0400	3.83	1,000	30	0200	3.21	725
	0930	4.95	1,770		0800	3.16	650		0300	3.73	938
	1000	5.24	1,960		1200	2.72	468		0600	4.55	1,460
	1030	4.95	1,770		1800	2.37	340		0800	4.99	1,820
	1200	4.32	1,240		2400	2.06	249		1000	5.30	2,100
	1300	4.95	1,770						1100	4.99	1,620
	1315	5.15	1,870	24	1200	1.78	170		1300	4.35	1,350
	1330	4.95	1,770		2400	1.74	161		1600	3.56	850
	1400	4.65	1,510						1900	2.96	564
	1630	3.88	934						2400	2.31	318
	1800	4.77	1,610	28	2400	1.35	84				
	1930	4.56	1,430					31	0600	1.88	195
	2000	4.95	1,770	29	1600	1.35	84		1200	1.66	144
	2100	6.6	3,400		1900	1.38	89		1800	1.54	119
	2200	5.50	2,.220		2030	1.61	133		2400	1.48	107

(99) 9-4979.8. Cherry Creek near Globe, Ariz.

Location. --Lat 33°49'40", long 110°51'20", in SW¼ sec. 30, T. 6 N., R. 15 E. (unsurveyed), in Tonto National Forest, on left bank 0.2 mile upstream from Devils Chasm, 13 miles upstream from mouth, and 30 miles north of Globe.

Drainage area. --200 sq mi.

Gage-height record. --Water-stage recorder graph Nov. 1 to Dec. 10; digital recorder tape Jan. 7-31. Altitude of gage is 3,200 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 75 cfs and extended above on basis of slope-area measurements at gage heights 5.85, 6.70, and 12.3 ft. Discharge for period of no gage-height record estimated on basis of record for Cherry Creek near Young.

Maxima. --November 1965 to January 1966: Discharge, 6,620 cfs (time unknown) Dec. 22 (gage height, 12.3 ft), from slope-area measurement of peak flow.
May to October 1965: Discharge, 2,280 cfs Aug. 17, 1965 (gage height. 6.70 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	6.9	12	300	16	7.4	200	31
2	6.9	11	200	17	7.9	180	31
3	6.9	10	130	18	8.5	170	37
4	6.9	9.1	110	19	8.5	160	38
5	6.9	9.1	100	20	8.5	150	35
6	7.4	7.9	80	21	8.5	140	31
7	7.4	6.9	74	22	11	3,500	29
8	7.4	7.4	69	23	54	1,000	27
9	7.4	217	64	24	20	500	25
10	7.4	2,300	56	25	246	450	24
11	7.4	700	50	26	178	350	22
12	7.4	350	45	27	48	300	21
13	7.4	300	41	28	23	280	20
14	7.4	250	36	29	14	350	20
15	7.4	220	33	30	13	3,500	20
				31	------	1,000	22
Monthly mean discharge, in cubic feet per second..					25.5	537	58.7
Runoff, in acre-feet					1,520	33,010	3,610

(100) 9-4985. Salt River near Roosevelt, Ariz.

Location. --Lat 33°37'10", long 110°55'15", in SE¼NE¼ sec. 9, T. 3 N., R. 14 E. (unsurveyed), in Tonto National Forest, on left bank 100 ft downstream from State Highway 288, a quarter of a mile downstream from Pinal Creek, 14 miles east of village of Roosevelt, and 17 miles upstream from Roosevelt Dam.

Drainage area. --4,306 sq mi.

Gage-height record. --Water-stage recorder graph. Datum of gage is 2,177.14 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 47,000 cfs and extended above by logarithmic plotting.

Maxima. --November 1965 to January 1966: Discharge, 68,800 cfs 0400 hours Dec. 23 (gage height, 25.8 ft).

1906 to October 1965: Discharge, 117,000 cfs Mar. 14, 1941 (gage height, 24.4 ft), from rating curve extended above 55,000 cfs on basis of velocity-area studies and float-area measurements at 66,000 and 102,000 cfs.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	165	845	10,500	16	162	2,110	1,110
2	165	690	5,930	17	165	2,090	1,060
3	165	616	4,060	18	165	2,040	1,060
4	165	550	3,160	19	165	1,780	1,060
5	165	490	2,500	20	167	1,430	1,020
6	165	445	2,120	21	167	1,290	943
7	167	417	1,920	22	172	13,200	853
8	167	390	1,730	23	194	45,100	763
9	169	450	1,640	24	274	11,700	684
10	172	9,410	1,560	25	919	5,170	684
11	174	12,900	1,450	26	3,070	3,300	684
12	174	5,660	1,380	27	2,820	2,400	644
13	172	2,710	1,330	28	1,900	1,960	644
14	167	2,860	1,240	29	1,330	1,740	644
15	165	2,580	1,160	30	1,020	29,200	644
				31	------	30,600	644
Monthly mean discharge, in cubic feet per second..					507	6,326	1,770
Runoff, in acre-feet					30,160	389,000	108,700

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	9.25	1,260	Dec. 23	1200	23.15	47,400	Dec. 30	0900	17.50	18,100
					1800	21.20	35,700		1200	20.00	29,500
22	0300	9.35	1,360		2400	18.30	21,300		1500	21.00	34,500
	0900	9.40	1,400						1800	23.90	52,800
	1000	9.42	1,420	24	0600	16.50	14,300		2100	24.80	59,900
	1100	10.25	2,210		1200	15.30	10,600		2400	24.30	55,900
	1200	10.58	2,560		1800	14.35	8,030				
	1300	12.22	4,890		2400	13.75	6,570	31	0600	21.60	38,100
	1400	13.58	7,460						1000	20.00	29,500
	1530	15.75	12,800	25	0600	13.25	5,500		1200	19.90	29,000
	1800	20.35	31,200		1800	12.85	4,700		1800	18.25	21,100
	1900	21.00	34,500		2400	12.58	4,200		2400	16.80	15,400
	2000	21.33	36,500								
	2130	21.17	35,500					Jan. 1	1200	14.95	9,660
	2400	22.35	42,600	29	2400	10.82	1,780		2400	14.10	7,400
23	0200	24.05	53,900	30	0400	11.60	2,680	2	1200	13.40	5,800
	0400	25.8	68,800		0500	13.50	6,020		2400	12.85	4,700
	1000	23.15	47,400		0600	14.30	7,900				

(101) 9-4988. Tonto Creek near Gisela, Ariz.

Location. --Lat 34°07'44", long 111°15'17", in NE¼ sec. 18, T. 9 N., R. 11 E., in Tonto National Forest, on left bank 0.2 mile upstream from Houston Creek, and 1½ miles northeast of Gisela.

Drainage area. --430 sq mi.

Gage-height record. --Water-stage recorder graph until Dec. 15. Altitude of gage is 2,940 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 13,000 cfs and extended above on basis of slope-area measurement of peak flow below Houston Creek. Discharge after Dec. 15 estimated on basis of records for Tonto Creek above Gun Creek, near Roosevelt.

Maxima. --November 1965 to January 1966: Discharge, approximately 30,000 cfs 1900 hours Dec. 22 (gage height, 19.0 ft), from slope-area measurement of peak flow adjusted for inflow from Houston Creek.
1964 to October 1965: Discharge, 12,600 cfs Jan. 7, 1965 (gage height, 11.7 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	10	57	1,200	16	12	800	115
2	10	50	700	17	12	900	120
3	10	45	400	18	13	800	125
4	10	41	350	19	13	700	120
5	11	37	300	20	12	700	110
6	11	36	250	21	12	700	100
7	11	33	230	22	13	13,000	95
8	11	32	210	23	45	8,000	85
9	11	130	190	24	125	2,000	80
10	11	10,400	180	25	1,900	1,100	75
11	11	3,040	160	26	726	800	70
12	11	1,400	150	27	168	500	68
13	11	727	140	28	111	400	65
14	12	904	130	29	83	350	62
15	12	1,000	120	30	67	10,000	60
				31	------	2,500	58
Monthly mean discharge, in cubic feet per second					116	1,974	197
Runoff, in acre-feet					6,890	121,400	12,130

(102) Houston Creek near Gisela, Ariz.

(Miscellaneous site)

Location. --Lat 34°07'32", long 111°15'26", in SE¼NE¼ sec. 18, T. 9 N., R. 11 E., 300 ft upstream from mouth, and 8.7 miles southeast of Payson.

Drainage area. --56.2 sq mi.

Maximum. --November 1965 to January 1966: Discharge, 4,530 cfs Dec. 22, from slope-area measurement of peak flow.

(103) 9-4988.7. Rye Creek near Gisela, Ariz.

Location. --Lat 34°02'15", long 111°17'40", in sec. 13, T. 8 N., R. 10 E., in Tonto National Forest, on right bank a quarter of a mile upstream from mouth, 0.7 mile downstream from bridge on county road, and 5½ miles south of Gisela.

Drainage area. --122 sq mi.

Gage-height record. --Water-stage recorder graph after Dec. 8. Altitude of gage is 2,730 ft (from topographic map).

Discharge record. --Stage-discharge relation poorly defined by current-meter measurements below 3,900 cfs and extended above on basis of slope-area measurement of peak flow.

Maximum. --November 1965 to January 1966: Discharge, 8,130 cfs 2100 hours Dec. 22 (gage height, 8.0 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	December	January	Day	December	January	Day	December	January
1	-	199	11	379	33	21	110	20
2	-	150	12	168	31	22	2,930	18
3	-	110	13	102	28	23	1,960	17
4	-	86	14	203	25	24	467	15
5	-	68	15	197	23	25	280	15
6	-	61	16	117	20	26	192	14
7	-	53	17	219	18	27	152	14
8	-	46	18	143	23	28	125	13
9	5	42	19	105	24	29	141	13
10	725	35	20	105	22	30	2,190	13
						31	486	13
Monthly mean discharge, in cubic feet per second							-	40.7
Runoff, in acre-feet							-	2,500

(104) 9-4989. Gold Creek near Payson, Ariz.

(Crest-stage station)

Location. --Lat 34°00'10", long 111°21'30", in SW¼ sec. 29, T. 8 N., R. 10 E., at State Highway 87, 16 miles south of Payson.

Drainage area. --6.52 sq mi.

Gage-height record. --Crest stages only. Datum of gage is 5,763.7 ft above mean sea level (from Arizona Highway Department bench mark).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 20 cfs and extended above on basis of computation of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 500 cfs Dec. 22 (gage height, 4.04 ft).
1963 to October 1965: Discharge, 1,370 cfs Aug. 22, 1963 (gage height, 7.75 ft).

(105) 9-4990. Tonto Creek above Gun Creek, near Roosevelt, Ariz.

Location. --Lat 33°59', long 111°18', in NE¼SW¼ sec. 2, T. 7 N., R. 10 E., in Tonto National Forest, on left bank 600 ft upstream from Gun Creek, 23½ miles northwest of village of Roosevelt, and 26 miles upstream from Roosevelt Dam.

Drainage area. --675 sq mi.

Gage-height record. --Water-stage recorder graph. Datum of gage is 2,523.14 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 27,000 cfs.

Maxima. --November 1965 to January 1966: Discharge, 44,700 cfs 2100 hours Dec. 22 (gage height, 16.7 ft).
1940 to October 1965: Discharge, 45,400 cfs Jan. 18, 1952 (gage height, 16.55 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	6.9	72	1,700	16	8.8	1,100	171
2	8.1	51	1,030	17	10	1,190	158
3	8.1	47	710	18	11	1,100	169
4	7.5	37	564	19	11	908	174
5	8.8	33	467	20	12	805	156
6	8.8	28	401	21	13	789	153
7	6.9	27	354	22	16	15,300	139
8	6.3	24	322	23	66	10,900	136
9	6.9	96	303	24	176	2,470	130
10	6.9	10,200	273	25	2,010	1,520	121
11	6.9	3,280	249	26	936	1,070	112
12	6.9	1,180	232	27	298	728	110
13	6.9	910	213	28	186	572	104
14	6.9	1,310	194	29	125	541	100
15	7.5	1,410	186	30	92	11,200	96
				31	------	3,210	94
Monthly mean discharge, in cubic feet per second					137	2,326	301
Runoff, in acre-feet					8,150	143,000	18,490

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66,

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	5.24	733	Dec. 23	2400	7.05	3,410	Dec. 30	0800	11.0	16,300
									1100	12.4	22,100
22	0700	5.39	882	24	1200	6.45	2,240		1500	10.1	13,200
	1100	8.00	5,300		2400	6.3	1,960		1800	9.6	11,600
	1500	13.1	25,500						2400	7.55	5,360
	1900	12.9	24,500	25	1200	5.90	1,410				
	2100	16.7	44,700		2400	5.80	1,290	31	0600	6.90	3,720
	2400	15.0	35,000						1200	6.5	2,860
				29	2400	5.30	805		2400	6.1	2,140
23	0600	10.4	14,100								
	1100	8.2	6,540	30	0200	6.1	1,670	Jan. 1	1200	5.80	1,660
	1900	7.45	4,350		0500	8.5	7,500		2400	5.55	1,330

(106) 9-5005. Salt River at Roosevelt, Ariz.

(Former gaging-station site)

Location. --Lat 33°40'30", long 111°09'30", in sec. 20, T. 4 N., R. 12 E. (unsurveyed), at Roosevelt Dam, 1 mile west of Roosevelt.

Drainage area. --5,830 sq mi, approximately.

Maxima. --November 1965 to January 1966: Discharge, 88,000 cfs 0300 hours Dec. 22, obtained by routing flow of Salt River near Roosevelt and Tonto Creek below Gun Creek near Roosevelt to Roosevelt Lake.

1888 to October 1965: Discharge, about 150,000 cfs Feb. 22-23, 1891, estimated on basis of records for Salt River at McDowell.

(107) 9-5010. Reservoir system on Salt River at and below Roosevelt Dam, Ariz.

Location. --This system comprises 4 storage reservoirs created by 4 dams on Salt River: Roosevelt Lake, formed by Roosevelt Dam, in sec. 20, T. 4 N., R. 12 E. (unsurveyed); Apache Lake, formed by Horse Mesa Dam, 17 miles downstream from Roosevelt Dam; Canyon Lake, formed by Mormon Flat Dam, 27 miles downstream from Roosevelt Dam; and Saguaro Lake, formed by Stewart Mountain Dam, 37 miles downstream from Roosevelt Dam.

Drainage area. --6,211 sq mi, at Stewart Mountain Dam.

Maxima. --November 1965 to January 1966: Contents, 1,684,000 acre-ft Dec. 31.
1910 to October 1965: Contents, 1,764,000 acre-ft May 22, 1941.

Remarks. --Records given herein represent usable contents. Dead storage negligible. Total capacity of the 4 reservoirs is 1,755,000 acre-ft, divided as follows: Roosevelt Lake, 1,382,000 acre-ft; Apache Lake, 245,000 acre-ft; Canyon Lake, 58,000 acre-ft; Saguaro Lake, 70,000 acre-ft. Dams forming these reservoirs were built as follows: Roosevelt 1905-11; Horse Mesa 1924-27; Mormon Flat 1923-26; Stewart Mountain 1928-30. Since 1910, spill over Roosevelt Dam because of capacity storage has occurred only during the following periods: Apr. 15 to June 21, 1915; Jan. 19 to May 30, 1916; Apr. 21 to June 7, 1917; Feb. 17 to June 3, 1920; Apr. 13 to July 24, 1941; Dec. 30, 1965, to Jan. 10, 1966. Records furnished by Salt River Valley Water Users' Association.

Contents, in thousands of acre-feet, at 2400, 1965-66

Day	November	December	January	Day	November	December	January
1	1,140	1,164	1,647	16	1,134	1,313	1,558
2	1,140	1,165	1,628	17	1,134	1,322	1,560
3	1,140	1,166	1,624	18	1,134	1,329	1,564
4	1,139	1,167	1,614	19	1,134	1,335	1,567
5	1,139	1,168	1,602	20	1,134	1,340	1,569
6	1,138	1,169	1,590	21	1,134	1,343	1,574
7	1,138	1,169	1,577	22	1,134	1,413	1,577
8	1,137	1,167	1,564	23	1,137	1,535	1,582
9	1,137	1,178	1,548	24	1,137	1,560	1,583
10	1,136	1,224	1,539	25	1,142	1,570	1,585
11	1,135	1,260	1,543	26	1,149	1,576	1,587
12	1,135	1,273	1,546	27	1,155	1,581	1,588
13	1,134	1,281	1,550	28	1,158	1,587	1,589
14	1,135	1,292	1,553	29	1,161	1,593	1,591
15	1,134	1,305	1,556	30	1,162	1,679	1,592
				31	------	1,684	1,592
Change in contents, in acre-feet					+21,000	+522,000	-92,000

(108) 9-5013. Tortilla Creek at Tortilla Flat, Ariz.
(Crest-stage station)

Location. --Lat 33°31'38", long 111°23'13", NW¼ sec. 13, T. 2 N., R. 9 E. (unsurveyed), 600 ft upstream from State Highway 88 and Tortilla Flat Store, and 3.7 miles southeast of Mormon Flat Dam.

Drainage area. --24.3 sq mi.

Gage-height record. --Crest stages only, from floodmarks. Altitude of gage is 1,755 ft (from topographic map).

Maximum. --November 1965 to January 1966: Discharge, 2,440 cfs Dec. 22 (gage height, 8.0 ft), from computation of flow over irregular weir.

(109) 9-5020. Salt River below Stewart Mountain Dam, Ariz.

Location. --Lat 33°33'00", long 111°34'35", in N½NW¼ sec. 6, T. 2 N., R. 8 E. (unsurveyed), on left bank 3½ miles downstream from Stewart Mountain Dam, and 6 miles upstream from Verde River.

Drainage area. --6,232 sq mi, of which 21 sq mi is below Stewart Mountain Dam.

Gage-height record. --Water-stage recorder graph, except 1900 hours Dec. 30 to 1300 hours Jan. 2. Altitude of gage is 1,370 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 9,700 cfs and extended above on basis of computation of peak flow over dam. Discharge for period of no gage-height record computed on basis of records of releases at Stewart Mountain Dam by Salt River Valley Water Users' Association.

Maxima. --November 1965 to January 1966: Discharge, 51,600 cfs 1900-2000 hours Jan. 1 (gage height, 22.4 ft, from floodmarks).
1921 to October 1965: Discharge, 11,700 cfs May 7, 1941 (gage height, 15.97 ft, at site 2¾ miles upstream at different datum).
1910 to October 1965: Daily discharge, 50,000 cfs Jan. 20 and 29, 1916.

Remarks. --Flow regulated at Stewart Mountain Dam and three other dams (combined capacity, 1,755,000 acre-ft; see station 107, Reservoir system on Salt River at and below Roosevelt Dam). Storage began in Roosevelt Dam in 1910.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	221	4.7	38,600	16	175	7.9	10
2	227	4.7	10,000	17	160	7.4	10
3	273	4.7	7,660	18	115	6.3	10
4	345	4.4	9,960	19	99	4.7	10
5	360	4.2	9,850	20	99	4.7	10
6	368	4.2	9,620	21	99	4.4	10
7	368	3.9	9,700	22	94	203	10
8	375	4.4	9,850	23	25	3,750	10
9	398	6.3	9,720	24	16	3,660	10
10	472	18	7,750	25	12	2,160	10
11	510	10	10	26	7.4	2,130	10
12	352	6.8	10	27	6.8	1,040	10
13	203	6.3	10	28	6.3	36	10
14	165	6.3	10	29	5.2	20	10
15	170	12	10	30	5.2	6,180	10
				31	------	37,200	596
Monthly mean discharge, in cubic feet per second					191	1,823	3,984
Runoff, in acre-feet					11,370	112,100	245,000

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Salt River below Stewart Mountain Dam, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.09	4.4	Dec. 29	2400	2.28	16	Jan. 1	2400	-	40,000
22	0100	2.09	4.4	30	1900	2.24	13	2	0230	-	40,400
	0200	2.67	86		1930	-	9,120		0300	-	20,200
	0800	2.82	145		2000	-	9,120		0400	-	10,100
	1600	2.40	30		2030	-	22,100		0500	-	10,200
	2100	3.23	412		2100	-	39,600		0500	-	6,900
	2400	4.08	1,140		2300	-	39,600		0800	-	5,050
					2400	-	38,000		2400	-	5,180
23	0400	5.00	2,260								
	0600	6.30	3,980	31	0700	-	38,000	3	1100	6.97	5,260
	0800	6.50	4,260		1300	-	37,200		1200	7.70	6,280
	1600	6.52	4,290		1500	-	36,800		1230	9.10	8,700
	2400	6.55	4,330		2400	-	36,000		1300	9.82	10,100
									1400	9.92	10,300
24	1530	6.57	4,360	Jan. 1	0700	-	36,000		2400	9.78	10,100
	1600	6.00	3,600		0900	-	35,600				
	1700	4.99	2,250		1400	-	35,500	4	1200	9.71	9,920
	2400	4.95	2,190		1500	-	40,800		2400	9.70	9,900
					1700	-	40,400				
25	1200	4.93	2,160		1900	22.4	51,600	5	1200	9.70	9,900
	2400	4.92	2,150		2000	22.4	51,600		2400	9.60	9,700
					2030	-	40,000				

(110) 9-5027. Crookton Wash near Seligman, Ariz.
(Crest-stage station)

Location. --Lat 35°17'15", long 112°43'55", in SE¼ sec. 17, T. 22 N., R. 4 W., at U. S. Highway 66, 9 miles east of Seligman, and 15 miles west of Ashfork.

Drainage area. -- About 6 sq mi.

Gage-height record.--Crest stages only. Altitude of gage is 5,700 ft (from topographic map).

Maxima. --November 1965 to January 1966: Discharge estimated to be less than 1 cfs.
1963 to October 1965: Discharge, 168 cfs Aug. 1, 1964 (gage height, 2.40 ft), from computation of flow through culvert.

Remarks. --Station has been included in this report because it is the only station in Chino Valley. Record indicates that little flow came from upper end of the valley.

(111) 9-5028. Williamson Valley Wash near Paulden, Ariz.

Location. --Lat 34°52'00", long 112°36'45", in SE¼SE¼ sec. 7, T. 17 N., R. 3 W., on left bank, 3.6 miles north of Simmons, and 8.5 miles west of Paulden.

Drainage area. --255 sq mi.

Gage-height record. --Water-stage recorder graph except Jan. 3-6 and short periods over the peaks of Nov. 25 and Dec. 10 which were reconstructed. Datum of gage is 4,447.38 ft above mean sea level.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 500 cfs and extended above on basis of slope-area measurement of peak flow. Stage-discharge relation affected by backwater from ice Jan. 21-30. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 3,630 cfs 0400 hours Dec. 30 (gage height, 6.38 ft).
March to October 1965: Discharge, 820 cfs Apr. 10, 1965 (gage height, 3.80 ft).

Mean discharge, in cubic feet per second, 1965-66, of Williamson Valley Wash near Paulden, Ariz.

Day	November	December	January	Day	November	December	January
1	1.7	3.0	52	16	2.8	33	3.6
2	1.7	2.8	35	17	3.0	32	3.6
3	1.7	2.8	15	18	3.0	34	4.2
4	1.8	2.8	14	19	3.0	26	5.8
5	1.8	2.8	14	20	3.0	22	5.4
6	1.8	2.8	14	21	3.0	40	4
7	2.0	2.8	13	22	3.4	686	3
8	2.0	3.0	12	23	4.0	691	3
9	2.0	14	10	24	3.4	85	3
10	2.2	1,400	9.0	25	530	43	2
11	2.2	313	8.8	26	219.0	26	2
12	2.2	76	7.2	27	14.0	22	2
13	2.4	65	5.4	28	4.0	19	3
14	2.6	72	4.4	29	3.2	156	3
15	2.6	41	4.2	30	3.0	1,620	3
				31	------	192	3.4
Monthly mean discharge, in cubic feet per second..					27.8	185	8.77
Runoff, in acre-feet					1,650	11,370	540

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Nov. 24	2400	1.67	3.8	Dec. 10	1600	4.7	1,520	Dec. 24	1100	2.00	62
					2000	4.43	1,270		2100	2.05	70
25	0330	1.72	6.0		2400	3.86	862		2400	1.99	59
	0430	1.84	11								
	0500	2.30	118	11	0400	3.30	530	28	2400	1.66	20
	0900	1.88	14		0700	2.92	348				
	1000	4.40	1,250		1300	2.57	211	29	0300	1.74	25
	1100	4.70	1,510		1900	2.38	148		1100	1.67	20
	1400	4.35	1,210		2400	2.26	116		1700	1.72	24
	1700	3.66	736						1800	2.25	112
	2000	3.14	250	21	2400	1.97	58		2200	2.82	308
	2230	2.94	366						2300	4.50	1,330
	2400	3.15	455	22	1000	2.08	71		2400	5.10	1,930
					1200	2.25	114				
26	0130	3.19	475		1400	2.95	360	30	0100	5.70	2,660
	0600	2.86	324		1700	3.73	778		0400	6.38	3,630
	1000	2.60	220		1800	4.51	1,340		0500	6.34	3,570
	1600	2.27	116		2000	5.44	2,330		0700	5.68	2,630
	2400	2.02	53		2200	5.36	2,230		0900	4.95	1,760
					2400	5.07	1,900		1100	4.50	1,330
Dec. 8	2400	1.55	3.0						1500	3.84	848
				23	0100	4.84	1,650		2000	3.38	570
9	1900	1.67	5.4		0300	4.51	1,340		2400	3.05	405
	2300	2.23	96		1000	3.46	616				
	2400	2.12	76		1500	2.97	368	31	0800	2.56	208
					2100	2.57	211		1400	2.36	148
10	0100	2.07	58		2400	2.32	130		2000	2.16	100
	0200	4.47	1,270						2400	2.05	77
	0500	5.5	2,400	24	0230	2.34	119				
	1130	4.26	1,140		0930	2.18	98				

(112) 9-5030. Granite Creek near Prescott, Ariz.

(Gaging station, discontinued 1947)

Location. --Lat 34°34', long 112°37', in SW¼ sec. 26, T. 14 N., R. 2 W., at old highway bridge, 1½ miles northeast of Prescott.

Drainage area. --39 sq mi.

Maxima. --November 1965 to January 1966: Discharge, about 1,500 cfs Dec. 10 or 30 (gage height, about 8.0, from floodmarks), from rating defined below 130 cfs by current-meter measurements made in 1946 and extended above on basis of contracted-opening measurement at gage height 12.5 ft made in 1963.

1932-47, 1963: Discharge, 6,660 cfs Aug. 19, 1963 (gage height, 12.5 ft, from floodmarks), from contracted-opening measurement of peak flow.

(113) 9-5037. Verde River near Paulden, Ariz.

Location. --Lat 34°53'42", long 112°20'26", in SW¼SW¼ sec. 35, T. 18 N., R. 1 W., on right bank a quarter of a mile upstream from Verde Valley Ranch, 7¼ miles east of Paulden, 8 miles upstream from Hell Canyon, 8½ miles downstream from Granite Creek, and 10½ miles downstream from Sullivan Lake.

Drainage area. --2,530 sq mi, approximately (including 373 sq mi in Aubrey Valley Playa, a closed basin).

Gage-height record. --Water-stage recorder graph except Dec. 11-17. Altitude of gage is 4,100 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 1,700 cfs and extended above on basis of slope-area measurements of peak flow. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 6,130 cfs 1700 hours Dec. 30 (gage height, 8.48 ft).

1963 to October 1965: Discharge, 1,270 cfs Aug. 5, 1964 (gage height, 5.44 ft, from high-water mark).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	21	23	713	16	23	60	25
2	21	23	229	17	23	46	25
3	21	22	71	18	23	46	25
4	21	22	48	19	23	43	25
5	21	22	40	20	23	39	25
6	21	22	36	21	23	37	25
7	21	22	33	22	23	44	25
8	21	22	29	23	24	1,460	25
9	21	24	27	24	24	544	25
10	21	636	26	25	24	379	25
11	21	1,300	26	26	412	123	25
12	22	500	25	27	65	66	25
13	22	200	25	28	32	49	25
14	22	150	25	29	26	42	25
15	22	100	25	30	24	1,750	26
				31	------	1,340	27
Monthly mean discharge, in cubic feet per second					37.0	285	57.5
Runoff, in acre-feet					2,200	18,160	3,530

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Verde River near Paulden, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Nov. 25	2400	1.63	24	Dec. 21	2400	1.85	37	Dec. 30	1100	2.06	47
									1200	2.20	55
26	0100	2.30	59	22	1000	1.90	39		1300	3.00	165
	0200	4.35	682		1800	2.13	50		1400	5.75	1,510
	0300	4.58	795		2400	2.27	59		1500	7.50	3,800
	0400	4.55	780						1600	8.38	5,690
	0500	4.45	730	23	0200	2.32	62		1700	8.48	6,130
	0900	3.87	473		0300	2.55	80		1800	8.35	5,620
	1200	3.62	373		0400	3.05	180		1900	8.04	4,910
	1700	3.53	340		0500	4.95	980		2100	7.20	3,240
	2100	3.23	236		0600	6.65	2,440		2400	6.44	2,190
	2400	2.95	152		0700	7.06	3,020				
					0730	7.09	3,060	31	0300	5.82	1,570
27	0300	2.70	100		0900	6.98	2,890		0700	5.28	1,170
	0600	2.49	74		1500	5.86	1,590		0900	5.18	1,110
	1200	2.22	54		1900	5.19	1,110		1100	5.18	1,110
	1800	2.04	43		2400	4.78	895		1300	5.28	1,170
	2400	1.92	37						1530	5.55	1,340
				24	1000	4.05	548		1800	5.61	1,390
Dec. 9	2400	1.80	31		1300	3.77	433		2000	5.60	1,380
					2000	3.58	358		2400	5.21	1,130
10	0300	1.87	35		2200	3.65	385				
	1200	1.80	31		2400	3.90	485	Jan. 1	0300	4.92	965
	1330	2.05	44						1000	4.48	745
	1400	2.70	100	25	0200	3.99	521		1500	4.19	610
	1500	5.50	1,310		0300	4.00	525		1900	3.96	509
	1600	5.88	1,610		0600	3.82	453		2400	3.77	433
	1700	5.91	1,640		1200	3.39	292				
	1800	5.86	1,590		1400	3.27	250	2	0900	3.31	264
	1900	5.71	1,470		1500	3.27	250		1300	2.97	158
	2200	5.73	1,480		1600	3.33	272		1700	2.77	114
					2400	3.20	225		1830	2.77	114
11	0200	6.22	1,940						2000	2.88	136
	0600	-	1,800	29	2400	1.95	42		2130	3.03	174
	1200	-	1,200						2400	2.90	140
	2400	-	850	30	0600	2.05	46				

(114) 9-5037.2 Hell Canyon near Williams, Ariz.

Location. --Lat 35°09'40", long 112°12'33", in NW¼NW¼ sec. 32, T. 21 N., R. 2 E., in Kaibab National Forest, on right bank, 6 miles south of Williams.

Drainage area. --14.9 sq mi.

Gage-height record. --Water-stage recorder graph except Nov. 3-14, 23-28, Dec. 14 to Jan. 18. Altitude of gage is 6,750 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 1,080 cfs Dec. 30 (gage height, 4.78 ft, from high-water mark in well corrected for an estimated amount of surge, 5.4 ft, outside, from floodmarks, as result of pileup near gage).
August to October 1965: Discharge, 55 cfs Sept. 18, 1965 (gage height, 1.80 ft).

Mean discharge, in cubic feet per second, 1965-66, of Hell Canyon near Williams, Ariz.

Day	November	December	January	Day	November	December	January
1	0	3.2	10	16	0	2.5	2
2	0	2.4	8	17	0	2	2
3	0	1.5	6	18	0	1.5	2
4	0	1.1	5	19	0	1	2
5	0	1.0	4	20	0	1	1.5
6	0	.8	3	21	0	1	1.5
7	0	.7	2	22	0	6	1.5
8	0	.6	2	23	150	25	1.5
9	0	74	2	24	50	10	1.5
10	0	112	2	25	400	3	1.5
11	0	50	2	26	41	2	1.5
12	0	28	2	27	10	1	1.5
13	0	12	2	28	5.0	1	1.5
14	0	6	2	29	3.6	3	1
15	0	4	2	30	3.4	200	1
				31	------	50	1
Monthly mean discharge, in cubic feet per second..					22.1	19.6	2.53
Runoff, in acre-feet					1,320	1,200	156

(115) 9-5038. Volunteer Wash near Bellemont, Ariz.

Location. --Lat 35°09'00", long 111°53'50", in $SE\frac{1}{4}SE\frac{1}{4}$ sec. 31, T. 21 N., R. 5 E., in Kaibab National Forest, on right bank, 7 miles southwest of Bellemort, and 14 miles west of Flagstaff.

Drainage area. --142 sq mi.

Gage-height record. --Water-stage recorder graph 1130 hours Nov. 25 to 2200 hours Nov. 26, 2000 hours Dec. 9 to 2000 hours Dec. 13, and 8 hours over peak of Dec. 30. Altitude of gage is 6,820 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 80 cfs and extended above on basis of slope-area measurement of peak flow of Dec. 7, 1966, at gage height 5.73 ft. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 578 cfs about 0200 hours Dec. 30 (gage height, 4.55 ft).
July to October 1965: Discharge, 92 cfs Sept. 19, 1965 (gage height, 2.85 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0	20	16	0	0.2	0
2	0	0	2.0	17	0	0	0
3	0	0	0	18	0	0	0
4	0	0	0	19	0	0	0
5	0	0	0	20	0	0	0
6	0	0	0	21	0	0	0
7	0	0	0	22	0	0	0
8	0	0	0	23	0	0	0
9	0	27	0	24	0	0	0
10	0	175	0	25	146	0	0
11	0	112	0	26	43	0	0
12	0	92	0	27	4.0	0	0
13	0	45	0	28	.2	0	0
14	0	20	0	29	0	.3	0
15	0	3.0	0	30	0	300	0
				31	------	100	0
Monthly mean discharge, in cubic feet per second..					6.44	28.2	0.71
Runoff, in acre-feet					383	1,730	44

(116) 9-5040. Verde River near Clarkdale, Ariz.

Location. --Lat 34°51'05", long 112°03'55", in SE¼NW¼ sec. 17, T. 17 N., R. 2 E., on left bank 1.7 miles downstream of Sycamore Canyon, and 5.6 miles north of Clarkdale.

Drainage area. --3,520 sq mi, approximately (including 373 sq mi in Aubrey Valley Playa, a closed basin).

Gage-height record. --Water-stage recorder graph. Altitude of gage is 3,520 ft (from topographic map).

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

Maxima. --November 1965 to January 1966: Discharge, 12,900 cfs 0700 hours Dec. 10 (gage height, 12.30 ft).
1915-21, April to October 1965: Discharge, 50,600 cfs Feb. 21, 1920 (gage height, 19.1 ft, at site 2½ miles downstream at different datum).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	74	116	1,730	16	73	337	82
2	74	106	675	17	74	295	82
3	73	101	339	18	74	273	82
4	73	99	227	19	74	235	82
5	73	97	171	20	74	200	82
6	73	96	143	21	74	197	82
7	73	96	122	22	75	536	81
8	73	94	109	23	1,370	2,880	80
9	73	101	103	24	777	1,180	80
10	73	5,880	101	25	4,130	686	79
11	73	3,010	100	26	1,740	456	79
12	73	1,380	97	27	618	328	79
13	73	716	96	28	278	265	77
14	73	556	87	29	182	232	77
15	73	417	85	30	139	6,950	77
				31	------	4,080	80
Monthly mean discharge, in cubic feet per second					362	1,030	176
Runoff, in acre-feet					21,520	63,460	10,840

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Verde River near Clarkdale, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Nov. 22	2400	1.09	77	Dec. 10	0050	1.67	116	Dec. 23	1030	5.10	1,810
					0100	3.5	690		1200	6.35	3,120
23	1250	1.12	81		0200	5.8	2,580		1300	6.80	3,680
	1300	5.05	1,760		0300	7.1	4,070		1400	6.90	3,810
	1400	6.75	3,620		0400	7.95	5,230		1600	6.50	3,420
	1500	6.85	3,740		0440	7.90	5,300		2000	5.90	2,580
	1600	6.64	3,470		0530	10.05	8,490		2400	5.35	2,040
	1630	6.40	3,180		0600	11.50	11,200				
	1715	7.03	3,980		0700	12.30	12,900	24	0600	4.75	1,510
	1900	6.40	3,180		0800	11.50	11,200		1200	4.10	1,030
	2200	5.10	1,810		0900	10.85	9,930		1800	3.75	820
	2400	4.50	1,310		1100	10.05	8,490		2400	3.60	740
					1400	8.30	5,750				
24	0130	4.80	1,550		1700	7.15	4,140	25	0500	3.63	755
	0400	4.25	1,140		1900	6.75	3,620		0700	3.73	808
	0700	3.87	892		2000	6.65	3,480		0900	3.73	808
	1500	3.08	497		2100	6.75	3,620		1700	3.33	605
	1900	2.73	365		2300	7.55	4,670		2400	3.15	525
	2400	2.40	270		2400	7.48	4,570				
								26	0400	3.17	533
25	0130	2.33	252	11	0500	6.90	3,810		1000	3.06	489
	0230	2.47	288		0900	6.70	3,550		1400	2.91	429
	0830	2.25	232		1300	6.18	2,920		2400	2.71	358
	0900	6.80	3,680		1700	5.50	2,180				
	1000	8.10	5,450		2000	5.25	1,940	29	2400	2.30	245
	1100	8.50	6,050		2400	5.22	1,920				
	1200	8.50	6,050					30	0300	2.30	245
	1300	9.60	7,760	12	0200	5.20	1,900		0550	2.42	272
	1430	10.70	9,660		1200	4.55	1,350		0600	5.60	2,280
	1530	11.50	11,200		1800	4.20	1,100		0700	7.50	4,600
	1600	10.75	9,750		2400	3.91	916		0800	10.45	9,210
	1700	10.05	8,490						0900	10.47	9,250
	1800	9.1	6,960	13	0600	3.75	820		0930	11.45	11,100
	1900	8.45	5,980		0800	3.72	802		1100	11.70	11,600
	2100	7.55	4,670		1800	3.31	595		1300	11.30	10,800
	2400	6.56	3,370		2100	3.22	554		1600	10.05	8,490
					2400	3.19	541		1800	9.40	7,440
26	0500	5.38	2,160						1900	10.05	8,490
	0800	5.05	1,760	14	0200	3.18	537		2100	11.15	10,500
	1000	4.80	1,550		0300	3.25	568		2400	10.30	8,940
	1100	5.05	1,760		0400	3.42	650				
	1200	5.10	1,810		0600	3.42	650	31	0100	10.05	8,490
	1300	5.00	1,720		1800	3.09	501		0300	8.95	6,720
	1700	4.45	1,280		2400	3.01	469		0700	7.45	4,530
	2000	4.17	1,080						1200	6.25	3,000
	2400	3.97	952	21	2400	2.14	207		1400	5.95	2,640
									1600	5.85	2,530
27	0400	3.75	820	22	1200	2.21	222		1800	5.95	2,640
	1200	3.30	590		1500	2.31	248		2030	6.17	2,900
	1800	3.00	465		1730	2.49	292		2400	5.95	2,640
	2400	2.72	362		1900	3.00	465				
					2000	3.20	545	Jan. 1	1000	5.05	1,760
28	0600	2.72	362		2100	5.05	1,760		2100	4.20	1,100
	1200	2.54	307		2300	5.70	2,380		2300	4.29	1,160
	1800	2.40	270		2400	6.25	3,000		2400	4.20	1,100
	2400	2.20	220								
				23	0100	6.53	3,340	Jan. 2	1000	3.45	665
Dec. 8	2400	1.51	94		0230	6.72	3,580		1600	3.18	537
					0400	6.52	3,320		2400	2.85	404
9	1200	1.55	100		0600	6.08	2,800				
	2400	1.63	110		0800	5.60	2,280				

(117) 9-5041. Hull Canyon near Jerome, Ariz.

(Crest-stage station)

Location. --Lat 34°44'20", long 112°08'35", NW¼ sec. 28, T. 16 N., R. 2 E., at U.S. Highway 89A, 2 miles west of Jerome.

Drainage area. --0.91 sq mi.

Gage-height record. --Crest stages only. Datum of gage is 6,010 ft above mean sea level (from Arizona Highway Department bench mark).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert and estimates of low flows.

Maxima. --November 1965 to January 1966: Discharge, 3 cfs, date unknown (gage height, 6.33 ft).
1963 to October 1965: Discharge, about 25 cfs Aug. 10, 1964 (gage height, 7.23 ft). High-water lines in culvert indicate a peak of about 500 cfs and a much higher peak (discharge not determined).

(118) 9-5044. Munds Canyon tributary near Sedona, Ariz.

(Crest-stage station)

Location. --Lat 34°55'10", long 111°38'50", in NW¼ sec. 27, T. 18 N., R. 7 E., at State Highway 79, 7 miles northeast of Sedona.

Drainage area. --1.6 sq mi, approximately.

Gage-height record. --Crest stages only. Datum of gage is 6,486 ft above mean sea level (from Arizona Highway Department bench mark).

Discharge record. --Stage-discharge relation defined by computations of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 222 cfs Nov. 25 (gage height, 6.91 ft).
1963 to October 1965: Discharge, 222 cfs Sept. 3, 1965 (gage height, 6.91 ft).

(119) 9-5045. Oak Creek near Cornville, Ariz.

Location. --Lat 34°46'00", long 111°53'30", in SE¼ sec. 23, T. 16 N., R. 4 E., near left bank on downstream side of county highway bridge, 0. 2 mile upstream from Page Springs, 4 miles northeast of Cornville, and 15 miles upstream from mouth.

Drainage area. --357 sq mi.

Gage-height record. --Water-stage recorder graph except Jan. 14-21. Altitude of gage is 3, 470 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 7, 700 cfs and extended above on basis of slope-area measurement of peak discharge. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 17, 600 cfs 1400 hours Nov. 25 (gage height, 15. 18 ft in well, 16. 89 ft on left bank, from floodmarks).

1939 to October 1965: Discharge, 17, 200 cfs Dec. 30, 1951 (gage height, 14. 5 ft in gage well, 16. 9 ft on bank from floodmarks).

Maximum flood known since at least 1885 occurred in March 1938 (stage at upstream side of bridge, 23 ft, from floodmarks).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	30	65	808	16	34	152	50
2	29	57	414	17	37	136	50
3	30	52	261	18	39	109	50
4	31	48	192	19	36	83	45
5	31	45	140	20	35	76	45
6	31	44	120	21	35	78	45
7	32	43	99	22	36	384	45
8	32	42	96	23	3,170	1,200	45
9	32	47	91	24	1,490	522	45
10	33	2,300	86	25	6,160	357	44
11	32	1,030	73	26	1,100	240	43
12	32	643	75	27	436	165	43
13	32	362	58	28	205	116	42
14	32	251	55	29	115	110	42
15	32	215	55	30	89	5,920	42
				31	------	1,730	43
Monthly mean discharge, in cubic feet per second..					450	536	108
Runoff, in acre-feet					26,750	32,970	6,630

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Oak Creek near Cornville, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Nov. 22	2400	3.29	40	Nov. 27	1200	4.52	423	Dec. 24	1800	4.55	415
					2400	4.18	303		2400	4.68	467
23	0900	3.38	47								
	0930	5.15	695	Dec. 8	2400	3.02	41	28	2400	3.62	89
	1030	7.02	2,060								
	1130	8.88	4,060	9	1700	3.21	56	29	0300	3.69	109
	1230	9.28	4,540		2400	3.34	71		2100	3.72	115
	1330	11.32	8,130						2400	4.06	205
	a1430	11.59	8,760	10	0100	5.35	820				
	1530	11.47	8,360		0300	7.02	2,020	30	0100	4.40	345
	1630	10.91	7,520		0500	8.35	3,400		0200	5.25	770
	1800	10.27	6,260		0730	9.73	5,200		0300	8.27	3,170
	2100	8.72	3,860		0800	9.00	4,260		0400	8.73	3,880
	2400	8.05	3,050		1100	7.50	2,440		0600	10.84	7,260
					1700	6.50	1,580		0700	12.03	9,790
24	0600	7.15	2,160		2200	6.50	1,580		0800	13.42	13,000
	1200	6.01	1,260		2400	6.25	1,400		1100	12.03	9,790
	1800	5.31	825						1300	10.79	7,580
	2400	4.99	643	11	0400	6.20	1,370		1400	10.53	6,800
					1900	5.25	795		1700	9.58	5,020
25	0100	5.27	805		2400	5.33	835		2000	8.97	4,160
	0200	5.97	1,230						2400	8.18	3,180
	0300	7.02	2,060	12	1200	4.97	634				
	0600	8.12	3,120		2400	4.57	443	31	0600	7.16	2,130
	0800	8.42	3,420						1200	6.40	1,510
	0900	9.13	4,380	21	2400	3.42	73		1800	6.12	1,290
	1000	10.28	6,260						2400	5.85	1,130
	1100	11.75	9,050	22	0600	3.50	86				
	1200	12.99	11,700		1200	3.70	130	Jan. 1	1200	5.30	795
	1300	14.42	15,500		1500	4.00	215		2400	4.98	607
	1400	15.18	17,600		1700	4.02	221				
	1500	14.42	15,500		2000	5.50	920	2	1200	4.47	370
	1700	11.73	9,030		2100	6.30	1,400		1800	4.32	317
	2000	8.92	4,100		2400	6.63	1,680		2400	4.42	334
	2200	8.00	3,000								
	2400	7.22	2,220	23	0200	6.91	1,930	3	0300	4.45	345
					0600	6.42	1,520		1900	4.05	202
26	0600	6.23	1,370		1200	5.78	1,060		2400	4.07	208
	1200	5.60	970		1800	5.50	920				
	1800	5.22	755		2400	5.25	745				
	2400	5.03	661								

a Corrected from hour published in annual report.

(120) 9-5052. Wet Beaver Creek near Rimrock, Ariz.

Location. --Lat 34°40'25", long 111°39'55", in center of SE¼ sec. 24, T. 15 N., R. 6 E. (unsurveyed), in Coconino National Forest, on right bank, 5 miles northeast of Rimrock, and 5¾ miles upstream from Red Tank Draw.

Drainage area. --95. 2 sq mi.

Gage-height record. --Water-stage recorder graph Nov. 1-9; digital recorder tape thereafter. Altitude of gage is 3, 680 ft (from topographic map).

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

Maxima. --November 1965 to January 1966: Discharge, 6, 150 cfs 1330 hours Nov. 25 (gage height, 11. 62 ft).
1961 to October 1965: Discharge, 6, 100 cfs Jan. 6, 1965 (gage height, 11. 58 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	7. 1	10	192	16	7. 4	62	10
2	7. 1	9. 2	87	17	7. 8	57	9. 5
3	7. 1	8. 3	57	18	7. 6	48	9. 2
4	7. 1	7. 8	36	19	7. 6	43	9. 0
5	7. 3	7. 6	26	20	7. 6	30	8. 7
6	7. 3	7. 4	22	21	7. 6	28	8. 7
7	7. 3	7. 4	20	22	8. 0	1, 110	8. 7
8	7. 3	7. 3	20	23	531	564	8. 7
9	7. 3	8. 2	21	24	211	159	8. 7
10	7. 3	1, 260	22	25	2, 520	121	8. 7
11	7. 3	367	23	26	270	88	8. 7
12	7. 4	149	24	27	82	64	8. 7
13	7. 4	82	18	28	34	55	8. 4
14	7. 4	46	14	29	18	171	8. 4
15	7. 4	68	12	30	13	2, 460	8. 4
				31	------	536	8. 3
Monthly mean discharge, in cubic feet per second..					128	246	23. 7
Runoff, in acre-feet					7, 620	15, 140	1, 460

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of Wet Beaver Creek near Rimrock, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Nov. 22	2400	3.18	9.0	Nov. 26	0600	5.48	354	Dec. 22	1830	9.67	3,350
					1200	4.89	198		2000	9.10	2,750
23	0200	3.21	9.8		1800	4.52	128		2200	8.12	1,870
	1100	3.52	22		2400	4.51	126		2400	7.94	1,720
	1200	4.91	202								
	1400	4.31	99	27	1200	4.19	84	23	0400	6.60	820
	1500	8.39	1,800		2400	3.81	41		0800	5.81	468
	1600	8.56	1,930						1200	5.63	406
	1700	8.48	1,870	Dec. 9	2400	3.21	9.8		1600	5.74	444
	1800	8.09	1,590						2000	5.41	333
	2000	7.22	1,040	10	0200	3.60	27		2400	5.09	258
	2200	6.51	729		0300	6.26	650				
	2400	6.01	530		0400	8.21	1,940	24	1200	4.40	111
					0430	8.53	2,210		2400	4.74	163
24	0400	5.28	262		0600	7.64	1,490				
	0800	4.88	185		0800	7.04	1,080	25	1200	4.22	88
	1200	4.61	142		1000	7.03	1,080		2400	4.05	67
	1600	4.40	111		1200	7.89	1,680				
	1800	4.36	106		1300	8.03	1,790	28	2400	4.19	84
	2000	4.81	173		1400	8.15	1,890				
	2200	5.00	206		1500	8.00	1,770	29	1600	4.02	63
	2300	5.33	272		1600	7.86	1,660		1800	4.71	157
	2400	7.50	1,350		2000	7.38	1,310		2000	5.71	434
					2400	6.60	820		2200	6.10	580
25	0200	8.38	2,070						2400	7.63	1,480
	0400	8.65	2,320	11	0600	5.75	448				
	0600	8.28	1,990		1200	5.29	298	30	0200	9.35	3,000
	0800	7.92	1,710		1800	5.09	248		0400	9.85	3,540
	1000	8.61	2,280		2400	5.26	290		0500	10.10	3,840
	1100	9.72	3,400						0600	10.01	3,730
	1200	10.54	4,370	12	1200	4.61	142		0800	9.63	3,300
	1300	11.02	4,980		2400	4.40	117		1000	9.41	3,060
	1330	11.62	6,150						1200	8.81	2,460
	1400	11.53	5,920	21	2400	3.69	32		1600	8.23	1,950
	1500	10.68	4,540						2000	7.87	1,670
	1600	9.69	3,370	22	0600	3.97	58		2400	7.15	1,150
	1800	8.49	2,170		0700	5.23	282				
	2000	7.43	1,340		0800	5.71	434	31	0600	6.31	675
	2200	6.93	1,020		1000	6.10	580		1200	5.73	440
	2400	6.68	868		1200	6.82	952		1800	5.69	426
					1400	7.37	1,300		2400	5.43	339
26	0200	6.19	616		1600	7.59	1,450				
	0400	5.82	472		1800	9.24	2,890				

(121) 9-5052.5. Red Tank Draw near Rimrock, Ariz.

Location. --Lat 34°41'45", long 111°42'50", in SE¼NE¼ sec. 16, T. 15 N., R. 6 E., in Coconino National Forest, on left bank 2.6 miles downstream from confluence of Rarick and Mullican Canyons, and 3½ miles northeast of Rimrock.

Drainage area. --49.4 sq mi.

Gage-height record. --Digital recorder tape. Altitude of gage is 3,950 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 480 cfs and extended above on basis of slope-area measurement at gage height 7.55 ft.

Maxima. --November 1965 to January 1966: Discharge, 2,010 cfs 1300 hours Nov. 25 (gage height, 7.62 ft).
1957 to October 1965: Discharge, 1,970 cfs Aug. 2, 1964 (gage height, 7.55 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0.79	28	16	0	28	0.50
2	0	.46	9.0	17	0	28	.40
3	0	.27	5.2	18	0	18	.40
4	0	.21	2.8	19	0	8.9	.30
5	0	.15	2.1	20	0	6.8	.30
6	0	.11	1.5	21	0	11	.20
7	0	.11	1.1	22	0	450	.20
8	0	.11	.90	23	215	323	.20
9	0	.22	2.1	24	107	81	.20
10	0	705	2.8	25	710	48	.10
11	0	190	2.4	26	171	32	.10
12	0	62	1.8	27	24	20	.10
13	0	25	1.3	28	6.2	15	.10
14	0	30	.90	29	2.8	79	.10
15	0	40	.70	30	1.4	913	.10
				31	------	118	.10
Monthly mean discharge, in cubic feet per second					41.2	104	2.13
Runoff, in acre-feet					2,450	6,410	131

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of Red Tank Draw near Rimrock, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Nov. 22	2400	-	0	Dec. 9	2400	1.89	0.6	Dec. 23	0400	4.84	519
									0600	4.36	368
23	1145	-	0	10	0100	3.25	110		0800	4.12	299
	1200	4.60	440		0200	4.88	533		1400	3.78	212
	1300	6.12	1,130		0400	6.59	1,390		1700	3.96	256
	1400	5.76	940		0500	7.48	1,930		2000	3.82	221
	1600	4.75	488		0600	6.90	1,580		2400	3.51	155
	1800	4.15	307		0700	5.64	880				
	2000	3.75	205		0900	4.70	470	24	1200	2.78	49
	2200	3.41	137		1200	5.60	860		2000	3.23	107
	2400	3.16	96		1300	5.64	880		2400	3.05	80
					1400	5.36	740				
24	1000	2.52	27		1600	5.16	647	25	1200	2.59	32
	1945	2.41	19		2000	4.86	526		2200	2.97	69
	2000	3.05	80		2400	4.37	371		2400	2.91	62
	2100	3.64	181								
	2200	4.97	568	11	0600	3.92	245				
	2400	5.01	584		1200	3.57	167	28	2400	2.31	13
					1800	3.28	115				
25	0200	5.05	600		2400	3.35	126	29	1800	2.48	24
	0400	4.64	452						2000	3.86	230
	0600	4.19	328	12	1200	2.87	58		2200	4.19	318
	0800	4.15	307		2400	2.56	30		2400	4.36	368
	1000	5.14	638								
	1200	6.71	1,470					30	0200	5.65	885
	1300	7.62	2,010	21	2400	2.29	12		0300	6.96	1,620
	1400	7.17	1,680						0400	7.36	1,860
	1600	5.83	975	22	0600	2.60	33		0430	7.49	1,930
	1800	4.89	536		0800	4.47	401		0600	6.94	1,600
	2000	4.95	560		1000	4.52	416		0800	6.39	1,280
	2200	4.74	484		1200	4.34	362		1200	5.68	900
	2400	4.54	422		1400	4.51	413		1600	5.08	612
					1600	4.81	508		2000	4.68	464
26	0600	3.94	250		1800	5.22	674		2400	4.22	327
	1200	3.57	167		1930	6.48	1,330				
	1800	2.92	63		2000	6.35	1,260	31	0200	3.98	261
	2400	2.75	46		2200	5.46	790		0600	3.59	171
					2400	5.34	730		1200	3.07	83
27	1200	2.44	21						1800	2.92	62
	2400	2.25	10	23	0200	5.21	670		2400	2.83	54

(122) 9-5053. Rattlesnake Canyon near Rimrock, Ariz.

Location. --Lat 34°46'00", long 111°40'20", in NW¼SW¼ sec. 24, T. 16 N., R. 6 E., in Coconino National Forest, on left bank 2.6 miles upstream from mouth, 7 miles northeast of Beaver Creek ranger station, and 9 miles northeast of Rimrock.

Drainage area. --24.6 sq mi.

Gage-height record. --Water-stage recorder graph except Nov. 17 to 1300 hours Nov. 23, 0200-1800 hours Nov. 24, Jan. 2-7. Graph reconstructed for Nov. 23, 24 on basis of high-water mark in well. Altitude of gage is 5,100 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 1,100 cfs and extended above on basis of computations of flow over weir at gage height 8.50 ft. Stage-discharge relation affected by backwater from ice part of each day Jan. 8-18. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 1,880 cfs 0230 hours Dec. 30 (gage height, 9.20 ft).
1957 to October 1965: Discharge, 1,430 cfs Jan. 6, 1965 (gage height, 8.50 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	1.1	35	16	0	24	0.2
2	0	.8	18	17	0	21	.2
3	0	.5	16	18	0	15	.2
4	0	.3	16	19	0	12	.1
5	0	.2	8.0	20	0	16	.07
6	0	.07	6.0	21	0	18	.06
7	0	.06	5.0	22	0	323	.06
8	0	.04	4.9	23	342	132	.03
9	0	49	5.9	24	235	47	.02
10	0	491	4.7	25	589	39	.02
11	0	128	5.1	26	65	25	.01
12	0	40	3.3	27	17	18	.01
13	0	26	1.9	28	7.2	18	.01
14	0	32	1.1	29	3.0	110	.01
15	0	31	.4	30	1.9	752	.01
				31	------	103	.01
Monthly mean discharge, in cubic feet per second..					42.0	79.8	4.27
Runoff, in acre-feet					2,500	4,910	262

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Rattlesnake Canyon near Rimrock, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Nov. 22	2400	-	0	Dec. 9	1600	2.01	0.2	Dec. 23	1000	3.98	118
					1630	2.96	28		1430	4.01	121
23	a0800	-	0		2000	2.91	26		1900	3.72	90
	a1100	8.9	1,670		2100	4.28	157		2400	3.42	61
	1300	8.1	1,190		2200	5.22	322				
	1500	7.10	800		2400	5.97	487	24	1000	2.94	27
	1700	5.55	391						1800	3.59	77
	2000	5.22	322	10	0200	7.07	791		2400	3.15	40
	2400	4.27	156		0400	7.55	950				
					0500	6.80	710	28	2400	2.98	29
24	0600	3.7	88		0600	5.97	487				
	1500	3.2	43		0830	5.34	346	29	1400	2.82	21
	1800	4.1	132		1100	6.42	602		1700	4.39	174
	1900	6.30	570		1130	6.52	630		2000	4.84	249
	1930	5.55	391		1300	6.25	557		2200	4.90	260
	2000	7.13	810		1900	5.30	338		2400	6.60	652
	2100	6.55	638		2400	4.60	208				
	2300	7.70	1,000					30	0100	7.45	915
	2400	7.77	1,030	11	1400	3.36	56		0230	9.20	1,880
					1800	4.13	136		0500	7.95	1,115
25	0100	7.50	932		2400	3.62	80		0600	7.75	1,025
	0300	6.35	583						0730	8.10	1,190
	0630	5.07	292	12	1800	2.93	26		0900	7.65	986
	0900	7.43	908		2400	3.03	32		1100	6.87	731
	1000	7.04	782						1900	5.62	376
	1100	7.58	961	21	2400	2.88	24		2400	4.57	203
	1130	8.29	1,300								
	1300	7.98	1,130	22	0400	2.91	26	31	0600	3.98	118
	1400	7.60	968		0700	4.32	163		1200	3.71	89
	1700	5.95	482		0800	4.44	182		1800	3.68	86
	2100	4.67	219		0930	5.06	290		2400	3.40	59
	2200	4.69	222		1100	4.98	274				
	2400	4.49	190		1500	5.23	324	Jan. 1	0500	3.18	42
					1700	6.04	504		0900	3.15	40
26	0600	3.75	93		b1830	7.15	810		1700	2.90	25
	1200	3.34	54		2000	6.55	638		2000	3.06	34
	1800	3.03	32		2230	5.79	444		2400	2.85	22
	2400	3.00	30		2400	5.89	468				
Dec. 8	2400	1.94	.1	23	0500	4.28	157				

a Time approximate.
b Erroneously published as 1630 in annual report.

(123) 9-5053.5. Dry Beaver Creek near Rimrock, Ariz.

Location. --Lat 34°43'40", long 111°46'30", in NW¼ sec. 1, T. 15 N., R. 5 E., in Coconino National Forest, on upstream side of abandoned highway bridge, 300 ft upstream from State Highway 179, and 5½ miles north of Rimrock.

Drainage area. --139 sq mi.

Gage-height record. --Water-stage recorder graph Nov. 1-22; digital recorder tape thereafter. Altitude of gage is 3,690 ft (based on elevation of bench mark on bridge 300 ft downstream).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 5,400 cfs and extended above on basis of computations of peak flow over submerged weir at gage heights 9.07 and 9.69 ft.

Maxima. --November 1965 to January 1966: Discharge, 9,670 cfs 1230 hours Nov. 23 (gage height, 9.69 ft).
1960 to October 1965: Discharge, 7,970 cfs Jan. 6, 1965 (gage height, 9.07 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	8.2	290	16	0	83	5.8
2	0	5.9	129	17	0	82	3.7
3	0	3.5	73	18	0	64	2.9
4	0	2.5	48	19	0	44	2.1
5	0	1.8	33	20	0	46	1.6
6	0	1.1	28	21	0	58	1.2
7	0	.60	26	22	0	685	.80
8	0	.30	30	23	2,750	726	.60
9	0	130	35	24	894	226	.35
10	0	2,200	32	25	3,190	172	.19
11	0	599	30	26	441	119	.12
12	0	259	28	27	147	79	.09
13	0	150	18	28	65	59	.07
14	0	123	11	29	25	125	.07
15	0	120	7.7	30	13	3,870	.06
				31	------	742	.06
Monthly mean discharge, in cubic feet per second..					251	348	27.0
Runoff, in acre-feet					14,930	21,400	1,660

Gage height, in feet, and discharge, in cubic feet per second, at indicated times, 1965, of Dry Beaver Creek near Rimrock, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Nov. 22	2400	0.75	0	Nov. 26	1800	3.68	245	Dec. 22	2000	5.85	2,110
					2400	3.62	223		2100	5.65	1,860
23	0800	.72	0						2200	5.49	1,690
	0900	2.84	31	Dec. 8	2400	1.81	.2		2400	5.33	1,500
	0930	5.66	1,850								
	1000	7.10	3,970	9	2045	1.86	.3	23	0400	5.02	1,190
	1100	8.22	6,160		2100	4.16	493		0800	4.49	728
	1200	9.38	8,750		2200	4.53	752		1200	4.21	524
	1230	9.69	9,670		2300	4.69	880		1600	4.18	511
	1400	8.90	7,590		2400	5.51	1,690		2000	4.06	440
	1600	7.39	4,480						2400	3.91	359
	1800	6.18	2,510	10	0100	6.16	2,500				
	2000	5.83	2,060		0200	6.69	3,290	24	1000	3.47	170
	2200	5.82	2,050		0300	7.13	4,040		1600	3.41	158
	2400	5.40	1,560		0400	7.24	4,210		2000	3.71	266
					0500	7.56	4,820		2400	3.70	261
24	0600	4.68	824		0600	7.17	4,110				
	1200	4.09	417		0700	6.30	2,700				
	2000	3.84	291		0800	5.72	1,930	28	2400	2.94	48
	2100	5.31	1,410		1000	5.33	1,490				
	2200	5.70	1,840		1200	5.51	1,690	29	1945	3.07	71
	2300	6.16	2,420		1400	5.47	1,650		2200	3.94	374
	2400	7.09	3,960		1600	5.25	1,410		2400	4.15	493
					1800	5.20	1,360				
25	0130	7.64	4,960		2400	4.87	1,030	30	0130	4.68	880
	0200	7.56	4,800						0300	6.23	2,620
	0400	6.58	3,110	11	0600	4.48	712		0400	7.57	4,860
	0600	5.77	1,980		1200	4.20	517		0530	8.33	6,440
	0800	5.55	1,720		1800	4.04	423		0700	8.11	5,970
	0900	6.67	3,240		2200	4.22	530		0830	9.08	8,040
	1000	7.98	5,660		2400	4.13	475		1000	8.60	7,000
	1030	7.98	5,660						1200	7.46	4,650
	1100	7.79	5,260						1400	6.72	3,360
	1200	7.66	4,990	21	2400	2.95	34		1600	6.36	2,810
	1400	7.33	4,370						2000	5.78	2,020
	1600	6.58	3,110	22	0800	3.12	82		2400	5.20	1,370
	1800	5.81	2,030		1000	3.98	395				
	2400	4.77	936		1200	4.33	610	31	0600	4.68	880
					1700	4.38	645		1200	4.38	645
26	0600	4.33	596		1800	4.68	880		1800	4.28	575
	1200	3.94	364		1900	5.37	1,550		2400	4.11	469

(124) 9-5056. Dirty Neck Canyon near Clints Well, Ariz.

(Crest-stage station)

Location. --Lat 34°30'45", long 111°21'30", in E½ sec. 14, T. 13 N., R. 9 E., at county road, 4 miles southwest of Clints Well, and 18 miles north of Payson.

Drainage area. --About 1.5 sq mi.

Gage-height record. --Crest stages only. Altitude of gage is 6,800 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by computation of flow through culvert.

Maxima. --November 1965 to January 1966: Discharge, 115 cfs Dec. 30 (gage height, 5.59 ft).
1964 to October 1965: Discharge, 85 cfs Jan. 6, 1965 (gage height, 4.83 ft).

(125) 9-5058. West Clear Creek near Camp Verde, Ariz.

Location. --Lat 34°32'20", long 111°41'35", in SW¼ sec. 2, T. 13 N., R. 6 E., in Coconino National Forest, on left bank at Bull Pen Ranch, 8½ miles upstream from mouth, and 9 miles east of Camp Verde.

Drainage area. --240 sq mi, approximately.

Gage-height record. --Water-stage recorder graph prior to Nov. 16; digital recorder tape thereafter except 1000 hours Dec. 30 to Jan. 26. Altitude of gage is 3,650 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 6,330 cfs 0300 hours Dec. 30 (gage height, 8.24 ft, from floodmark).
1964 to October 1965: Discharge, 6,510 cfs Jan. 6, 1965 (gage height, 8.3 ft, from floodmark).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	14	39	300	16	15	97	25
2	14	32	150	17	17	91	20
3	14	28	100	18	16	80	20
4	14	25	60	19	16	64	20
5	14	23	45	20	15	56	20
6	15	21	40	21	15	54	20
7	15	21	35	22	15	1,520	20
8	15	19	30	23	21	868	20
9	15	23	25	24	22	259	20
10	15	1,100	25	25	1,210	200	20
11	15	759	25	26	1,020	163	20
12	15	362	25	27	197	122	20
13	15	195	25	28	92	110	20
14	15	129	30	29	58	311	20
15	15	115	30	30	43	3,500	20
				31	------	800	20
Monthly mean discharge, in cubic feet per second					99.7	361	41.0
Runoff, in acre-feet					5,930	22,190	2,520

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965, of West Clear Creek near Camp Verde, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Nov. 24	2400	3.31	23	Dec. 10	1600	6.26	1,990	Dec. 23	2400	4.55	402
					1800	6.27	2,010				
25	0200	3.32	24		2000	6.15	1,850	24	1600	3.96	194
	0400	3.79	98		2200	6.09	1,770		2200	4.19	240
	0600	4.41	304		2400	5.70	1,280		2400	4.16	229
	1000	4.28	246								
	1200	5.77	1,310	11	0200	5.48	1,060				
	1400	6.45	2,210		0400	5.40	990	28	2400	3.81	118
	1600	6.51	2,300		1200	5.02	686				
	1800	5.97	1,560		1800	4.87	566	29	1800	4.03	184
	2000	6.19	1,850		2400	4.86	558		1900	4.85	574
	2200	6.95	3,030						2000	5.13	798
	2230	7.00	3,130	12	1200	4.50	362		2200	5.23	878
	2400	6.91	2,950		2400	4.20	232		2400	6.01	1,710
26	0600	5.88	1,430					30	0100	7.13	3,530
	1200	5.17	766	21	2400	3.50	57		0200	7.44	4,160
	1800	4.73	456						0300	a8.24	a6,330
	2400	4.44	313	22	0800	3.58	70		0400	7.79	5,040
					1000	4.36	331		0500	7.53	4,380
27	1200	4.13	188		1200	5.40	1,010		0600	7.66	4,660
	2400	3.89	120		1400	6.28	2,030		0730	7.46	4,160
					1600	6.58	2,530		0930	7.98	5,510
					1800	7.70	4,810		1000	7.90	5,310
Dec. 9	2400	3.29	26		2000	7.25	3,770		1500	-	2,800
					2200	6.44	2,300		2000	-	1,800
10	0200	4.05	180		2400	6.35	2,160		2400	-	1,200
	0400	4.21	236								
	0500	4.99	662	23	0600	5.39	1,010	31	1200	-	800
	0800	5.22	854		1200	4.92	630		2400	-	500
	1100	4.93	614		1800	4.84	566				

a Stage and discharge from outside high-water mark, published in annual report.

(126) 9-5065. Verde River at Childs, near Camp Verde, Ariz.

(Discontinued gaging station)

Location. --Lat 34°20'45", long 111°41'45", 600 ft downstream from Arizona Public Service Co. powerhouse at Childs, $6\frac{3}{4}$ miles upstream from East Verde River, and 18 miles southeast of Camp Verde.

Drainage area. --5,090 sq mi, approximately (including 373 sq mi in Aubrey Valley Playa, a closed basin).

Gage-height record. --Daily staff-gage readings except during flood periods, when gage was read more frequently. Records obtained from Arizona Public Service Co. for only those days shown below. Altitude of gage is 2,610 ft (from topographic map).

Discharge record. --Discharges at times of gage readings furnished by Arizona Public Service Co.; basis of stage-discharge relation unknown. Remaining discharges were estimated from hydrographic comparison with records for Verde River "near Clarkdale" and "below Tangle Creek, above Horseshoe Dam."

Maxima. --November 1965 to January 1966: Discharge observed, 27,200 cfs 2000 hours Dec. 30 (gage height, 9.5 ft).
1911-17: Gage height, 23 ft Jan. 19, 1916, at site and datum then in use (discharge not determined).

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	-	450	Dec. 24	2400	-	3,000	Dec. 30	1630	8.6	21,600
									2000	9.5	27,200
22	1000	0.80	480	25	1000	2.0	2,080		2400	-	30,000
	1500	-	550		2400	-	1,500				
	2000	-	3,000					31	0500	-	26,000
	2400	-	11,000						1000	8.3	20,000
				29	2400	-	1,500		2400	-	7,500
23	0400	-	15,000								
	1000	5.8	9,880	30	0400	-	1,800	Jan. 1	1000	3.8	5,270
	2400	-	6,500		0700	-	7,000		1300	4.5	6,600
					1000	5.8	9,880		1500	3.8	5,270
24	0600	-	700		1330	7.6	16,300		1900	3.0	3,780
	1000	4.0	5,670		1430	8.0	18,300		2400	-	3,200

(127) 9-5076. East Verde River near Pine, Ariz.

Location. --Lat 34°23'30", long 111°16'05", in $SE\frac{1}{4}SW\frac{1}{4}$ sec. 26, T. 12 N., R. 10 E. (unsurveyed), on right bank 0.8 mile upstream from Dude Creek, 2.7 miles south of Washington Park, and $10\frac{1}{2}$ miles east of Pine.

Drainage area. --6.65 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 5,400 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 40 cfs and extended above on basis of slope-area measurements at gage heights 3.05 and 3.67 ft. Stage-discharge relations affected by backwater from ice part of each day Jan. 21-29.

Maxima. --November 1965 to January 1966: Discharge, 960 cfs 0330 hours Dec. 30 (gage height, 3.67 ft).
1961 to October 1965: Discharge, 264 cfs Sept. 11, 1963 (gage height, 3.05 ft).

Mean discharge, in cubic feet per second, 1965-66, of East Verde River near Pine, Ariz.

Day	November	December	January	Day	November	December	January
1	3.7	3.6	23	16	28	6.2	5.2
2	9.6	3.6	16	17	28	8.4	5.2
3	12	3.4	15	18	28	17	5.2
4	26	6.0	12	19	28	21	4.9
5	26	5.2	10	20	28	5.8	4.9
6	26	5.8	9.4	21	28	6.6	4.5
7	26	2.6	9.8	22	29	65	4.0
8	26	12	9.4	23	27	34	4.0
9	24	17	8.9	24	15	15	4.0
10	23	48	13	25	58	12	3.8
11	24	12	7.5	26	15	11	3.8
12	23	8.4	7.0	27	7.5	11	3.8
13	30	7.9	6.6	28	5.5	11	3.8
14	30	7.0	6.2	29	4.6	61	3.8
15	28	6.6	5.5	30	3.8	260	3.6
				31	------	38	3.6
Monthly mean discharge, in cubic feet per second					22.4	23.6	7.34
Runoff, in acre-feet					1,330	1,450	451

(128) 9-5077. Webber Creek above West Fork Webber Creek, near Pine, Ariz.

Location. --Lat 34°24'40", long 111°22'20", in SW¼ sec. 23, T. 12 N., R. 9 E. (unsurveyed), in Tonto National Forest, on left bank 0.2 mile upstream from West Fork Webber Creek, and 4.9 miles northeast of Pine.

Drainage area. --4.92 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 5,530 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 33 cfs and extended above on basis of slope-area measurement at gage height 3.13 ft.

Maxima. --November 1965 to January 1966: Discharge, 366 cfs 0800 hours Dec. 30 (gage height, 3.05 ft).
1959 to October 1965: Discharge, 399 cfs Sept. 13, 1961 (gage height, 3.13 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0.2	2.3	24	16	0.3	5.6	3.6
2	.3	2.0	16	17	.3	5.6	3.6
3	.3	1.8	12	18	.3	4.6	3.4
4	.3	1.8	10	19	.3	4.6	3.1
5	.3	1.6	8.4	20	.3	4.6	2.9
6	.3	1.5	6.6	21	.3	5.2	2.9
7	.3	1.5	6.8	22	.5	29	2.7
8	.3	1.5	6.2	23	4.7	20	2.7
9	.3	3.6	5.9	24	18	11	2.7
10	.3	34	5.6	25	77	9.8	2.5
11	.3	16	5.6	26	15	9.3	2.5
12	.3	9.8	5.2	27	6.6	8.4	2.5
13	.3	7.6	4.6	28	4.4	8.0	2.3
14	.3	7.0	4.1	29	3.4	25	2.1
15	.3	6.2	4.1	30	2.7	200	2.1
				31	------	50	2.1
Monthly mean discharge, in cubic feet per second					4.62	16.1	5.45
Runoff, in acre-feet					275	990	335

(129) 9-5079.8. East Verde River near Childs, Ariz.

Location. --Lat 34°16'20", long 111°37'50", in sec. 21, T. 10 N., R. 7 E. (unsurveyed), in Tonto National Forest, on right bank 2 miles upstream from mouth, and 7 miles southeast of Childs.

Drainage area. --317 sq mi.

Gage-height record. --Water-stage recorder graph to 1200 hours Dec. 16. Gage washed out during peak of Dec. 22. Altitude of gage is 2,600 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 1,100 cfs and extended above on basis of slope-area measurement at gage height 16.0 ft.

Maxima. --November 1965 to January 1966: Discharge, 17,000 cfs about 2000 hours Dec. 22 (gage height unknown), from slope-area measurement of peak flow.
1961 to October 1965: Discharge, 11,400 cfs Aug. 22, 1963 (gage height, 16.0 ft).

Mean discharge, in cubic feet per second, 1965

Day	November	December	Day	November	December	Day	November	December
1	1.4	27	11	24	855	21	31	-
2	1.5	22	12	24	201	22	32	-
3	1.6	20	13	27	121	23	52	-
4	1.6	17	14	25	171	24	82	-
5	5.4	16	15	29	209	25	730	-
6	17	16	16	29	156	26	419	-
7	21	16	17	29	-	27	107	-
8	22	18	18	31	-	28	60	-
9	22	16	19	30	-	29	42	-
10	24	2,200	20	30	-	30	32	-
Monthly mean discharge, in cubic feet per second							66.1	-
Runoff, in acre-feet							3,930	-

(130) 9-5085. Verde River below Tangle Creek, above Horseshoe Dam, Ariz.

Location.--Lat 34°04'25", long 111°42'50", in sec. 35, T. 9 N., R. 6 E. (unsurveyed), in Tonto National Forest, on right bank 1¼ miles downstream from Tangle Creek, and 9 miles upstream from Horseshoe Dam.

Drainage area.--5,872 sq mi (including 373 sq mi in Aubrey Valley Playa, a closed basin).

Gage-height record.--Water-stage recorder graph, except 1800 hours Nov. 29 to 1400 hours Dec. 1, 2000 hours Dec. 25 to 1830 hours Dec. 28, and 1100 hours Jan. 2 to 1530 hours Jan. 6, for which graph was reconstructed on basis of indicated recession. Datum of gage is 2,029.0 ft above mean sea level, datum of 1929.

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

Maxima.--November 1965 to January 1966: Discharge, 39,300 cfs 2400 hours Dec. 22 (gage height, 16.43 ft).

1945 to October 1965: Discharge, 81,600 cfs Dec. 31, 1951 (gage height, 17.62 ft), from rating curve extended above 42,000 cfs by logarithmic plotting.

Greatest floods since 1888 occurred in February 1891 (discharge probably more than 150,000 cfs) and Mar. 3, 1938, discharge, 100,000 cfs (gage height, 19.0 ft, from floodmarks), computed from comparison of peak discharge at other stations on Verde River.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	179	710	7,710	16	220	2,040	515
2	182	604	4,100	17	236	2,220	492
3	171	522	2,600	18	246	1,870	488
4	169	477	2,000	19	253	1,440	473
5	175	440	1,500	20	274	1,230	469
6	181	409	1,200	21	277	1,170	466
7	192	386	978	22	298	12,400	451
8	194	366	871	23	391	19,000	430
9	202	392	795	24	6,420	6,880	420
10	207	9,400	743	25	5,810	3,630	400
11	216	14,700	702	26	16,400	2,600	390
12	223	5,580	670	27	3,680	2,100	380
13	221	3,080	625	28	1,900	1,700	370
14	221	2,440	583	29	1,240	1,430	373
15	220	2,580	546	30	930	18,900	370
				31	------	22,300	370
Monthly mean discharge, in cubic feet per second					1,384	4,613	1,048
Runoff, in acre-feet					82,370	283,600	64,420

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Verde River below Tangle Creek, above Horseshoe Dam, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Nov. 22	2400	2.66	321	Dec. 10	0300	3.30	558	Dec. 23	0600	14.70	24,500
					0500	5.00	1,480		1000	13.70	17,400
23	1900	2.96	416		0600	6.00	2,150		1300	12.85	13,500
	2100	3.38	575		0800	9.90	4,810		1900	12.08	11,000
	2400	3.25	522		1000	12.10	10,600		2400	11.68	9,880
					1200	11.55	9,310				
24	0400	3.12	473		1400	11.16	8,400	24	0500	10.68	7,600
	0500	9.50	5,250		1600	12.46	11,700		1000	10.78	7,820
	0700	11.11	7,860		1800	13.65	16,400		1300	10.42	7,120
	1000	11.10	7,840		2000	14.28	20,000		1500	9.90	6,250
	1300	11.90	9,680		2200	13.90	17,600		2100	8.87	4,810
	1400	12.04	10,000		2400	14.18	19,300		2400	8.53	4,430
	1600	11.86	9,580								
	1800	11.25	8,130	11	0300	15.00	25,600	25	1000	7.70	3,660
	2000	10.10	6,040		0400	14.96	25,300		1500	7.47	3,470
	2400	8.77	4,400		0500	14.80	23,800		2400	6.87	2,960
					0800	13.90	17,600				
25	0600	7.55	3,290		1200	12.53	11,900	29	2400	5.45	1,800
	1100	7.02	2,860		1800	11.60	9,430				
	1300	9.00	4,650		2400	11.00	8,040	30	0200	6.35	2,480
	1600	11.24	8,150						0300	7.40	3,330
	1800	11.84	9,520	12	0600	10.30	6,690		0400	9.10	5,040
	2000	12.05	10,000		1200	9.40	5,360		0500	10.87	7,930
	2300	11.90	9,680		1800	8.73	4,550		0600	12.57	12,400
	2400	12.17	10,300		2400	8.12	3,940		0800	14.07	19,400
									1000	14.57	23,300
26	0300	13.76	15,900	13	1200	7.05	3,020		1300	14.87	25,700
	0600	15.70	29,400		2400	6.45	2,560		2400	14.77	24,900
	0700	15.94	31,400								
	0800	15.66	29,100	14	1200	6.12	2,300	31	0100	15.13	27,700
	1000	14.98	23,700		1900	6.13	2,310		0530	15.58	31,600
	1200	14.64	21,100		2400	6.72	2,760		1000	14.92	26,100
	1600	13.00	12,900						1200	14.27	20,900
	2000	11.70	9,240	21	2400	4.40	1,110		1800	13.68	17,000
	2400	10.24	6,360						2400	12.25	11,300
				22	0700	4.60	1,230				
27	0600	8.67	4,340		0900	6.20	2,370	Jan. 1	0500	11.38	9,090
	1200	7.63	3,410		1200	9.70	5,880		1000	10.71	7,580
	1800	7.07	2,960		1500	12.08	10,900		1800	10.18	6,600
	2400	6.50	2,530		1700	13.68	17,300		2400	9.32	5,320
					1800	14.78	25,200				
28	1200	5.60	1,840		1900	15.28	29,200	2	1200	8.10	3,950
	2400	5.02	1,460		2400	16.43	39,300		2400	7.10	3,080
Dec. 9	2400	3.06	466	23	0400	15.61	32,100				

(131) 9-5095. Reservoir system on Verde River at and below Horseshoe Dam, Ariz.

Location. --This system comprises the two storage reservoirs created by Horseshoe and Bartlett Dams on Verde River: Horseshoe Reservoir, formed by Horseshoe Dam, lat 33°59'15", long 111°42'45", in sec. 2, T. 7 N., R. 6 E. (unsurveyed); and Bartlett Reservoir, formed by Bartlett Dam, lat 33°49', long 111°38', in sec. 34, T. 6 N., R. 7 E. (unsurveyed).

Drainage area. --6,185 sq mi, at Bartlett Dam.

Gage-height record. --Water-stage recorder graph. Datum of gage on Horseshoe Reservoir is 1,900.00 ft and on Bartlett Reservoir 1,599.46 ft above mean sea level, datum of 1929.

Maxima. --November 1965 to January 1966: Contents, 315,200 acre-ft Dec. 30.
1939 to October 1965: Contents, 313,200 acre-ft Apr. 20, 1965.

Remarks. --Horseshoe Reservoir is formed by earth- and rock-fill dam, completed in November 1945. Bartlett Reservoir is formed by concrete multiple-arch dam, completed in May 1939. Total capacity of the two reservoirs is 317,700 acre-ft, divided as follows: Horseshoe Reservoir, 139,200 acre-ft at elevation 2,026.0 ft (top of spillway gates); Bartlett Reservoir, 178,500 acre-ft at elevation 1,787.46 ft (top of spillway gates). Capacity tables furnished by Salt River Valley Water Users' Association.

Contents, in acre-feet, at 2400, 1965-66

Day	November	December	January	Day	November	December	January
1	15,330	91,690	307,200	16	20,680	174,900	274,500
2	16,610	92,200	306,700	17	21,040	180,400	274,600
3	16,880	92,850	306,200	18	21,430	184,400	274,700
4	17,120	93,220	304,200	19	21,820	187,300	275,000
5	17,390	94,560	299,400	20	22,260	189,900	275,900
6	17,660	93,550	292,800	21	22,680	192,400	276,500
7	17,920	93,790	286,000	22	23,200	221,100	276,300
8	18,220	93,870	279,100	23	23,930	261,700	275,900
9	18,510	94,240	271,900	24	34,690	275,000	275,300
10	18,800	112,400	266,300	25	45,200	283,200	274,600
11	19,040	141,700	267,800	26	76,020	288,800	273,700
12	19,340	151,900	269,800	27	83,580	292,800	272,700
13	19,690	158,400	271,100	28	87,090	295,100	271,200
14	20,040	164,000	272,300	29	89,250	297,800	270,500
15	20,380	170,700	273,500	30	90,750	315,200	269,400
				31	------	307,500	269,700
Change in contents, in acre-feet					+74,690	+216,800	-37,800

(132) 9-5100. Verde River below Bartlett Dam, Ariz.

Location. --Lat 33°48'50", long 111°38'10", in sec. 34, T. 6 N., R. 7 E. (unsurveyed), on right bank 0.2 mile downstream from Bartlett Dam, 5½ miles upstream from Camp Creek, and 18 miles east of town of Cave Creek.

Drainage area. --6,185 sq mi.

Gage-height record. --Water-stage recorder graph except 0400 hours Jan. 1 to 1700 hours Jan. 2 for which graph was reconstructed on the basis of adjoining record and records of releases from Bartlett Dam by Salt River Valley Water Users' Association. Altitude of gage is 1,600 ft (from topographic map). Gage heights subsequent to 1600 hours Dec. 30 are for auxiliary gage located 2 miles downstream from base gage. Datum of auxiliary gage is 1,572.34 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 8,800 cfs for base gage and below 32,000 cfs for auxiliary gage.

Maxima. --November 1965 to January 1966: Discharge, 35,600 cfs 1900 hours Dec. 30 (gage height, 16.95 ft at auxiliary gage).

1888-1938: Discharge, not determined but probably over 150,000 cfs Feb. 24, 1891.

1939 to October 1965: Discharge, 45,800 cfs Mar. 15, 1941 (gage height, 17.5 ft at auxiliary gage).

Remarks. --Flow regulated by Bartlett Reservoir since Feb. 5, 1939, and by Horseshoe Reservoir since Nov. 15, 1945 (combined capacity, 317,700 acre-ft; see station 131).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	38	168	7,800	16	45	0	179
2	42	204	4,600	17	43	0	360
3	42	204	3,240	18	42	0	528
4	42	204	3,160	19	42	0	411
5	42	246	3,750	20	41	0	200
6	42	337	4,200	21	43	0	286
7	42	395	4,180	22	42	0	548
8	42	375	4,150	23	41	0	630
9	58	285	4,120	24	41	0	695
10	50	80	3,370	25	41	0	752
11	50	37	182	26	42	0	812
12	48	36	179	27	42	0	932
13	47	40	176	28	42	75	967
14	43	37	176	29	42	338	953
15	46	21	176	30	76	12,100	600
				31	------	28,700	170
Monthly mean discharge, in cubic feet per second					44.6	1,416	1,693
Runoff, in acre-feet					2,660	87,040	104,100

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Verde River below Bartlett Dam, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 28	1700	-	0	Dec. 31	1100	15.85	28,000	Jan. 2	1900	6.42	3,360
	1700	1.30	118		1200	16.35	31,400		2400	6.30	3,240
	1800	1.78	267		1900	16.15	30,000				
	2400	1.78	267		2100	15.45	25,400	3	1200	6.30	3,240
					2200	15.45	25,400		2400	6.30	3,240
29	1700	1.79	271		2300	13.50	14,000				
	1730	2.27	504		2400	13.48	13,900	4	1000	6.27	3,200
	2400	2.29	514						1400	6.11	3,020
				Jan. 1	0300	13.50	14,000		1700	6.23	3,150
30	1000	2.29	514		0400	12.80	11,500		2400	6.21	3,130
	1100	5.37	4,240		0700	12.60	10,900				
	1200	5.39	4,270		0900	10.00	6,870	5	1100	6.21	3,130
	1400	5.14	3,910		1200	8.50	5,380		1130	7.80	4,680
	1600	11.3	14,400		2400	8.40	5,270		1200	7.40	4,300
	1800	16.8	34,600						2400	7.33	4,220
	1900	16.95	35,600	2	1500	8.30	5,170				
	2400	16.4	31,800		1700	6.60	3,530				

(133) 9-5100.7. West Fork Sycamore Creek above McFarland Canyon, near Sunflower, Ariz.

Location. --Lat 33°57'38", long 111°29'12", in SE¼SW¼ sec. 12, T. 7 N., R. 8 E. (unsurveyed), in Tonto National Forest, on left bank 0.2 mile upstream from McFarland Canyon, 2.7 miles upstream from mouth, and 6.8 miles north of Sunflower.

Drainage area. --4.58 sq mi.

Gage-height record. --Water-stage recorder graph. Altitude of gage is 4,380 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 28 cfs and extended above on basis of weir computation of peak flow.

Maximum. --November 1965 to January 1966: Discharge, 430 cfs Dec. 22 (gage height, 4.45 ft), from computation of flow over weir.

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.43	8.1	Dec. 22	2400	3.78	172	Dec. 29	2200	2.66	18
									2400	2.81	27
22	0300	2.44	8.4	23	0400	3.40	91				
	0500	2.52	11		0700	3.26	78	30	0200	3.05	46
	0700	2.77	24		1300	3.12	54		0300	3.12	54
	0815	3.23	68		1900	2.99	40		0500	3.21	65
	0900	3.40	91		2400	2.91	34		0700	3.55	120
	1030	3.68	148						0830	3.65	141
	1100	3.86	194	24	1100	2.76	24		1300	3.50	110
	1145	3.92	217		1600	2.76	24		1500	3.33	81
	1215	3.65	141		2400	2.72	21		1800	3.29	76
	1645	3.67	145						2400	3.12	54
	1730	4.05	255	28	2400	2.54	12				
	1845	4.20	315					31	0600	3.03	44
	1900	4.45	430	29	1100	2.53	11		1800	2.87	31
	2100	4.01	239		2100	2.62	16		2400	2.81	27

(134) 9-5100.8. West Fork Sycamore Creek near Sunflower, Ariz.

Location. --Lat 33°56'45", long 111°29'05", in SE¼ sec. 13, T. 7 N., R. 8 E., in Tonto National Forest, 1.2 miles upstream from mouth, and 5.7 miles north of Sunflower.

Drainage area. --9.80 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 24-29 and Jan. 1-14. Altitude of gage is 4,000 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 420 cfs and extended above on basis of slope-area measurement of peak flow. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 698 cfs 1800 hours Dec. 22 (gage height, 6.75 ft).
1961 to October 1965: Discharge, 116 cfs Feb. 11, 1963; gage height, 3.29 ft Aug. 22, 1963.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0.6	50	16	0	7.4	2.3
2	0	.5	35	17	0	9.6	2.3
3	0	.5	25	18	0	8.1	2.8
4	0	.4	20	19	.01	7.7	2.8
5	0	.4	15	20	.01	10	2.6
6	0	.3	10	21	.01	14	2.3
7	0	.3	9	22	.02	264	2.0
8	0	.3	7	23	.7	131	1.9
9	0	1.4	6	24	.3	50	1.9
10	0	62	5	25	1.6	35	1.9
11	0	24	4	26	2.2	25	1.9
12	0	10	4	27	1.7	20	1.9
13	0	7.7	3	28	1.2	15	1.7
14	0	9.6	3	29	.8	15	1.6
15	0	9.6	2.6	30	.7	196	1.6
				31	------	94	1.6
Monthly mean discharge, in cubic feet per second					0.308	33.2	7.47
Runoff, in acre-feet					18	2,040	460

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	1.69	14	Dec. 22	1900	6.58	656	Dec. 30	0100	2.70	121
					2000	6.25	610		0200	2.95	147
22	0400	1.72	16		2200	4.00	253		0400	3.06	159
	0600	1.95	33		2400	3.65	218		0600	4.12	263
	0700	3.50	203						0730	4.60	315
	0830	3.95	248	23	0300	3.30	183		1100	3.95	246
	0930	4.30	283		0600	3.00	153		1500	3.35	187
	1030	4.40	293		1200	2.67	117		1800	3.08	160
	1130	4.42	295		2400	2.36	80		2400	2.82	134
	1200	4.75	335								
	1330	4.32	285	28	2400	-	13	31	0600	2.62	111
	1500	4.67	325						0900	2.50	97
	1600	4.67	325	29	1200	-	12		1500	2.40	84
	1700	5.80	500		2000	-	14		2400	2.23	63
	1800	6.75	698		2400	2.55	103				

(135) 9-5101. East Fork Sycamore Creek near Sunflower, Ariz.

Location. --Lat 33°56'58", long 111°27'39", in NE¼SE¼ sec. 18, T. 7 N., R. 9 E., in Tonto National Forest, on left bank 1.7 miles upstream from West Fork, and 6 miles north of Sunflower.

Drainage area. --4.49 sq mi.

Gage-height record. --Water-stage recorder graph except 1800 hours Dec. 23 to Dec. 29 and Dec. 31 to Jan. 14. Graph reconstructed for Dec. 23. Altitude of gage is 4,020 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 130 cfs and extended above on basis of slope-area measurement of peak flow. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 330 cfs 1630 hours Dec. 22 (gage height, 5.07 ft).
1961 to October 1965: Discharge, 30 cfs Sept. 1, 1963 (gage height, 2.84 ft, at site 0.2 mile downstream at different datum).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0.04	20	16	0	3.6	1.1
2	0	.04	10	17	0	5.4	1.1
3	0	.04	8	18	0	4.3	1.3
4	0	.03	6	19	0	4.0	1.4
5	0	.03	4	20	0	4.3	1.3
6	0	.03	3	21	0	5.4	1.2
7	0	.04	2	22	0	134	1.0
8	0	.04	2	23	.9	53	1.0
9	0	.8	2	24	.06	30	1.0
10	0	41	1.5	25	9.0	20	.9
11	0	12	1.5	26	1.8	15	.9
12	0	3.7	1.4	27	.3	10	.8
13	0	2.7	1.3	28	.1	10	.8
14	0	4.6	1.2	29	.06	20	.8
15	0	4.4	1.2	30	.05	84	.8
				31	------	30	.8
Monthly mean discharge, in cubic feet per second..					0.409	16.2	2.62
Runoff, in acre-feet					24	997	161

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	1.62	5.6	Dec. 22	1715	4.81	299	Dec. 29	2000	-	30
					1900	4.30	238		2400	2.68	52
22	0200	1.64	5.9		2000	3.95	196				
	0300	1.70	7.1		2200	3.53	146	30	0200	2.70	54
	0400	1.95	14		2400	3.29	117		0300	2.95	78
	0500	2.23	25						0400	3.50	142
	0700	3.32	120	23	0200	3.07	91		0530	3.82	180
	0800	3.38	128		0400	2.85	68		0630	3.74	171
	0845	3.36	125		0700	2.69	53		0800	3.40	130
	1030	3.50	142		1000	2.61	47		1115	3.00	83
	1145	3.40	130		2400	2.45	36		1430	2.77	60
	1330	3.70	166						1900	2.65	50
	1430	3.66	161	28	2400	-	12		2400	2.57	44
	1530	4.15	220								
	1630	5.07	330	29	1200	-	10				

(136) 9-5101.5. Sycamore Creek near Sunflower, Ariz.

Location. --Lat 33°51'05", long 111°27'09", in NE¼ sec. 20, T. 6 N., R. 9 E., in Tonto National Forest, on right bank 1.1 miles upstream from Boulder Creek, 1.2 miles north of Crabtree Butte, and 1.2 miles southeast of Sunflower.

Drainage area. --53.4 sq mi.

Gage-height record. --Water-stage recorder graph. Datum of gage is 3,307.9 ft above mean sea level.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 260 cfs and extended above on basis of slope-area measurements at gage heights 5.7 and 7.90 ft.

Maxima. --November 1965 to January 1966: Discharge, 4,800 cfs 1900 hours Dec. 22 (gage height, 7.90 ft).
1961 to October 1965: Discharge, 1,120 cfs Feb. 11, 1963 (gage height, 5.7 ft).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0.1	5.9	112	16	0.2	90	9.6
2	.1	5.9	75	17	.2	177	8.5
3	.1	5.9	56	18	.2	96	13
4	.1	5.9	43	19	.2	65	19
5	.1	5.9	36	20	.2	58	17
6	.1	5.9	29	21	.2	56	14
7	.1	5.9	25	22	.4	1,280	11
8	.1	5.9	21	23	50	628	11
9	.1	88	19	24	2.2	231	10
10	.1	728	16	25	223	162	9.6
11	.2	156	14	26	41	120	8.5
12	.2	59	13	27	13	98	8.5
13	.2	84	11	28	7.9	84	8.2
14	.2	162	11	29	6.6	87	7.9
15	.2	176	10	30	6.1	555	7.9
				31	------	180	7.6
Monthly mean discharge, in cubic feet per second..					11.8	175	21.4
Runoff, in acre-feet					701	10,740	1,310

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

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	2.87	58	Dec. 22	2400	6.00	1,400	Dec. 29	1200	3.00	72
									2400	3.31	131
22	0600	3.10	90	23	0100	6.22	1,620				
	0700	4.70	572		0200	6.00	1,400	30	0200	3.82	251
	0715	6.49	1,930		0300	5.45	985		0400	4.10	331
	0800	6.00	1,400		0400	5.60	1,080		0600	4.90	670
	0900	5.45	985		1100	4.50	482		0630	6.20	1,570
	1130	6.30	1,720		1800	4.20	364		0800	6.15	1,530
	1330	5.60	1,400		2400	3.95	286		1130	4.83	630
	1500	6.42	1,860						1600	4.20	361
	1600	5.58	1,060	24	1200	3.65	180		2400	3.85	254
	1800	7.00	2,670		1800	3.80	245				
	1900	7.90	4,800		2400	3.63	200	31	1200	3.56	180
	2000	7.00	2,670						2400	3.45	157
	2100	6.00	1,400	28	2400	3.03	80				
	2230	5.35	920								

(137) 9-5101.7. Camp Creek near Sunflower, Ariz.

Location. --Lat 33°45'35", long 111°29'44", in SW¼ sec. 24, T. 5 N., R. 8 E., on right bank at upstream side of culvert on State Highway 87, half a mile upstream from mouth, and 7 miles south of Sunflower.

Drainage area. --2.6 sq mi, approximately.

Gage-height record. --Water-stage recorder graph except Jan. 2-11. Datum of gage is 2,186.61 ft above mean sea level (Arizona Highway Department bench mark).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 26 cfs and extended above on basis of computation of flow through culvert at gage height 4.96 ft. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 167 cfs 1830 hours Dec. 22 (gage height, 2.90 ft).
1963 to October 1965: Discharge, 391 cfs Aug. 16, 1963 (gage height, 4.96 ft, from high-water mark in gage well).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0	3.5	16	0	5.2	0.6
2	0	0	3	17	0	4.4	.4
3	0	0	2.5	18	0	2.9	.8
4	0	0	2	19	0	1.3	.8
5	0	0	1.5	20	0	.8	.6
6	0	0	1.5	21	0	.5	.6
7	0	0	1.5	22	0	54	.6
8	0	0	1.5	23	1.7	53	.8
9	0	0	1.5	24	0	12	.8
10	0	27	1	25	4.7	6.8	.8
11	0	14	1	26	0	4.0	.8
12	0	1.8	1.0	27	0	3.2	.8
13	0	1.8	.9	28	0	2.6	.8
14	0	3.2	.9	29	0	2.1	.8
15	0	13	.8	30	0	21	.8
				31	------	6.8	.7
Monthly mean discharge, in cubic feet per second..					0.21	7.79	1.15
Runoff, in acre-feet					13	479	71

(138) 9-5101.8. Rock Creek near Sunflower, Ariz.

Location. --Lat 33°43'49", long 111°30'28", in SE¼ sec. 35, T. 5 N., R. 8 E., on left bank 300 ft upstream from State Highway 87, 0.3 mile upstream from mouth, and 9.9 miles south of Sunflower.

Drainage area. --15 sq mi, approximately.

Gage-height record. --Water-stage recorder graph except Dec. 24-30, Jan. 4-11. Record for Dec. 30 reconstructed. Datum of gage is 2,051.59 ft above mean sea level (Arizona Highway Department bench mark).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 70 cfs and extended above on basis of slope-area measurements at gage heights 4.49, 5.40, and 6.80 ft. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 1,900 cfs 1900 hours Dec. 22 (gage height, 6.80 ft).
1963 to October 1965: Discharge, 916 cfs Aug. 1, 1964 (gage height, 5.40 ft).

Mean discharge, in cubic feet per second, 1965-66, of Rock Creek near Sunflower, Ariz.

Day	November	December	January	Day	November	December	January
1	0	0	26	16	0	21	2.8
2	0	0	21	17	0	24	2.5
3	0	0	20	18	0	18	5.3
4	0	0	17	19	0	15	6.1
5	0	0	13	20	0	13	5.3
6	0	0	11	21	0	13	4.0
7	0	0	9	22	0	450	3.6
8	0	0	8	23	0	240	4.0
9	0	0	6	24	0	60	3.2
10	0	109	5	25	4.3	40	2.8
11	0	54	4.5	26	2.0	30	2.8
12	0	21	4.0	27	0	25	2.8
13	0	18	3.6	28	0	20	2.8
14	0	21	3.6	29	0	20	2.8
15	0	28	2.8	30	0	115	3.2
				31	------	42	3.2
Monthly mean discharge, in cubic feet per second..					0.21	45.1	6.83
Runoff, in acre-feet					12	2,770	420

(139) 9-5102. Sycamore Creek near Fort McDowell, Ariz.

Location. --Lat 33°41'39", long 111°32'28", in sec. 16, T. 4 N., R. 8 E. (unsurveyed), in Tonto National Forest, on right bank, 0.7 mile southwest of Sugarloaf Mountain, 8½ miles northeast of Fort McDowell, 10 miles upstream from mouth, and 25½ miles northeast of Scottsdale.

Drainage area. --165 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 1-9, 2300 hours Dec. 11 to 1700 hours Dec. 14 for which graph was reconstructed on basis of adjoining good record and typical recession for the station. Datum of gage is 1,759.17 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 3,600 cfs and by slope-area measurement at 15,800 cfs.

Maxima. --November 1965 to January 1966: Discharge, 11,200 cfs 2030 hours Dec. 22 (gage height, 12.1 ft).

1959 to October 1965: Discharge, 15,800 cfs Dec. 25 or 26, 1959 (gage height, 15.0 ft, from floodmarks), from rating curve extended above 1,600 cfs on basis of slope-area measurement of peak flow.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0.4	293	16	0	235	40
2	0	.4	210	17	0	310	42
3	0	.3	163	18	0	216	45
4	0	.3	137	19	0	148	53
5	0	.2	120	20	0	110	55
6	0	.2	103	21	0	102	49
7	0	.2	86	22	0	3,030	42
8	0	.2	71	23	7.8	2,280	42
9	0	.9	63	24	8.6	618	40
10	0	1,760	58	25	234	368	40
11	0	648	53	26	52	263	40
12	0	170	49	27	6.4	190	39
13	0	90	47	28	1.2	157	37
14	0	200	43	29	.8	135	37
15	0	448	42	30	.5	1,240	37
				31	------	482	39
Monthly mean discharge, in cubic feet per second..					10.4	426	71.5
Runoff, in acre-feet					617	26,190	4,390

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Sycamore Creek near Fort McDowell, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	1.55	78	Dec. 23	0400	6.14	3,350	Dec. 30	0330	1.89	182
					0600	6.02	3,230		0500	2.08	252
22	0300	1.55	78		0700	6.24	3,450		0700	3.15	800
	0600	1.63	99		0830	5.39	2,600		0800	4.80	2,070
	0800	1.72	126		1200	4.59	1,880		0900	5.78	2,990
	0900	2.30	340		2000	3.85	1,290		1000	5.80	3,010
	1000	3.20	830		2400	3.38	950		1100	5.60	2,810
	1030	4.69	1,970						1330	4.45	1,770
	1100	7.14	4,450	24	0600	3.00	710		1700	3.85	1,270
	1200	6.52	3,760		1200	2.70	540		2300	3.12	780
	1630	5.74	2,950		1800	2.57	470		2400	3.04	734
	1800	6.64	3,890		2130	2.70	540				
	1900	7.94	5,410		2400	2.63	502	31	0300	2.65	622
	2000	11.1	9,690						1000	2.59	460
	2030	12.1	11,200	25	0400	2.45	410		1800	2.41	390
	2100	11.6	10,400		1200	2.33	354		2400	2.32	349
	2200	10.45	8,720		1800	2.25	320				
	2300	7.94	5,410		2400	2.25	320	Jan. 1	1200	2.17	288
	2400	7.14	4,450						2400	2.07	248
				29	2400	1.83	160				
23	0200	6.54	3,780								

(140) 9-5113. Verde River near Scottsdale, Ariz.

Location. --Lat 33°34'50", long 111°40'10", in NE¼ sec. 30, T. 3 N., R. 7 E., near left bank on downstream side of bridge on State Highway 87, in Fort McDowell Indian Reservation, 2.5 miles upstream from mouth, 3.8 miles downstream from Fort McDowell, and 16 miles northeast of Scottsdale.

Drainage area. --6,600 sq mi, approximately.

Gage-height record. --Water-stage recorder graph, except 2000 hours Dec. 11 to 1800 hours Dec. 14, 1200 hours Dec. 19 to 0700 hours Dec. 22, 1800 hours Dec. 25 to 1130 hours Dec. 27, and 0200-1030 hours Dec. 31 for which graph was reconstructed on basis of indicated recession, peak stage in well, adjoining good record, and records for upstream stations. Datum of gage is 1,351.35 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 8,000 cfs and extended above on basis of two poor current-meter measurements that include estimate of about 30 percent of the flow.

Maxima. --November 1965 to January 1966: Discharge, 31,300 cfs 1900-2300 hours Dec. 31 (gage height, 12.75 ft).
1961 to October 1965: Discharge, 8,770 cfs Apr. 20, 1965 (gage height, 9.73 ft).

Remarks. --Flow regulated by Bartlett and Horseshoe Reservoirs (station 131).

Mean discharge, in cubic feet per second, 1965-66, of Verde River near Scottsdale, Ariz.

Day	November	December	January	Day	November	December	January
1	69	78	14,000	16	22	138	79
2	47	168	6,280	17	23	90	186
3	37	190	4,040	18	22	95	553
4	33	197	3,290	19	21	40	605
5	30	201	3,430	20	20	30	217
6	27	268	4,510	21	18	20	86
7	26	335	4,500	22	21	2,050	495
8	25	360	4,420	23	34	2,950	760
9	24	310	4,300	24	28	610	880
10	32	954	4,170	25	59	334	922
11	31	410	889	26	55	210	982
12	27	100	212	27	37	150	1,020
13	26	70	138	28	34	112	1,080
14	25	120	109	29	33	217	1,070
15	23	273	92	30	33	2,580	1,000
				31	------	30,200	492
Monthly mean discharge, in cubic feet per second..					31.4	1,415	2,090
Runoff, in acre-feet					1,870	87,000	128,500

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 21	2400	-	20	Dec. 25	1700	2.77	286	Jan. 1	0400	11.95	20,800
					2400	2.70	250		0600	11.80	19,000
22	0700	-	20						1000	11.38	14,700
	0800	2.22	116	29	2400	2.78	291		1300	10.55	10,400
	1030	2.50	201						1600	9.30	7,300
	1230	2.38	162	30	0200	3.09	445		1700	9.15	6,990
	1245	4.90	1,640		0900	3.30	550		2000	9.03	6,740
	1300	5.76	2,540		1000	3.53	665		2400	8.95	6,600
	1400	6.57	3,500		1030	3.82	832				
	1600	6.22	3,040		1100	4.80	1,550	2	0600	8.90	6,510
	1830	6.44	3,320		1200	5.91	2,620		1200	8.85	6,420
	2100	7.28	4,550		1330	6.30	3,030		2000	8.79	6,310
	2200	8.14	5,810		1500	6.01	2,730		2100	8.58	5,930
	2330	9.67	8,540		1600	6.46	3,230		2200	8.18	5,290
	2400	9.60	8,410		1700	6.63	3,450		2400	7.77	4,690
					2000	6.86	3,780				
23	0200	8.15	5,830		2100	7.24	4,330	3	0200	7.58	4,410
	0300	7.67	5,140		2200	7.96	5,390		0800	7.37	4,100
	0530	6.85	3,920		2300	9.36	7,880		2400	7.08	3,680
	0600	6.55	3,470		2400	11.70	17,800				
	0900	6.57	3,500					4	1200	6.81	3,300
	1400	5.08	1,810	31	0100	12.10	22,600		1600	6.65	3,100
	2400	4.12	1,020		0300	12.35	25,700		1930	6.53	2,970
					0500	12.50	27,800		2200	6.63	3,080
24	0130	3.93	900		0800	12.57	28,800		2400	6.62	3,060
	1100	3.37	585		1300	12.50	27,800				
	1800	3.08	440		1700	12.70	30,600	5	0600	6.60	3,040
	2130	3.03	415		1900	12.75	31,300		1500	6.58	3,020
	2400	3.08	440		2300	12.75	31,300		1700	7.26	3,950
					2400	12.70	30,600		2000	7.53	4,330
25	0130	3.09	445						2400	7.57	4,380
	1000	2.87	335	Jan. 1	0100	12.60	29,200				

(141) 9-5115. Salt River below Granite Reef Dam, Ariz.

(Discontinued gaging station)

Location. --Lat 33°30'57", long 111°41'28", in SE¼ sec. 13, T. 2 N., R. 6 E., at Granite Reef Dam, 3.4 miles downstream from Verde River, and 10.7 miles northeast of Mesa city hall.

Drainage area. --12,900 sq mi, approximately.

Discharge record. --Discharge computed by combining the flow for Salt River below Stewart Mountain Dam and Verde River near Scottsdale, adjusted for flow diverted into canals at Granite Reef Dam. Elevation of crest of dam is 1,310.0 ft above mean sea level.

Maxima. --November 1965 to January 1966: Discharge, 67,000 cfs 2000 hours Dec. 31.
1888 to October 1965: Discharge, 300,000 cfs Feb. 24, 1891, computed from weir formula for Arizona Dam.
1939 to October 1965: Discharge, about 45,000 cfs Mar. 14, 1941, estimated from records for Verde River below Bartlett Dam.

Remarks. --Records of discharge include flow over Granite Reef Dam, but do not include flow in Arizona and South Canals which divert from river immediately above the dam. Flow regulated by reservoirs on the Salt River since 1910 (capacity, 1,755,000 acre-ft; see station 107) and by reservoirs on the Verde River since 1939 (capacity, 317,700 acre-ft; see station 131).
A gaging station was operated at the former Arizona Dam 2½ miles upstream from Granite Reef Dam 1888-91 and 1895-96. Records published as "at Arizona Dam" and as "below Verde River."

Mean discharge, in cubic feet per second, 1965-66

Day	December	January	Day	December	January	Day	December	January
1	0	53,000	11	0	1,000	21	0	0
2	0	17,000	12	0	0	22	1,900	0
3	0	11,000	13	0	0	23	6,900	0
4	0	12,000	14	0	0	24	4,300	0
5	0	12,000	15	0	0	25	2,300	0
6	0	13,000	16	0	0	26	2,100	0
7	0	13,000	17	0	0	27	990	0
8	0	13,000	18	0	0	28	0	0
9	0	12,000	19	0	0	29	0	0
10	0	11,000	20	0	0	30	6,100	0
						31	64,000	0
Monthly mean discharge, in cubic feet per second							2,860	5,420
Runoff, in acre-feet							176,000	333,000

Discharge, in cubic feet per second, at indicated time, 1965-66, of Salt River below Granite Reef Dam, Ariz.

Date	Hour	Discharge	Date	Hour	Discharge	Date	Hour	Discharge	Date	Hour	Discharge
Dec. 21	2400	0	Dec. 24	1600	4,700	Dec. 30	2100	12,000	Jan. 1	2130	57,000
				1800	2,600		2130	26,000		2130	46,000
22	0300	80		2230	2,500		2200	43,000		2400	46,000
	0900	240		2400	2,500		2400	47,000			
	1130	270							2	0330	46,000
	1330	200	25	0230	2,500	31	0100	55,000		0400	26,000
	1345	1,700		1100	2,300		0200	60,000		0500	16,000
	1400	2,600		2400	2,200		0400	63,000		0600	16,000
	1500	3,500					0600	65,000		0600	13,000
	1700	3,000	29	2400	0		0900	66,000		0900	11,000
	1930	3,400					1400	64,000		2100	11,000
	2200	4,900	30	0100	0		1800	66,000		2300	9,900
	2400	8,300		0300	60		2000	67,000		2400	9,700
				1000	80		2400	67,000			
23	0030	9,500		1100	180				3	0300	9,200
	0100	9,300		1130	340	Jan. 1	0200	65,000		0900	8,800
	0400	6,900		1200	1,000		0500	56,000		1200	8,700
	0700	7,400		1300	2,100		0700	54,000		1300	9,600
	0900	7,700		1400	2,400		1100	50,000		1330	11,000
	1000	7,700		1600	2,200		1400	45,000		1400	13,000
	1500	6,000		1700	2,700		1500	44,000		1500	13,000
	2400	5,300		1800	2,900		1600	48,000		2400	12,000
				2000	3,200		1800	47,000			
24	0230	5,200		2030	12,000		2000	58,000			

(142) Salt River at Jointhead Dam, Phoenix, Ariz.

Location. --Lat 33°26'25", long 111°58'22", in SW¼ sec. 8, T. 1 N., R. 4 E., 1,500 ft upstream from 48th Street in Phoenix, 1.7 miles downstream from Tempe bridge, and 5.8 miles east of Phoenix Post Office.

Drainage area. --13,500 sq mi, approximately.

Gage-height record. --Water-stage recorder graph 1200 hours Dec. 23 to 1900 hours Dec. 28, 0500 hours Dec. 31 to 1200 hours Jan. 11, furnished by the Salt River Valley Water Users' Association. Altitude of gage is 1,130 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 10,000 cfs and extended above on basis of peak discharge at Granite Reef Dam and Gila River below Gillespie Dam. Discharge for 1900 hours Dec. 28 to 0500 hours Dec. 31 estimated on basis of field estimates and adjoining good record.

Maxima. --November 1965 to January 1966: Discharge, about 66,000 cfs 2400 hours Dec. 31 (gage height, 10.3 ft).

1888 to October 1965: Discharge, about 300,000 cfs Feb. 24, 1891, estimated on basis of records for former station at Arizona Dam.

Remarks. --Large diversions above station for irrigation, municipal, and industrial use. Flow regulated by 4 dams on Salt River (capacity, 1,755,000 acre-ft; see station 107) and 2 dams on Verde River (capacity, 317,700 acre-ft; see station 131).

Mean discharge, in cubic feet per second, 1965-66, of Salt River at Jointhead Dam, Phoenix, Ariz.

Dec. 21	0	Jan. 1	50,700
22	(a)	2	27,200
23	(a)	3	7,770
24	3,180	4	7,870
25	1,430	5	8,490
26	1,130	6	9,550
27	1,000	7	9,540
28	142	8	9,570
29	10	9	9,810
30	5	10	10,000
31	42,200	11	(a)
		12	0

a Not determined.

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 23	1200	4.6	6,750	Dec. 27	1200	2.49	1,050	Jan. 1	0400	10.20	64,200
	1300	4.18	5,080		1900	2.44	1,000		0800	9.60	54,500
	1500	4.10	4,800		2100	2.33	890		1400	9.10	46,900
	1700	4.13	4,900		2400	1.95	550		2200	8.35	36,700
	2400	3.81	3,850						2400	8.80	42,700
				28	0300	1.60	310				
24	0700	3.67	3,380		1200	1.10	74	2	0100	9.00	45,500
	0900	3.65	3,340		1600	.98	41		0400	8.60	39,900
	1100	3.58	3,120		1900	.79	16		0800	8.50	38,500
	1500	3.50	2,940		2400	.4	10		1100	7.50	27,500
	1900	3.50	2,940						1500	6.55	18,900
	2400	3.40	2,680	30	2400	-.10	5		1900	6.00	14,800
									2400	5.50	11,400
25	0100	3.30	2,440	31	0300	-.10	5				
	0400	2.90	1,600		0500	3.00	1,620	3	0700	5.00	8,600
	0700	2.77	1,380		0700	4.50	6,300		1200	4.73	7,340
	1100	2.70	1,270		0800	7.00	22,500		1600	4.53	6,440
	2400	2.61	1,170		0900	10.60	64,000		1700	4.1	4,800
					1200	10.35	63,000		2000	4.5	6,300
26	0600	2.60	1,160		1500	10.20	62,000		2400	4.68	7,110
	1200	2.58	1,140		2100	10.20	63,000				
	2400	2.52	1,080		2400	10.30	66,000	4	1300	4.90	8,100
									2400	4.93	8,250

(143) 9-5123. Cave Creek near Cave Creek, Ariz.

Location. --Lat 33°47'07", long 112°00'24", in SW¼ sec. 12, T. 5 N., R. 3 E, on left bank 200 ft upstream from power transmission line, 4¾ miles southwest of the town of Cave Creek, and 5.0 miles upstream from Cave Creek Dam.

Drainage area. --121 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 11-14, 24-29, Jan. 1-10. Altitude of gage is 1,800 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 720 cfs and extended above on basis of slope-area measurement at gage height 6.79 ft and logarithmic plotting. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 6,000 cfs 1830 hours Dec. 22 (gage height, 6.90 ft).
1958 to October 1965: Discharge, 8,570 cfs Oct. 29, 1959 (gage height, 8.47 ft).

Remarks. --All flow stored in Cave Creek Reservoir and released slowly to prevent flooding in Phoenix.

Mean discharge, in cubic feet per second, 1965-66, of Cave Creek near Cave Creek, Ariz.

Day	November	December	January	Day	November	December	January
1	0	0	1	16	0	67	0
2	0	0	0	17	0	324	0
3	0	0	0	18	0	101	0
4	0	0	0	19	0	30	0
5	0	0	0	20	0	8.0	0
6	0	0	0	21	0	5.9	0
7	0	0	0	22	0	886	0
8	0	0	0	23	0	266	0
9	0	2	0	24	0	100	0
10	0	435	0	25	30	20	0
11	0	95	0	26	8.1	1	0
12	0	2	0	27	0	0	0
13	0	1	0	28	0	0	0
14	0	45	0	29	0	0	0
15	0	184	0	30	0	402	0
				31	------	50	0
Monthly mean discharge, in cubic feet per second					1.27	97.6	0.03
Runoff, in acre-feet					76	6,000	2

(144) 9-5125. Agua Fria River near Mayer, Ariz.

Location. --Lat 34°19', long 112°04', in NW¼SE¼ sec. 20, T. 11 N., R. 3 E., on left bank at Sycamore damsite, 700 ft downstream from Bigbug Creek, and 12 miles southeast of Mayer.

Drainage area. --588 sq mi.

Gage-height record. --Water-stage recorder graph except Nov. 26 to Dec. 1 and Jan. 4-10. Datum of gage is 3,434 ft (levels by Maricopa County Municipal Water Conservation District No. 1).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 1,600 cfs and extended above on basis of slope-area measurement at gage height 11.97 ft. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 12,100 cfs 0530 hours Dec. 10 (gage height, 11.65 ft).
1940 to October 1965: Discharge, 13,000 cfs Mar. 1, 1941 (gage height, 11.97 ft).

Remarks. --All flow stored in Lake Pleasant above Waddell Dam for irrigation.

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	1.0	2.4	225	16	1.0	67	15
2	1.0	2.6	81	17	1.0	304	15
3	.9	2.9	44	18	1.0	72	15
4	.9	3.4	30	19	1.0	42	15
5	.9	3.2	21	20	1.0	30	15
6	.9	2.9	20	21	1.0	34	15
7	1.0	3.2	18	22	1.7	3,400	14
8	1.1	3.4	17	23	35	1,270	14
9	1.1	202	17	24	8.9	502	14
10	1.3	4,290	16	25	865	151	14
11	1.4	678	16	26	32	84	14
12	1.4	67	16	27	5	50	13
13	1.1	30	16	28	3	33	13
14	1.1	61	16	29	3	34	13
15	1.0	134	16	30	2.5	1,800	13
				31	------	678	13
Monthly mean discharge, in cubic feet per second					32.6	453	25.6
Runoff, in acre-feet					1,940	27,840	1,570

(145) 9-5137.8. New River near Rock Springs, Ariz.

Location. --Lat 33°58'27", long 112°05'54", in SW¼SW¼ sec. 6, T. 7 N., R. 3 E., on right bank 180 ft upstream from road crossing, and 6 miles southeast of Rock Springs.

Drainage area. --67.3 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 24-27 and Jan. 6-10. Altitude of gage is 2,300 ft (from topographic map).

Discharge record. --Stage-discharge relation defined by current-meter measurements below 380 cfs and extended above on basis of slope-area measurements at gage heights 2.6, 3.73, and 6.3 ft. Discharge for periods of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 4,020 cfs 1800 hours Dec. 22 (gage height, 5.80 ft).
1962 to October 1965: Discharge, 4,900 cfs Aug. 2, 1964 (gage height, 6.3 ft, from floodmarks).

Mean discharge, in cubic feet per second, 1965-66

Day	November	December	January	Day	November	December	January
1	0	0	100	16	0	146	1.6
2	0	0	72	17	0	545	.4
3	0	0	56	18	0	175	4.0
4	0	0	42	19	0	104	8.5
5	0	0	33	20	0	69	6.4
6	0	0	25	21	0	79	5.6
7	0	0	20	22	0	1,190	4.0
8	0	0	15	23	0	468	3.2
9	0	0	10	24	0	200	2.4
10	0	623	9	25	67	100	1.6
11	0	163	6.8	26	24	70	.4
12	0	44	5.6	27	10	40	.4
13	0	33	4.8	28	4.4	31	.4
14	0	130	4.0	29	0	28	0
15	0	261	3.6	30	0	628	0
				31	------	175	0
Monthly mean discharge, in cubic feet per second					3.51	171	14.4
Runoff, in acre-feet					209	10,520	884

(146) 9-5138. New River at New River, Ariz.

(Formerly published as "near Black Canyon")

Location. --Lat 33°54'29", long 112°08'37", in SW¼NE¼ sec. 34, T. 7 N., R. 2 E., on right bank 0.3 mile downstream from bridge on State Highway 69, 0.75 mile southwest of village of New River, and 10 miles south of Rock Springs.

Drainage area. --85.7 sq mi.

Gage-height record. --Water-stage recorder graph except Dec. 26-29 which was reconstructed. Datum of gage is 1,973.16 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 1,300 cfs and extended above on basis of slope-area measurements at gage heights 5.57 and 7.33 ft.

Maxima. --November 1965 to January 1966: Discharge, 4,180 cfs 1900 hours Dec. 22 (gage height, 7.50 ft).
1960 to October 1965: Discharge, 4,620 cfs Aug. 16, 1963 (gage height, 7.33 ft).

Mean discharge, in cubic feet per second, 1965-66, of New River at New River, Ariz.

Day	November	December	January	Day	November	December	January
1	0	0	77	16	0	139	5.9
2	0	0	52	17	0	553	5.7
3	0	0	41	18	0	184	7.1
4	0	0	32	19	0	101	9.4
5	0	0	25	20	0	84	10
6	0	0	21	21	0	87	8.4
7	0	0	17	22	0	1,180	7.1
8	0	0	14	23	3.9	428	6.3
9	0	4.1	13	24	.2	184	5.9
10	0	686	11	25	39	111	5.7
11	0	174	10	26	19	80	5.4
12	0	40	9.2	27	.8	50	5.4
13	0	24	8.4	28	.1	35	5.4
14	0	138	7.1	29	0	30	5.4
15	0	265	6.3	30	0	660	5.4
				31	------	144	5.2
Monthly mean discharge, in cubic feet per second..					2.10	172	14.4
Runoff, in acre-feet					125	10,590	888

(147) 9-5138.2. Deadman Wash near New River, Ariz.

(Crest-stage station)

Location. --Lat 33°50'30", long 112°08'40", in NW¼ sec. 27, T. 6 N., R. 2 E., at State Highway 69, 4½ miles south of New River.

Drainage area. --11.1 sq mi.

Gage-height record. --Crest stages only. Datum of gage is 1,782.82 ft above mean sea level.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 60 cfs and extended above on basis of slope-area measurement at gage height 5.92 ft.

Maxima. --November 1965 to January 1966: Discharge, 200 cfs Dec. 22 (gage height, 3.41 ft).
1959 to October 1965: Discharge, 1,850 cfs Dec. 25, 1959 (gage height, 7.0 ft).

(148) 9-5138.35. New River at Bell Road near Peoria, Ariz.

(Crest-stage station)

Location. --Lat 33°38'18", long 112°14'22", in NE¼NE¼ sec. 3, T. 3 N., R. 1 E., at Bell Road, 3.1 miles north of Peoria.

Drainage area. --187 sq mi.

Gage-height record. --Crest stages only. Datum of gage is 1,195.00 ft above mean sea level.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 1,800 cfs and extended above on basis of slope-area measurement of peak flow.

Maxima. --November 1965 to January 1966: Discharge, 4,060 cfs Dec. 22 (gage height, 5.5 ft).
1963, 1965: Discharge, 1,550 cfs Aug. 17, 1963.

(149) 9-5138.8. Skunk Creek near Phoenix, Ariz.

(Crest-stage station)

Location. --Lat 33°43'40", long 112°07'10", in SE¼ sec. 35, T. 5 N., R. 2 E., at State Highway 69, 3 miles north of Adobe, and 8½ miles north of Phoenix city limits.

Drainage area. --64.6 sq mi.

Gage-height record. --Crest stages only. Datum of gage is 1,466.00 ft above mean sea level.

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

Maxima. --November 1965 to January 1966: Discharge, 280 cfs Dec. 22 (gage height, 1.22 ft).
1959 to October 1965: Discharge, 11,500 cfs Aug. 1, 1964 (gage height, 4.49 ft).

(150) 9-5139.7. Agua Fria River at Avondale, Ariz.

(Crest-stage station)

Location. --Lat 33°26'06", long 112°19'29", in NW¼ sec. 14, T. 1 N., R. 1 W., at Buckeye Road, half a mile east of Avondale.

Drainage area. --2,013 sq mi (including 1,459 sq mi above Lake Pleasant that is non-contributing, but not including 247 sq mi above McMicken Dam from which flow has been diverted into Agua Fria River since 1956).

Gage-height record. --Crest stages only. Datum of gage is 950.00 ft above mean sea level.

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

Maxima. --November 1965 to January 1966: Discharge, 800 cfs Dec. 23 (gage height, 8.89 ft).
1959 to October 1965: Discharge, 4,700 cfs December 1959 (gage height, 11.0 ft).

(151) 9-5155. Hassayampa River at Box damsite, near Wickenburg, Ariz.

Location. --Lat 34°02'35", long 112°42'35", in SE¼ sec. 7, T. 8 N., R. 4 W. (unsurveyed), on right bank at Box damsite, 7½ miles upstream from Wickenburg.

Drainage area. --417 sq mi.

Gage-height record. --Water-stage recorder graph except Nov. 29 to Dec. 9 when float was on mud. Datum of gage is 2,236.12 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 2,000 cfs and extended above on basis of slope-area measurements at gage heights 9.16 and 18.3 ft. Discharge for period of no gage-height record estimated.

Maxima. --November 1965 to January 1966: Discharge, 5,560 cfs 0530 hours Dec. 10 (gage height, 10.36 ft).
1938 to October 1965: Discharge, 27,000 cfs Aug. 29, 1951 (gage height, 18.3 ft).

Mean discharge, in cubic feet per second, 1965-66, of Hassayampa River at Box damsite, near Wickenburg, Ariz.

Day	November	December	January	Day	November	December	January
1	2	40	300	16	2	210	110
2	2	30	260	17	2	330	110
3	2	30	240	18	2	260	100
4	2	20	200	19	2	220	100
5	2	20	145	20	2	190	100
6	2	20	135	21	2	180	100
7	2	10	130	22	2	1,220	100
8	2	10	130	23	410	810	100
9	2	50	120	24	300	630	90
10	2	1,700	120	25	710	500	90
11	2	370	120	26	160	240	90
12	2	140	120	27	81	200	90
13	2	110	110	28	60	190	90
14	2	110	110	29	50	180	90
15	2	160	110	30	40	980	80
				31	------	470	80
Monthly mean discharge, in cubic feet per second..					61.8	278	125
Runoff, in acre-feet					3,680	18,310	7,680

(152) 9-5170. Hassayampa River near Arlington, Ariz.

(Crest-stage station)

Location. --Lat 33°20'50", long 112°43'30", in NW¼ sec. 13, T. 1 S., R. 5 W., 0.2 mile east of Hassayampa Store, 1.8 miles upstream from mouth, and 2.8 miles northeast of Arlington.

Drainage area. --1,470 sq mi.

Gage-height record. --Water-stage recorder graph. Datum of gage is 831.91 ft above mean sea level.

Discharge record. --Stage-discharge relation poorly defined by current-meter measurements below 1,700 cfs and extended above on basis of logarithmic plotting. Stage-discharge relation not adequately defined for determination of daily discharges.

Maxima. --November 1965 to January 1966: Discharge, about 1,600 cfs 1400 hours Dec. 10 (gage height, 4.35 ft).
1961 to October 1965: Discharge, 6,500 cfs Aug. 14, 1964 (gage height, 6.05 ft).

(153) 9-5195. Gila River below Gillespie Dam, Ariz.

Location. --Lat 33°13'45", long 112°46'00", in SE¼NE¼ sec. 28, T. 2 S., R. 5 W., at left end of Gillespie Dam, 8 miles downstream from Hassayampa River.

Drainage area. --49,650 sq mi.

Gage-height record. --Water-stage recorder graph except 1500 hours Jan. 3 to 1100 hours Jan. 4 for which graph was reconstructed on the basis of Corp of Engineers' telemark readings at Gillespie Dam. Datum of gage is 743.5 ft above mean sea level, datum of 1929.

Discharge record. --Stage-discharge relation defined by current-meter measurements below 46,000 cfs.

Maxima. --November 1965 to January 1966: Discharge, 64,200 cfs 0030 hours Jan. 2 (gage height, 16.1 ft).

1921 to October 1965: Discharge observed, 85,000 cfs Dec. 28, 1923 (gage height, 16.0 ft, present datum). The greatest flood since construction of Bartlett Dam on the Verde River in 1939 occurred Mar. 16, 1941, discharge, 45,800 cfs (gage height, 9.45 ft).

Greatest discharge known, 250,000 cfs (estimated) February 1891.

Remarks. --Discharge records include flow over crest and through sluice gates of Gillespie Dam but do not include flow in Gila Bend and Enterprise Canals which divert from river immediately above dam. Flow is regulated by San Carlos Reservoir on Gila River (station 45), by a series of reservoirs on Salt River (station 107) and Verde River (station 131), and by Lake Pleasant on Agua Fria River.

Mean discharge, in cubic feet per second, 1965-66

Day	December	January	Day	December	January	Day	December	January
1	0	13,300	11	574	12,000	21	555	20
2	0	48,800	12	300	8,780	22	555	20
3	0	26,500	13	68	3,130	23	640	20
4	0	10,400	14	63	1,410	24	910	20
5	0	9,410	15	205	590	25	730	20
6	0	10,600	16	255	310	26	730	20
7	0	11,400	17	330	160	27	730	20
8	0	12,100	18	330	120	28	760	20
9	0	11,900	19	330	80	29	1,030	20
10	12	12,000	20	480	20	30	1,580	20
						31	1,370	20
Monthly mean discharge, in cubic feet per second							405	6,230
Runoff, in acre-feet							24,910	383,300

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1965-66, of Gila River below Gillespie Dam, Ariz.

Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge	Date	Hour	Gage height	Discharge
Dec. 31	2400	10.43	1,300	Jan. 2	0800	15.65	52,600	Jan. 4	0200	12.3	12,400
					1000	15.5	48,200		0400	12.2	11,800
Jan. 1	0500	10.40	1,170		1200	15.3	45,100		0600	12.1	11,200
	1500	10.29	827		1500	15.2	43,200		0800	12.0	10,600
	1700	10.40	1,170		1800	15.1	41,400		1000	12.0	10,600
	1730	10.50	1,530		2400	15.05	40,600		1200	11.99	10,500
	1800	12.4	13,000						1400	11.91	10,100
	1830	14.1	27,400	3	0200	15.0	39,700		1600	11.84	9,640
	1900	14.6	33,700		0400	14.9	38,100		1800	11.77	9,220
	1930	15.0	39,700		0600	14.7	35,100		2000	11.71	8,860
	2000	15.3	45,100		0800	14.5	32,300		2200	11.66	8,560
	2100	15.7	53,700		1000	14.35	30,400		2400	11.62	8,320
	2200	16.0	61,300		1200	13.9	25,300				
	2300	16.05	62,800		1400	13.65	22,800	5	0300	11.60	8,200
	2400	16.09	64,200		1600	13.25	19,200		0800	11.70	8,800
					1800	13.0	17,200		1100	11.80	9,400
2	0030	16.1	64,200		2000	12.9	16,500		1500	11.90	10,000
	0300	16.0	61,300		2200	12.6	14,400		1800	11.94	10,200
	0500	15.85	57,400		2400	12.45	13,400		2400	11.98	10,500
	0600	15.8	56,100								

(154) 9-5198. Gila River below Painted Rock Dam, Ariz.

Location. --Lat 33°04'30", long 113°00'50", in SE¼ sec. 18, T. 4 S., R. 7 W., on left bank a quarter of a mile downstream from Painted Rock Dam, and 19 miles northeast of Sentinel.

Drainage area. --50,910 sq mi, approximately.

Gage-height record. --Water-stage recorder graph. Datum of gage is 518.69 ft above mean sea level (levels by Corps of Engineers).

Discharge record. --Stage-discharge relation defined by current-meter measurements. Relation indefinite Jan. 2-4 and Mar. 24-31; discharge computed on the basis of gate openings at Painted Rock Dam furnished by Corps of Engineers.

Maxima. --November 1965 to January 1966: Discharge, 2,850 cfs 1730 hours Jan. 3 (gage height, 8.70 ft).
1959 to October 1965: Discharge, 240 cfs Jan. 5, 1960 (gage height, 3.26 ft), but may have been more during period of backwater Jan. 18 to Apr. 11, 1960.

Remarks. --Regulated at Painted Rock Dam since 1959.

Mean discharge, in cubic feet per second, 1966, of Gila River below Painted Rock Dam, Ariz.

Day	January	February	March	Day	January	February	March
1	1.6	1,640	1,670	16	1,680	1,670	1,580
2	552	1,650	1,680	17	1,690	1,630	1,600
3	2,480	1,640	1,640	18	1,700	1,610	1,610
4	598	1,620	1,680	19	1,680	1,600	1,570
5	622	1,610	1,700	20	1,670	1,570	1,510
6	636	1,600	1,660	21	1,630	1,610	1,570
7	782	1,610	1,630	22	1,610	1,630	1,620
8	1,210	1,620	1,620	23	1,580	1,610	1,590
9	1,230	1,630	1,620	24	1,630	1,640	700
10	1,540	1,660	1,620	25	1,680	1,660	210
11	1,730	1,640	1,600	26	1,700	1,640	110
12	1,750	1,630	1,600	27	1,680	1,620	75
13	1,770	1,610	1,540	28	1,640	1,630	60
14	1,700	1,630	1,570	29	1,620	-------	46
15	1,680	1,680	1,600	30	1,610	-------	41
				31	1,610	-------	39
Monthly mean discharge, in cubic feet per second..					1,432	1,628	1,231
Runoff, in acre-feet					88,640	90,430	75,670

(155) Gila River at Avenue 51E near Mohawk, Ariz.

Location. --Lat 32°47'20", long 113°45'50", at west line of sec. 25, T. 7 S., R. 15 W., 5 miles northeast of Mohawk.

Drainage area. --Not determined.

Gage-height record. --Water-stage recorder graph through Apr. 8. Altitude of gage is 310 ft (from topographic map).

Discharge record. --Furnished by U. S. Bureau of Reclamation; basis for stage-discharge relation unknown. Probably no flow Apr. 9-30.

Maximum. --November 1965 to April 1966: Daily discharge, 1,208 cfs Mar. 25-26.

Remarks. --Flow completely regulated at Painted Rock Dam. Water released from Painted Rock Dam first reached this station Feb. 3.

Mean discharge, in cubic feet per second, 1966

Day	February	March	Day	February	March	Day	February	March
1 ...	0	961	11 ...	730	1,156	21 ...	853	1,188
2 ...	0	978	12 ...	745	1,162	22 ...	858	1,182
3 ...	53	1,002	13 ...	770	1,175	23 ...	858	1,142
4 ...	217	1,032	14 ...	775	1,162	24 ...	875	1,156
5 ...	329	1,068	15 ...	775	1,162	25 ...	898	1,208
6 ...	401	1,092	16 ...	775	1,162	26 ...	898	1,208
7 ...	477	1,110	17 ...	795	1,156	27 ...	904	848
8 ...	578	1,136	18 ...	826	1,168	28 ...	921	508
9 ...	662	1,142	19 ...	836	1,175	29 ...	------	202
10 ...	696	1,142	20 ...	848	1,188	30 ...	------	174
						31 ...	------	149
Monthly mean discharge, in cubic feet per second							656	1,009
Runoff, in acre-feet							36,440	62,070

Mean discharge, in cubic feet per second, April 1966

Apr. 1	124	Apr. 5	56
2	104	6	41
3	88	7	22
4	72	8	4

(156) 9-5205. Gila River near Dome, Ariz.

Location. --Lat 32°45'40", long 114°25'10", in SW¼ sec. 4, T. 8 S., R. 21 W., on right bank 440 ft upstream from State Highway 95, 3 miles west of Dome, and 12 miles upstream from mouth.

Drainage area. --57, 850 sq mi, approximately.

Gage-height record. --Water-stage recorder graph. Datum of gage is 148.18 ft above mean sea level, datum of 1929.

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

Maxima. --November 1965 to April 1966: Discharge, 618 cfs 1200 hours Mar. 24 (gage height, 8.35 ft).
1929 to October 1965: Discharge, 20,700 cfs Feb. 15, 1932 (gage height, 16.75 ft). Greatest flood since 1903 occurred Jan. 22, 1916 (approximate daily discharge, 200,000 cfs).

Remarks. --Flow completely regulated at Painted Rock Dam. Water released from Painted Rock Dam first reached this station on Feb. 18.

Mean discharge, in cubic feet per second, 1966

Day	February	March	April	Day	February	March	April
1	3.8	348	168	16	4.8	575	20
2	3.8	366	124	17	5.1	580	16
3	4.0	394	106	18	4.0	592	13
4	4.3	422	93	19	14	595	11
5	4.7	442	80	20	25	590	9.7
6	5.1	460	70	21	42	598	8.9
7	5.6	476	69	22	85	595	8.2
8	4.8	498	69	23	112	605	7.4
9	2.4	515	59	24	137	615	6.7
10	4.0	528	55	25	182	612	5.8
11	4.6	548	42	26	230	592	5.2
12	4.7	558	35	27	271	575	4.7
13	5.0	560	30	28	316	590	4.4
14	5.4	568	25	29	------	608	4.0
15	5.4	570	23	30	------	528	3.8
				31	------	284	------
Monthly mean discharge, in cubic feet per second..					53.4	527	39.2
Runoff, in acre-feet					2,970	32,420	2,330

REFERENCES CITED

Aldridge, B. N., 1966, Floods of December 1965 to January 1966 in the Salt and Gila Rivers downstream from Granite Reef Dam, Arizona: U. S. Geol. Survey open-file rept., 78 p.

Benson, M. A., and Dalrymple, Tate, 1967, General field and office procedures for indirect discharge measurements: U. S. Geol. Survey Techniques Water-Resources Inv., book 3, chap. A1, 30 p.

Bodhaine, G. L., 1968, Measurement of peak discharge at culverts by indirect methods: U. S. Geol. Survey Techniques Water-Resources Inv., book 3, chap. A3, 60 p.

Clyma, Wayne, and Shaw, R. J., 1968, Natural recharge in Tucson basin: Progressive Agriculture in Arizona, v. 20, no. 2, p. 14-15.

Dalrymple, Tate, and Benson, M. A., 1967, Measurement of peak discharge by the slope-area method: U. S. Geol. Survey Techniques Water-Resources Inv., book 3, chap. A2, 12 p.

Hodges, E. B., and others, 1967, Annual report on ground water in Arizona, spring 1965 to spring 1966: Arizona State Land Dept. Water-Resources Rept. 32, 61 p

Hulsing, Harry, 1967, Measurement of peak discharge at dams by indirect methods: U. S. Geol. Survey Techniques Water-Resources Inv., book 3, chap. A5, 29 p.

Matthai, H. F., 1967, Measurement of peak discharge at width contractions by indirect methods: U. S. Geol. Survey Techniques Water-Resources Inv., book 3, chap. A4, 44 p.

Olmstead, F. H., 1919, Gila River flood control—a report on flood control of the Gila River in Graham County, Arizona: U. S. 65th Cong., 3d sess., Senate Doc. 436, 94 p.

Patterson, J. L., and Somers, W. P., 1966, Magnitude and frequency of floods in the United States, Part 9, Colorado River basin: U. S. Geol. Survey Water-Supply Paper 1683, 475 p.

U. S. Army Corps of Engineers, 1966, Flood-damage report on flood of December 1965-January 1966, Salt and Gila Rivers, Granite Reef Dam to Gillespie Dam, Arizona: Corps of Engineers, U. S. Army Engineers District, Los Angeles, 33 p.

U. S. Bureau of Reclamation, 1967, Supplement No. 1 to Report on operation of the main outlet drain extension, Minute No. 218 with Mexico: Boulder City, Nev., 10 p.

U. S. Geological Survey, 1967a, Water resources data for Arizona, 1966—Part 1: Surface-water records: U. S. Geol. Survey open-file rept., 237 p.

_____1967b, Water resources data for New Mexico, 1966—Part 1, Surface-water records: U. S. Geol. Survey open-file rept., 262 p.

U. S. Weather Bureau, 1966a, Climatological data, Arizona, November 1965: U. S. Dept. Commerce, v. 69, no. 11, p. 206-223.

_____1966b, Climatological data, Arizona, December 1965: U. S. Dept. Commerce, v. 69, no. 12, p. 226-248.

_____1966c, Climatological data, New Mexico, November 1965: U. S. Dept. Commerce, v. 69, no. 11, p. 192-207.

_____1966d, Climatological data, New Mexico, December 1965: U. S. Dept. Commerce, v. 69, no. 12, p. 209-230.

_____1966e, Hourly precipitation data, Arizona, November 1965: U. S. Dept. Commerce, v. 15, no. 11, 4 p.

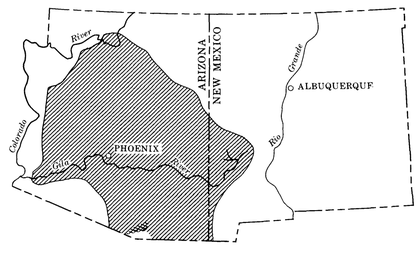
_____1966f, Hourly precipitation data, Arizona, December 1965: U.S. Dept. Commerce, v. 15, no. 12, 7 p.

University of Arizona, 1965, Normal annual precipitation—normal October-April precipitation—1931-1960, State of Arizona: Univ. Arizona map.

INDEX

U. S. GOVERNMENT PRINTING OFFICE : 1970 O - 379-175

MAP SHOWING AREA OF REPORT AND SITES WHERE HYDROLOGIC DATA WERE COLLECTED, GILA RIVER BASIN, ARIZONA AND NEW MEXICO



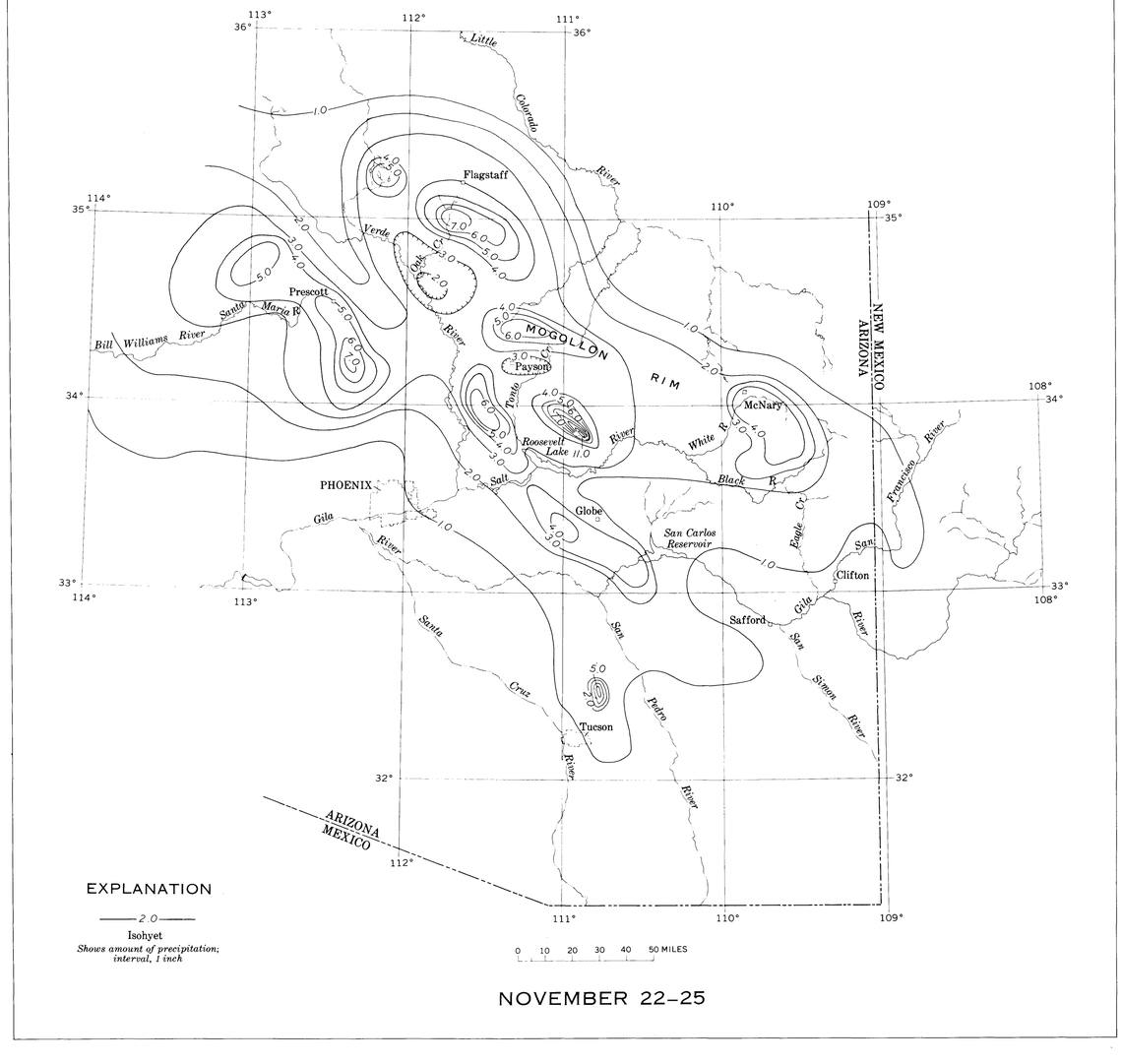
INDEX MAP

EXPLANATION

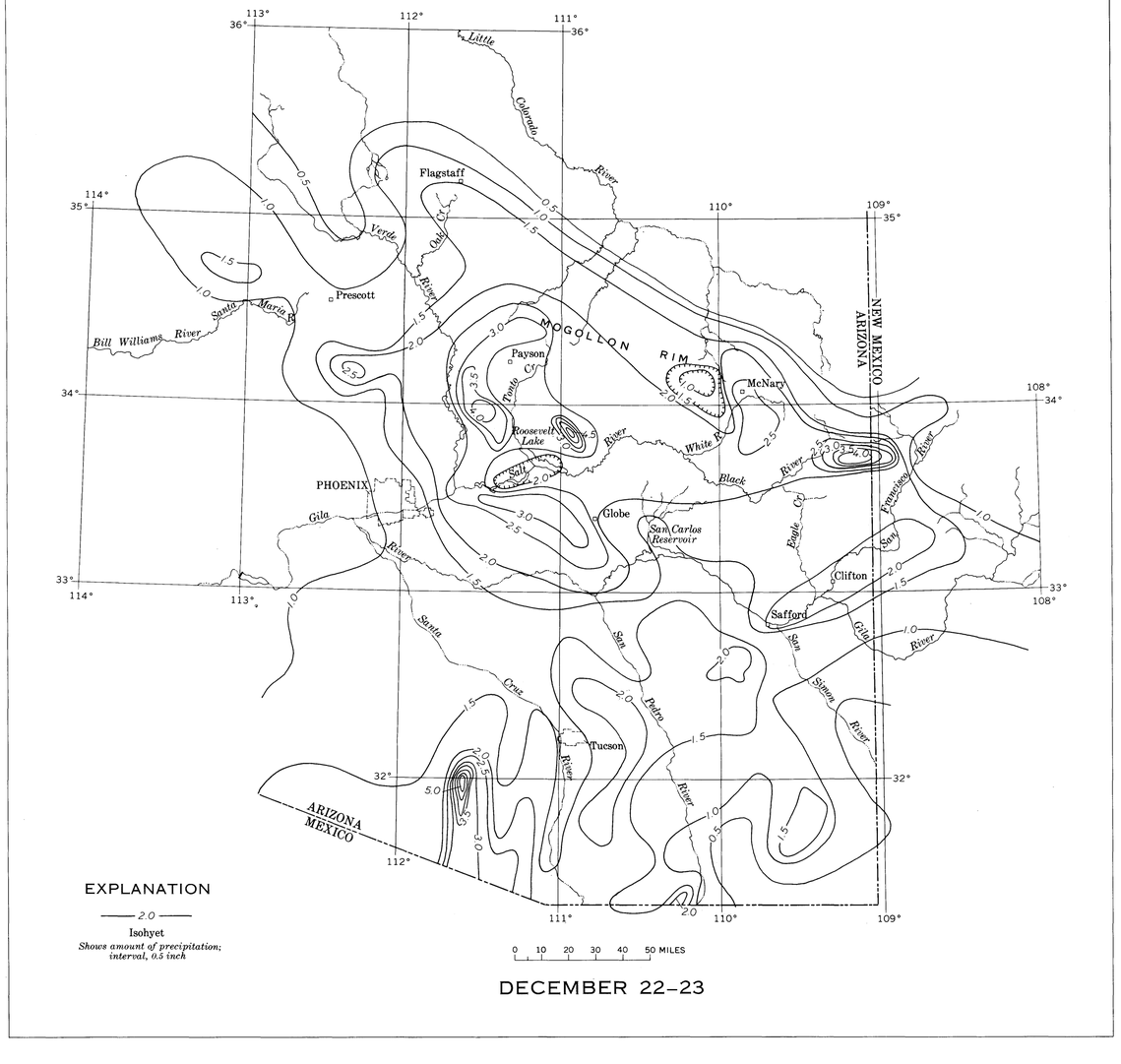
- Precipitation station and number
  Data on snowfall and depths of snow on ground for most stations are shown in table 1
- Snow-survey course and number
  Data shown in table 2
- Streamflow-measuring site and number
  Data shown in table 9 and "Station Data"
- (7) Area for which ground-water data are shown in table 8
  Number refers to table 8

0 10 20 30 40 50 MILES
0 10 20 30 40 50 KILOMETERS

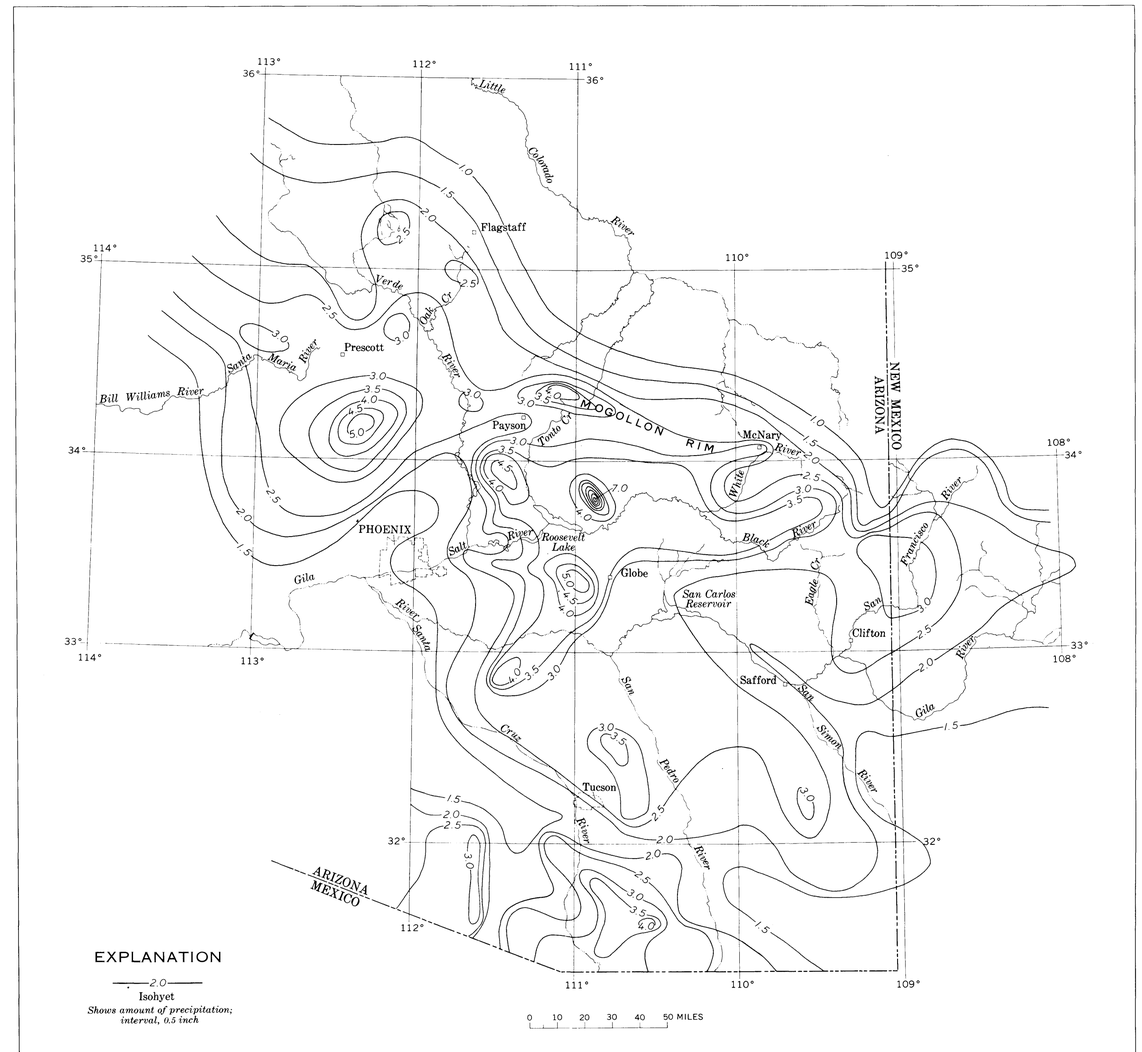
379-175 O - 70 (In pocket)



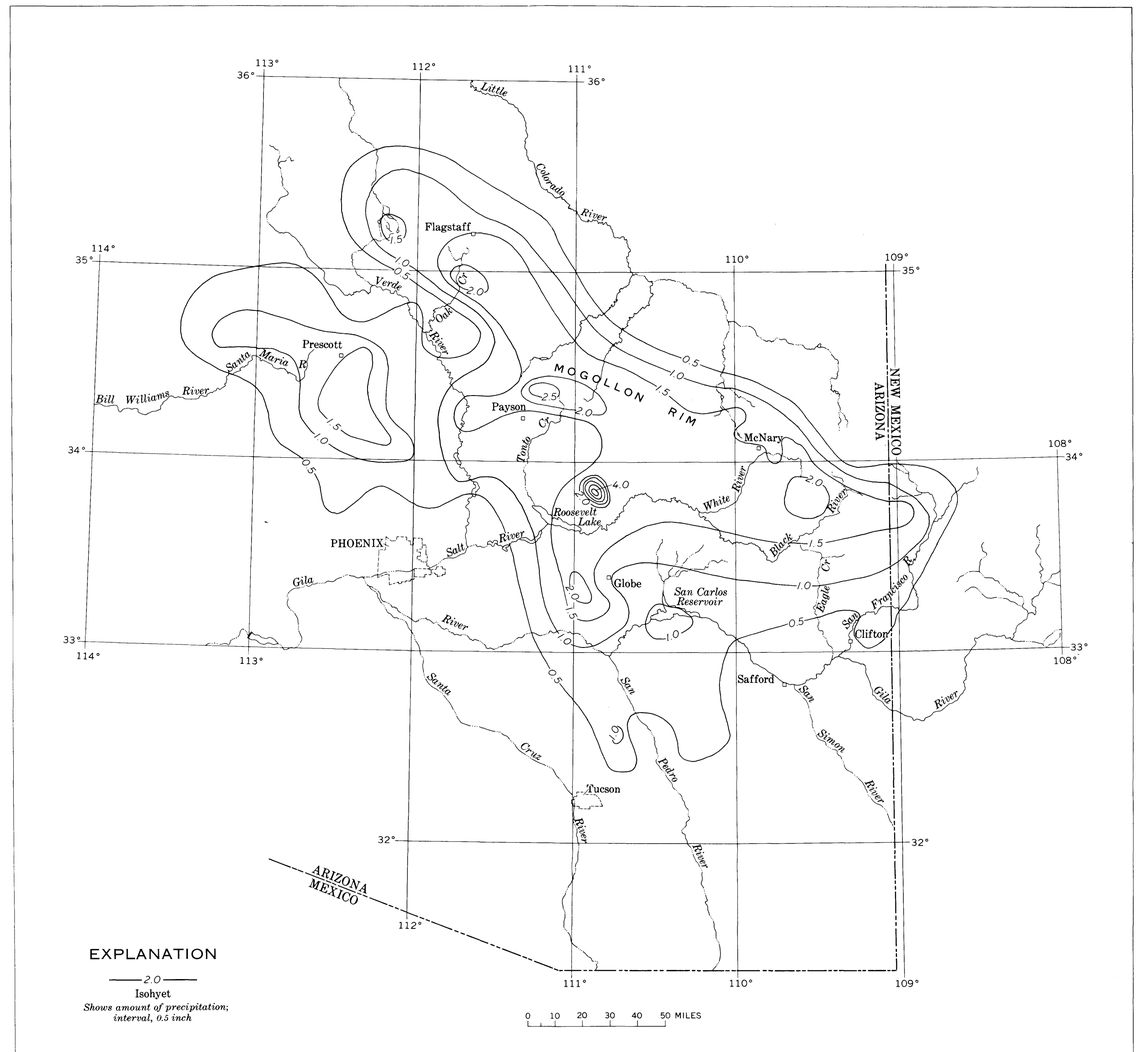
NOVEMBER 22–25



DECEMBER 22–23



DECEMBER 9–11

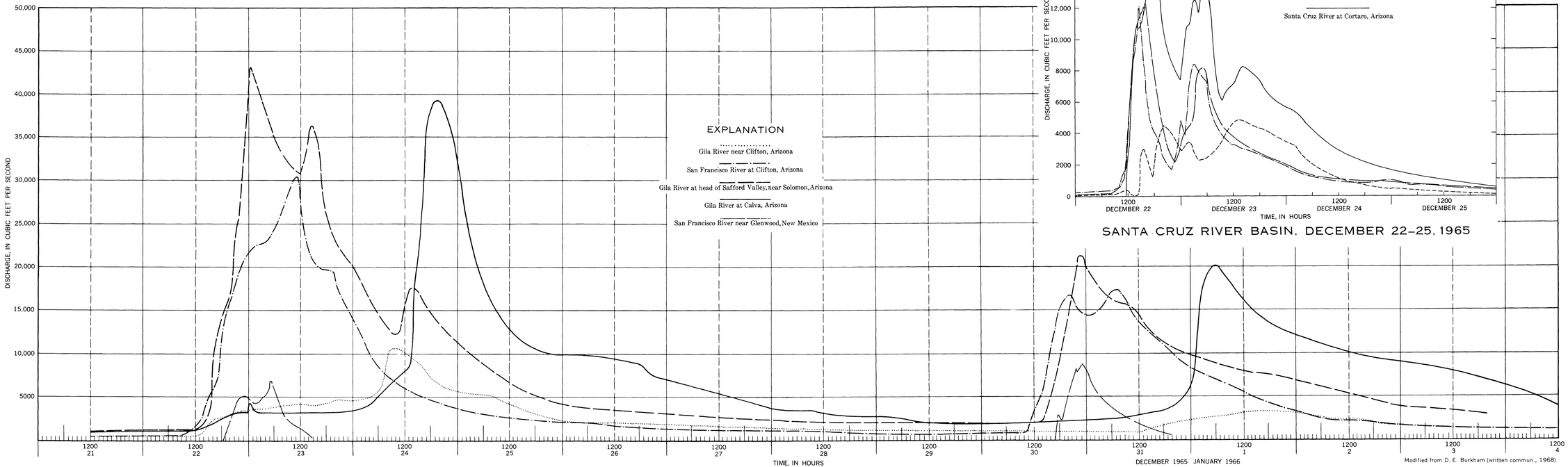


DECEMBER 29–30

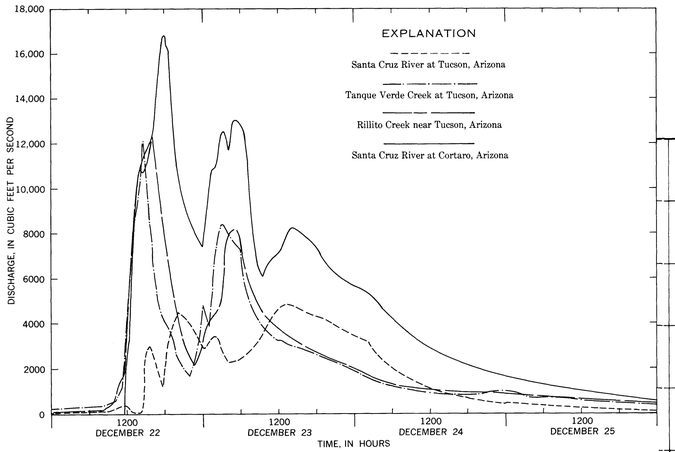
MAPS SHOWING PRECIPITATION, NOVEMBER AND DECEMBER 1965, IN THE GILA RIVER BASIN, ARIZONA AND NEW MEXICO

379-175 O - 70 (in pocket)

HYDROGRAPHS SHOWING DISCHARGE AT SELECTED GAGING STATIONS, SANTA CRUZ AND GILA RIVER BASINS, ARIZONA AND NEW MEXICO



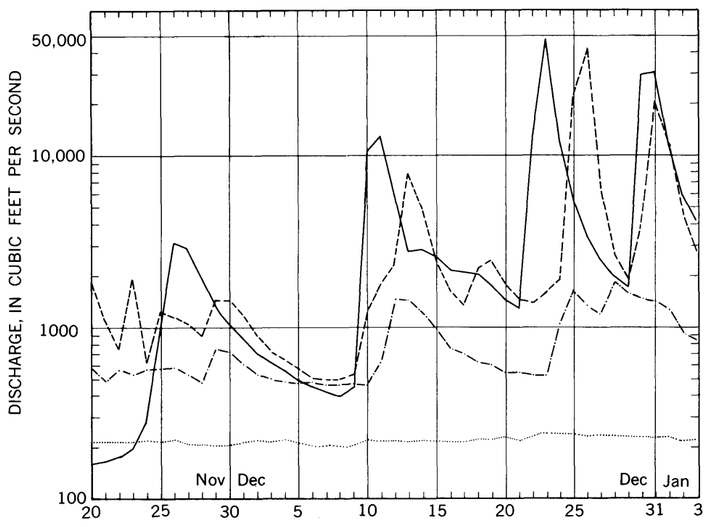
GILA RIVER BASIN ABOVE COOLIDGE DAM, DECEMBER 21, 1965, TO JANUARY 4, 1966



SANTA CRUZ RIVER BASIN, DECEMBER 22–25, 1965

Modified from D. E. Burkham (written commun., 1968)

379-175 O - 70 (In pocket)



EXPLANATION

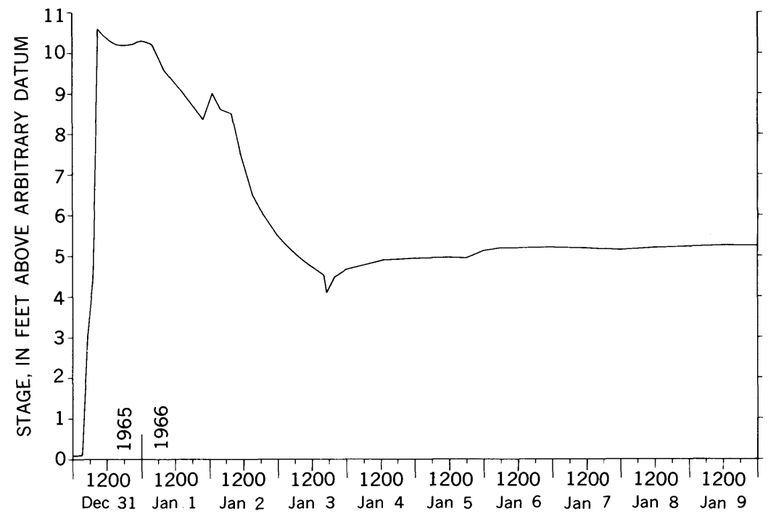
Daily mean discharge from November 20, 1965, to January 3, 1966

Maximum daily mean discharge for indicated day during 1931-60 water years

Daily mean discharge that was exceeded 10 percent of the time during 1931-60 water years

Median daily mean discharge during 1931-60 water years

DAILY MEAN DISCHARGE OF THE SALT RIVER NEAR ROOSEVELT, NOVEMBER 20, 1965, TO JANUARY 3, 1966, COMPARED WITH A DAILY DURATION HYDROGRAPH FOR 1931-60.



STAGE OF SALT RIVER AT JOINTHEAD DAM DURING THE PHOENIX FLOOD, DECEMBER 31, 1965, THROUGH JANUARY 9, 1966.

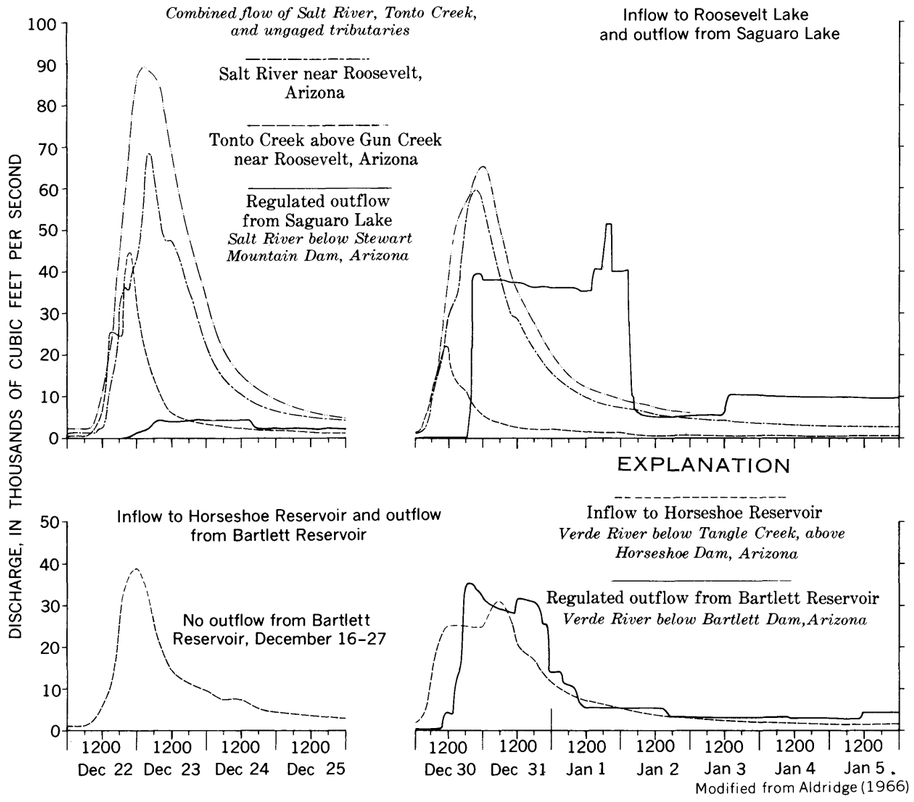
EXPLANATION

Inflow to Roosevelt Lake
Combined flow of Salt River, Tonto Creek, and ungaged tributaries

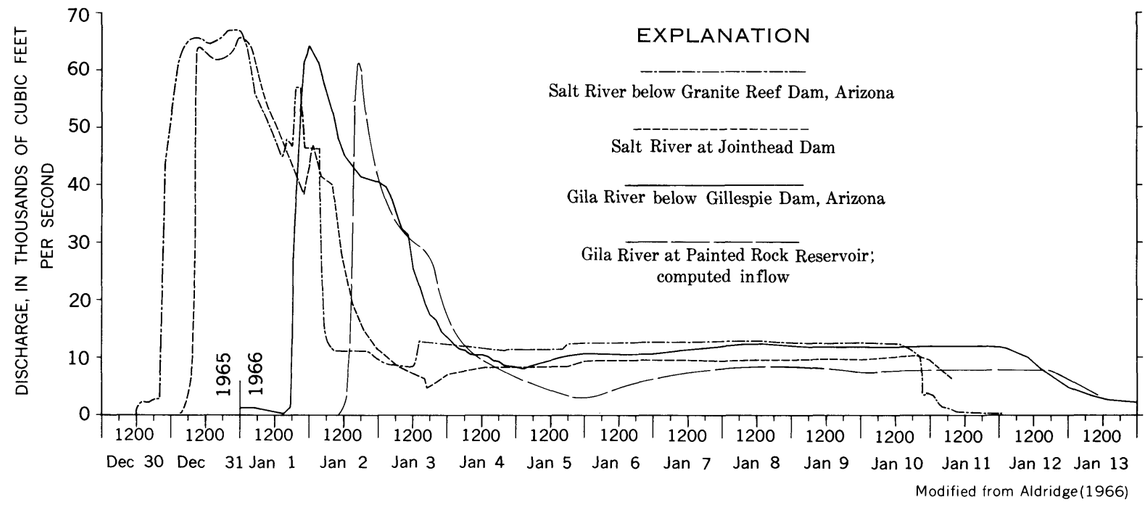
Salt River near Roosevelt, Arizona

Tonto Creek above Gun Creek near Roosevelt, Arizona

Regulated outflow from Saguaro Lake
Salt River below Stewart Mountain Dam, Arizona



DISCHARGE AT PRINCIPAL GAGING STATIONS ABOVE AND BELOW RESERVOIRS ON THE SALT AND VERDE RIVERS, DECEMBER 22-25 AND DECEMBER 30, 1965, TO JANUARY 5, 1966.

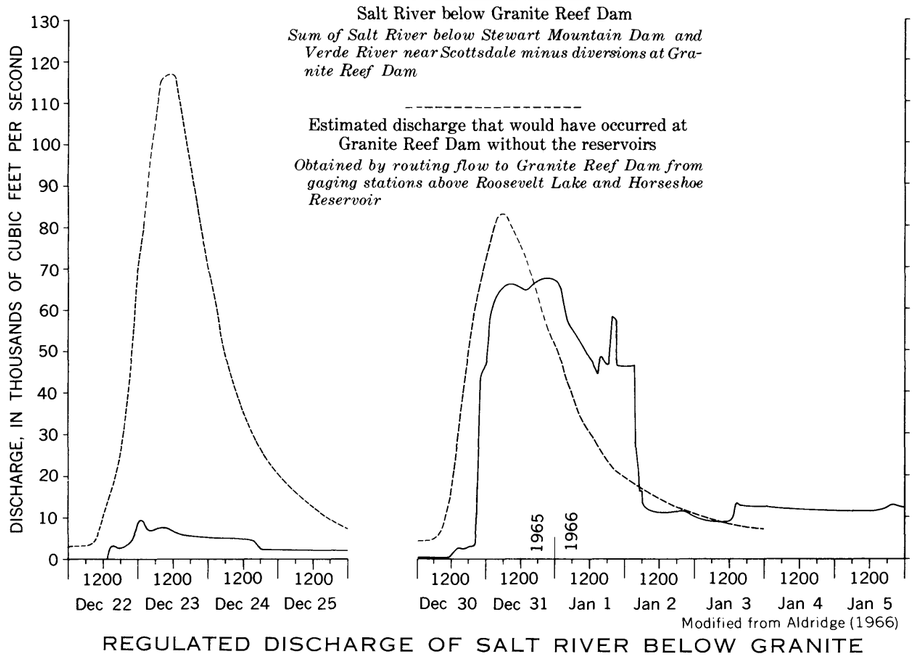


DISCHARGE DURING THE PHOENIX FLOOD AT GAGING STATIONS ON THE SALT AND GILA RIVERS BETWEEN GRANITE REEF AND PAINTED ROCK DAMS.

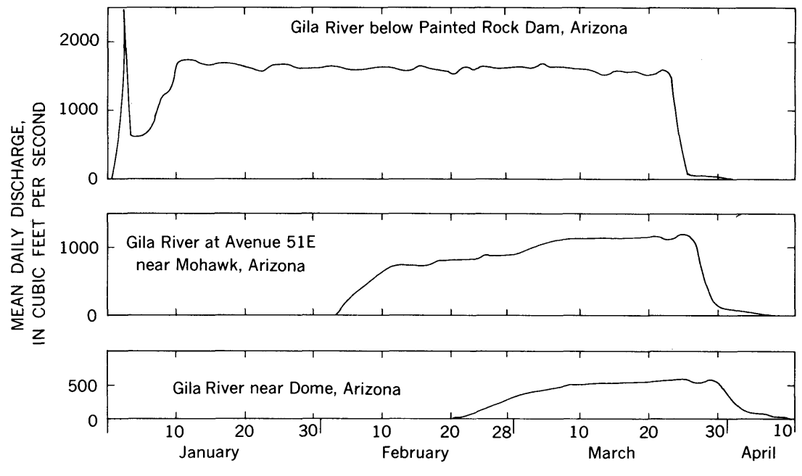
EXPLANATION

Salt River below Granite Reef Dam
Sum of Salt River below Stewart Mountain Dam and Verde River near Scottsdale minus diversions at Granite Reef Dam

Estimated discharge that would have occurred at Granite Reef Dam without the reservoirs
Obtained by routing flow to Granite Reef Dam from gaging stations above Roosevelt Lake and Horseshoe Reservoir



REGULATED DISCHARGE OF SALT RIVER BELOW GRANITE REEF DAM AND ESTIMATED DISCHARGE THAT WOULD HAVE OCCURRED WITHOUT THE RESERVOIRS, DECEMBER 22-25 AND DECEMBER 30, 1965, TO JANUARY 5, 1966.



DISCHARGE AT GAGING STATIONS ON THE GILA RIVER DOWNSTREAM FROM PAINTED ROCK RESERVOIR, 1966.

379-175 O - 70 (In pocket)

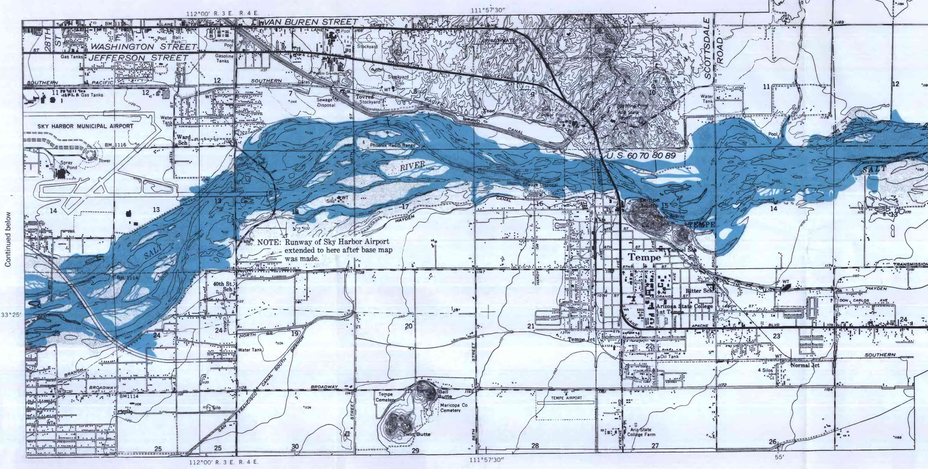
GRAPHS SHOWING DISCHARGE AND STAGE AT SELECTED STATIONS ON THE SALT, VERDE, AND GILA RIVERS, ARIZONA

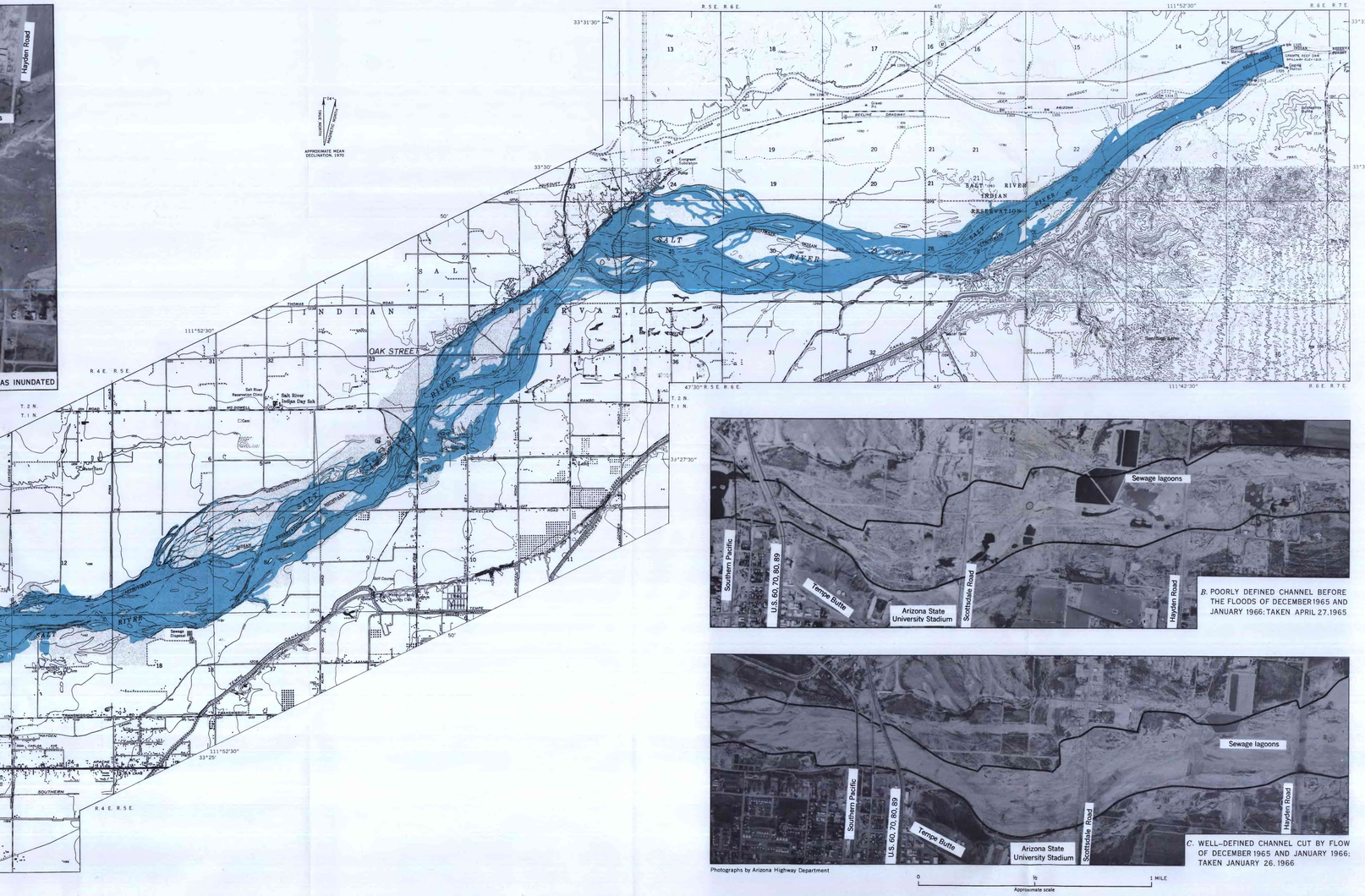
A. AREAS INUNDATED

Photograph by Arizona Highway Department

0 ½ 1 MILE
Approximate scale

AERIAL PHOTOGRAPH OF THE PHOENIX FLOOD ON THE SALT RIVER NEAR TEMPE, ARIZONA





B. POORLY DEFINED CHANNEL BEFORE THE FLOODS OF DECEMBER 1965 AND JANUARY 1966; TAKEN APRIL 27, 1965

C. WELL-DEFINED CHANNEL CUT BY FLOW OF DECEMBER 1965 AND JANUARY 1966; TAKEN JANUARY 26, 1966

Photographs by Arizona Highway Department

0 ½ 1 MILE
Approximate scale

AERIAL PHOTOGRAPHS OF THE PHOENIX FLOOD ON THE SALT RIVER NEAR TEMPE, ARIZONA

EXPLANATION

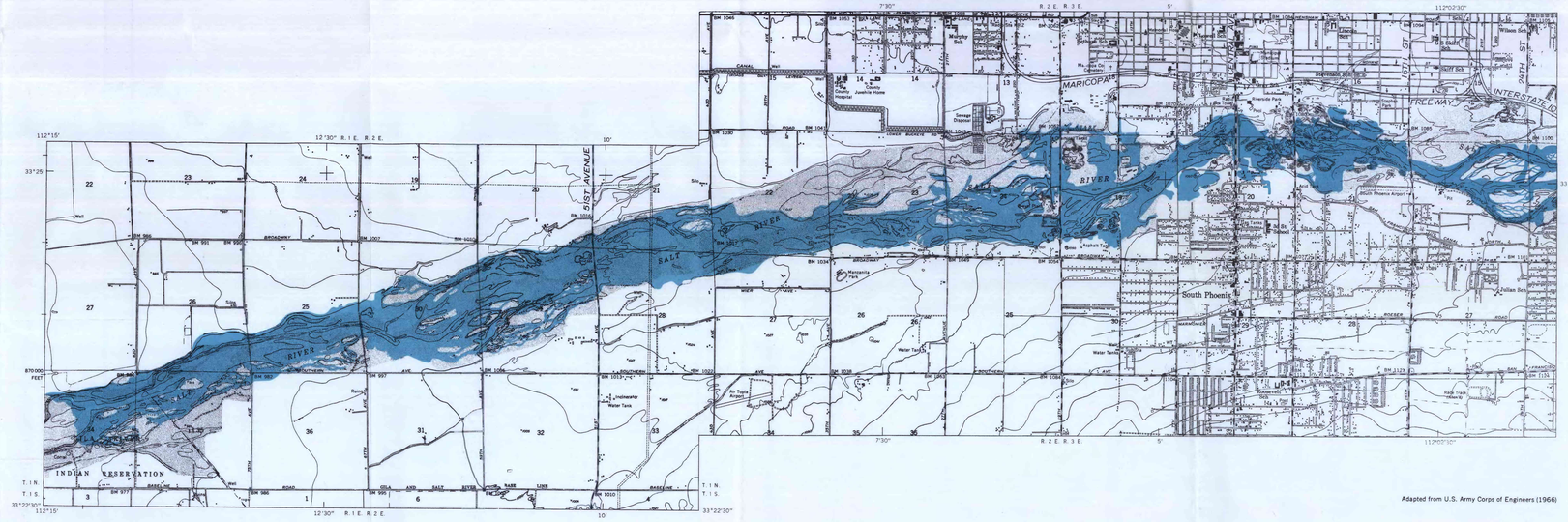
Flooded area

FLOOD MAP AND PHOTOGRAPHS OF THE SALT RIVER IN THE PHOENIX METROPOLITAN AREA, ARIZONA

SCALE 1:31 680

1 .5 0 1 MILE
1 .5 0 1 KILOMETER

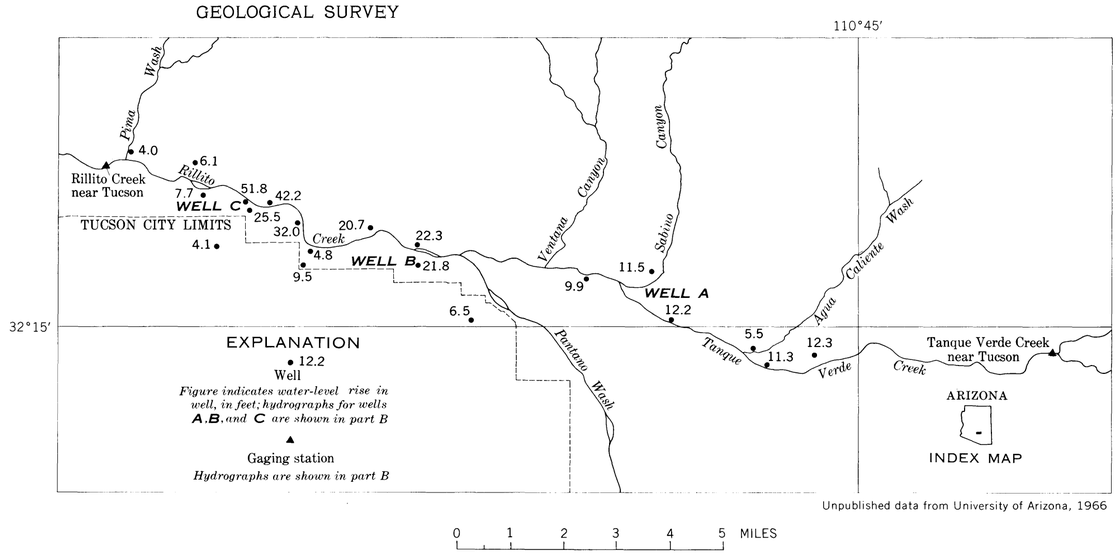
CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL



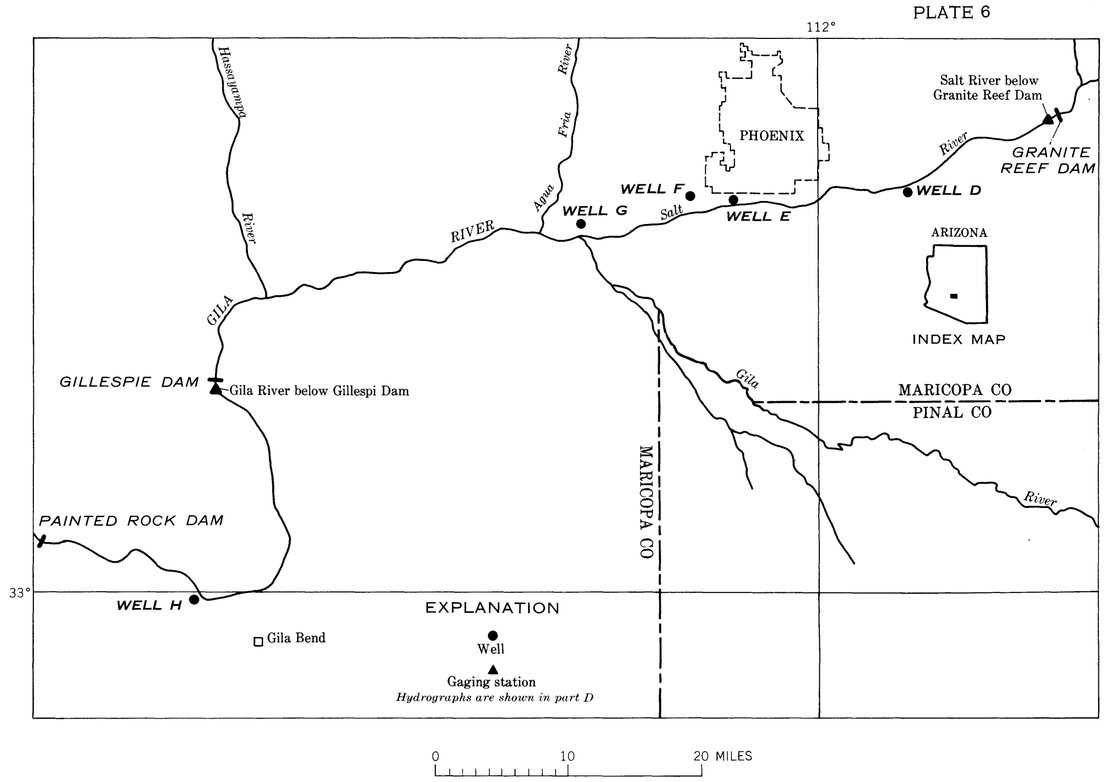
Adapted from U.S. Army Corps of Engineers (1966)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

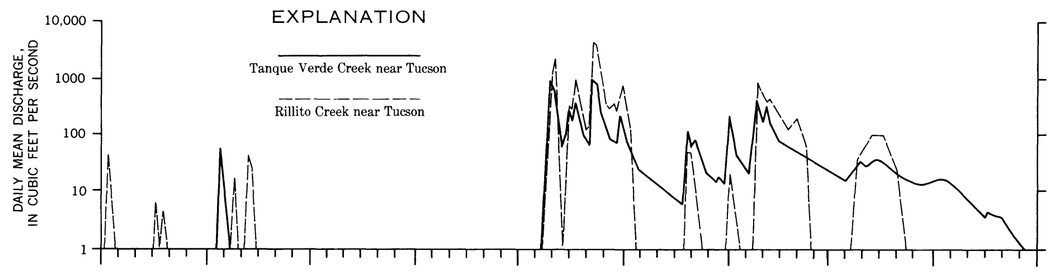
WATER-SUPPLY PAPER 1850-C
PLATE 6

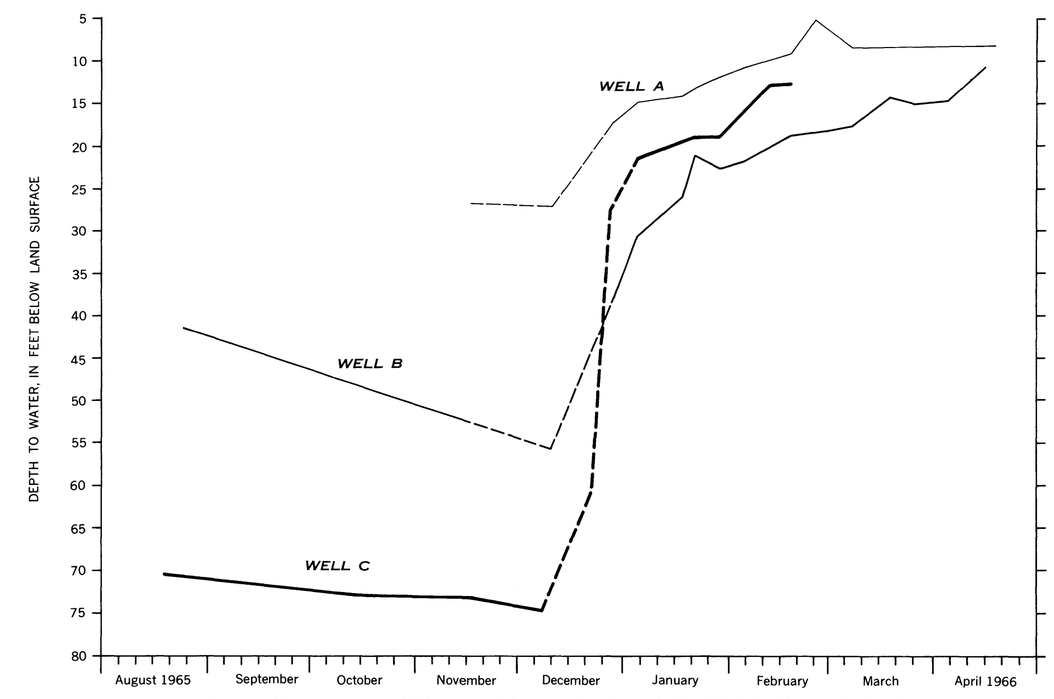


A.— RISES IN WATER LEVELS IN WELLS ALONG RILLITO AND TANQUE VERDE CREEKS, NOVEMBER 16, 1965, TO JANUARY 4, 1966.

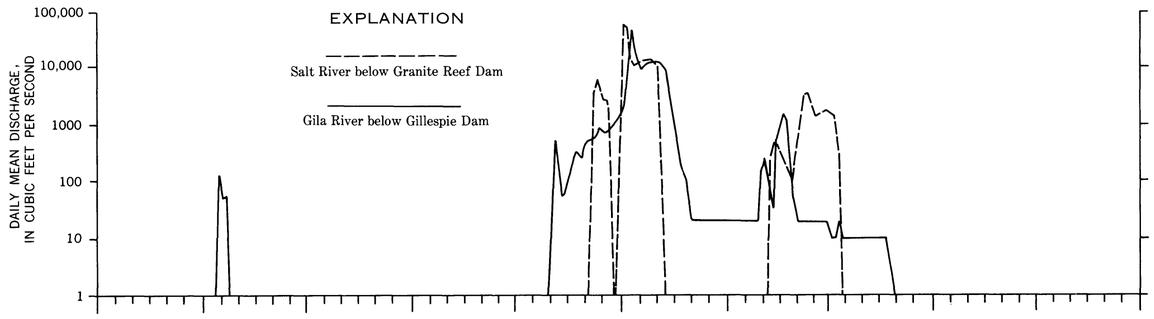


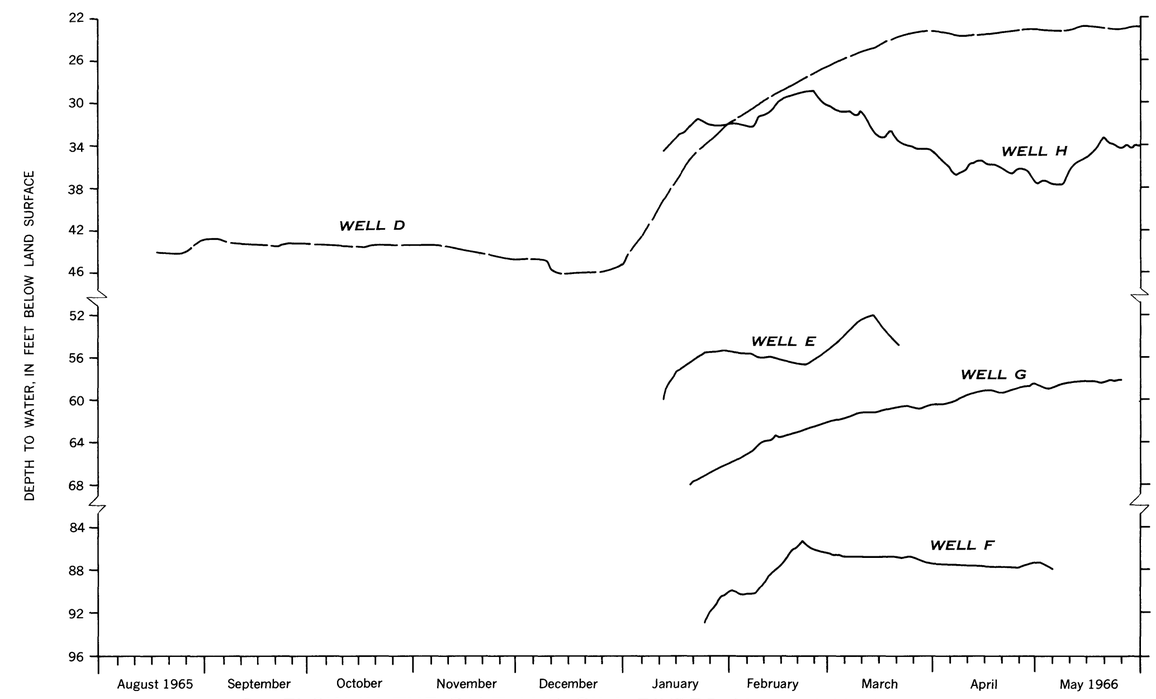
C.— LOCATION OF SELECTED WELLS ALONG THE SALT AND GILA RIVERS.





B.— FLOW IN TANQUE VERDE AND RILLITO CREEKS AND DEPTH TO WATER IN SELECTED WELLS IN THE FLOOD PLAINS.





D.— FLOW IN THE SALT AND GILA RIVERS AND DEPTH TO WATER IN SELECTED WELLS IN THE FLOOD PLAINS.

MAPS AND HYDROGRAPHS SHOWING DAILY MEAN DISCHARGE AND RISE IN WATER LEVELS AT SELECTED WELLS ALONG RILLITO AND TANQUE VERDE CREEKS AND SALT AND GILA RIVERS, ARIZONA

379-175 O - 70 (In pocket)