GEOLOGICAL SURVEY CIRCULAR 151

October 1951

KANSAS-MISSOURI FLOODS OF JULY 1951

Prepared by Water Resources Division

UNITED STATES DEPARTMENT OF THE INTERIOR

Oscar L. Chapman, Secretary

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W. E. Wrather, Director

Washington, D. C.

Free on application to the Geological Survey, Washington 25, D. C.

GPO 82-8000589

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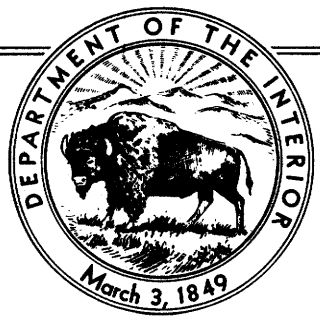

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PREFACE

This preliminary report on the Kansas-Missouri floods of July 1951 was prepared by the U. S. Geological Survey, Water Resources Division, under the general direction of C. G. Paulsen, Chief Hydraulic Engineer, and J. V. B. Wells, Chief, Surface Water Branch. Technical personnel of the Branch detailed to Kansas from Washington, D. C., and from several of the District offices in the United States, have made this report possible by performing, under the pressure of emergency conditions, the difficult and tedious field surveys and office computations required.

Basic records of discharge collected by the Geological Survey in cooperation with the States of Kansas, Missouri, and Nebraska under the direction of J. B. Spiegel, H. C. Bolon, and D. D. Lewis, District Engineers, Surface Water Branch, are supplemented by the detailed records of the flood being currently obtained and disseminated.

The following agencies have materially aided the preparation of this report by furnishing the services listed after each: Corps of Engineers--hydraulic engineers, survey parties, typist; Bureau of Reclamation--survey parties; Kansas Board of Agriculture, Water Resources Division--hydraulic engineers and survey parties; and the U. S. Weather Bureau--office space for the period August 13 to September 6.

KANSAS-MISSOURI FLOODS OF JULY 1951

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KANSAS-MISSOURI FLOODS OF JULY 1951

INTRODUCTION

The great July 1951 flood of eastern Kansas exceeded any others that have occurred in that area since the historic flood of 1844. The stream-flow records collected in the area during the flood period are of tremendous importance for the design of all contemplated projects in which volumes of flood flows and rates of flood discharges must be considered. This preliminary flood report has been prepared to provide all interested parties promptly with information on the stages and discharges at gaging stations operated by the Geological Survey.

The period of intense flooding in eastern Kansas, July 10-16, was preceded by a 2-months period of above-normal stream flow. Mean daily discharges at selected gaging stations are therefore presented for the period May 1 through July 31. For the period July 8-25, stages and discharges at indicated times of each day are also presented. The location of the area reported on is shown on figure 1, and the locations of gaging stations and points for which peak discharges are reported are shown on figure 2.

Data included in the report for each gaging station are as follows: descriptive information on type and location of gage, size of drainage area, length of record, general notes regarding the continuity of gage record, the definition of the rating and special remarks describing any divergence from the standard method of computing discharge, and statements giving the July 1951 flood crest stage and discharge and similar data for the highest occurrence of past record. The descriptive information for each station is followed by a table giving the mean daily discharge from May 1 to July 31. Stages and discharges at indicated times are shown for each day of the period July 8-25. Present and past flood maxima are summarized in a table showing the highest previous flood stage and discharge compared with the current data.

The brief text contains descriptive information on the associated precipitation, the sequence of major flood events, and explanation of general field and office procedures used in collecting and assembling the gaging-station records. A short descriptive section on flood damage is also included.

GENERAL FEATURES OF THE FLOODS

The great flood of July 1951 in eastern Kansas climaxed a prolonged wet spring and early summer, culminating in a 4-day period of almost unprecedented rainfall--July 9-12. Runoff during May and June was above normal throughout eastern Kansas and serious flooding occurred at many points. Notable floods of that period occurred on Big Creek at Hays, Kans., May 22; on Saline River at Tescott, Kans., June 7-12; and on Delaware River at Perry, Kans., June 21. When the unusually great rainfall of July 9-12 fell on the area most of it ran off into the already heavily burdened stream channels. There was then created a flood of a magnitude believed to be practically unattainable in this area.

Antecedent Conditions

During April, precipitation was slightly below normal in Kansas. A prolonged period of above-normal rainfall started on April 20 and continued to the time of the July flood period. The amount and distribution of daily precipitation for the period April 20 to July 13 are illustrated on figure 3, a plot of the observed precipitation published by the U. S. Weather Bureau for six selected weather stations in or near the flood area. The normal and measured precipitation for the months of April, May, and June 1951, for the stations shown on figure 3, are given in table 1.

The monthly mean rainfall for the State in May 1951, weighted on an areal basis, was 6.43 inches as compared with 3.82 inches in May 1950, and 5.43 inches in May 1949; the monthly mean rainfall in June was 9.55 inches as compared with 2.86 inches in June 1950, and 5.93 inches in June 1949. In the June issue of Climatological data, published by the Weather Bureau, 14 stations reported more than 14 inches of rainfall in June, the greatest of which was 16.50 inches at Climax, in the Verdigris River basin, in south-central Kansas.

The heavy rainfall that occurred during May and June caused the major streams in Kansas to rise well above normal. The high continuous runoff that occurred during the period antecedent to the July flood is shown on figures 4 and 5--hydrographs of the mean daily discharge at six selected gaging stations in the flooded area during the period May 1 to July 31. On June 30, at the close of the antecedent period, conditions were such that destructive runoff could result from heavy precipitations.

July Flood

The severe storm that caused the great July 1951 flood in Kansas began on July 9 and 10 and generally lasted 4 days. Figure 6, an isohyetal map prepared from a larger-scale map furnished by the Weather Bureau, shows the magnitude and areal distribution of the storm rainfall. Centers of high rainfall were as follows:

17 inches plus:	10 miles south of Emporia, Kans., in Neosho River basin.
	12 miles west of Council Grove, Kans., in Neosho River basin.
	12 miles south of Junction City, Kans., in Kansas

Table 1.-- Precipitation at selected Weather Bureau stations in Kansas

Station	April 20-30		May		June		July 1-13	
	Total prec.	Normal	Total prec.	Normal	Total prec.	Normal	Total prec.	Normal
Dodge City	1.56	2.00	8.69	2.85	7.95	3.19	8.69	2.60
Emporia	1.70	2.95	7.37	5.20	8.67	4.73	15.48	3.48
Lincoln	5.10	2.40	5.33	3.45	14.31	4.25	8.69	2.60
Manhattan	2.75	2.66	10.29	4.43	11.12	4.61	15.32	3.73
Ottawa	2.96	3.11	7.78	4.96	10.90	4.81	13.78	3.56
Valley Falls	2.51	2.80	4.33	4.48	10.63	4.58	9.23	3.33

River basin.
2 miles south of Alma, Kans. in Kansas River basin.

14 inches plus: at Lyndon, Kans., in Marais des Cygne River basin.
11 miles south of Clay Center, Kans., in Kansas River basin.

About 6,700 square miles of area in Kansas received 10 inches or more of precipitation during the period July 9-13.

The streams in the area of heavy precipitation began an almost immediate rise on July 9, the first day of the storm. On July 11, Manhattan, Kans., situated just upstream from the junction of Big Blue and Kansas Rivers, was partially inundated and extensive rescue operations were under way. The Air Force, Coast Guard, U. S. Marines, National Guard, and Red Cross rushed rescue personnel and equipment into the flooded area and began moving people from flooded homes to higher ground. The rapidly rising Kansas River burst the dike protecting North Topeka at 1:05 a.m. July 12, in the vicinity of the Melan bridge and soon inundated the business district. Shortly after the initial failure, there was general failure of the dikes and North Topeka was almost submerged.

The heavy rain continued through July 13, adding more runoff to the already-swollen Kansas River. Destruction along the Kansas River mounted rapidly with the rising flood. Bridges both of railway and of highway systems failed and were swept downstream; houses and business buildings in the flooded cities stood abandoned with windows smashed in. The flood crested at Wamego about 5 a.m. on July 13 and moved rapidly downstream. Tributary inflow between Wamego and Topeka caused the Kansas River to reach peak stage at Topeka at 6:30 a.m. the same day. The crest stage at Bonner Springs, the most-downstream gaging station operated by the Geological Survey on the Kansas River, about 15 miles upstream from Kansas City, occurred at midnight July 13.

The worst flood destruction in the area was at Kansas City. Just before midnight, July 12, a section of dike protecting Argentine, low-lying industrial area on the right bank of the Kansas River, gave way. The ensuing rush of flood water submerged the Santa Fe Railroad freight yards where scores of diesel locomotives were stored, the Sinclair Oil Refinery, and scores of new homes. More than 2,000 residents fled to the high bluffs just ahead of the flood. At 5:20 a.m. July 13, Kansas River overtopped the Armourdale dike protecting the industrial area, located on the left bank opposite Argentine. Early on July 13, Kansas River overtopped the concrete flood wall protecting the central industrial area located on the right bank of Kansas River just above the mouth at Kansas City, Mo. Many animals at the stock yards were swept away. A derelict 6,000-gallon oil tank floated into a high-tension wire and started a fire that gutted the Phillips Petroleum Co. Plant, the Socony Vacuum Oil Co. plant, and many nearby installations. Firemen, working from boats, attempted to control the fire but an estimated loss of about 10 million dollars (according to the Kansas City Star, July 22) resulted from this disaster alone. Although the Kansas City area had already received terrific damage, more was to come. Before recession of the flood was complete, the city water supply of Kansas City, Mo., became contaminated and the Fairfax industrial area, located on the right bank of Missouri River at Kansas City, Kans., was inundated. The flood moved downstream on Missouri River, establishing new peak discharge records for the period of gage operation by the Geological Survey. However, at St. Louis the Mississippi River reached a peak discharge of only 778,000 cfs on July 21, which was 66,000 cfs less than the peak of April 30, 1944.

The story of destruction and prolonged inundation by the flood in the Marais des Cygne and Neosho River basins is relatively the same as that for the Kansas River basin. Council Grove, Marion, Strong, Florence, and many smaller communities were almost completely inundated by the Cottonwood and Neosho Rivers. From the July flood, Ottawa received the most damage of any city in the Marais des Cygne basin.

The comparative hydrographs of figures 4

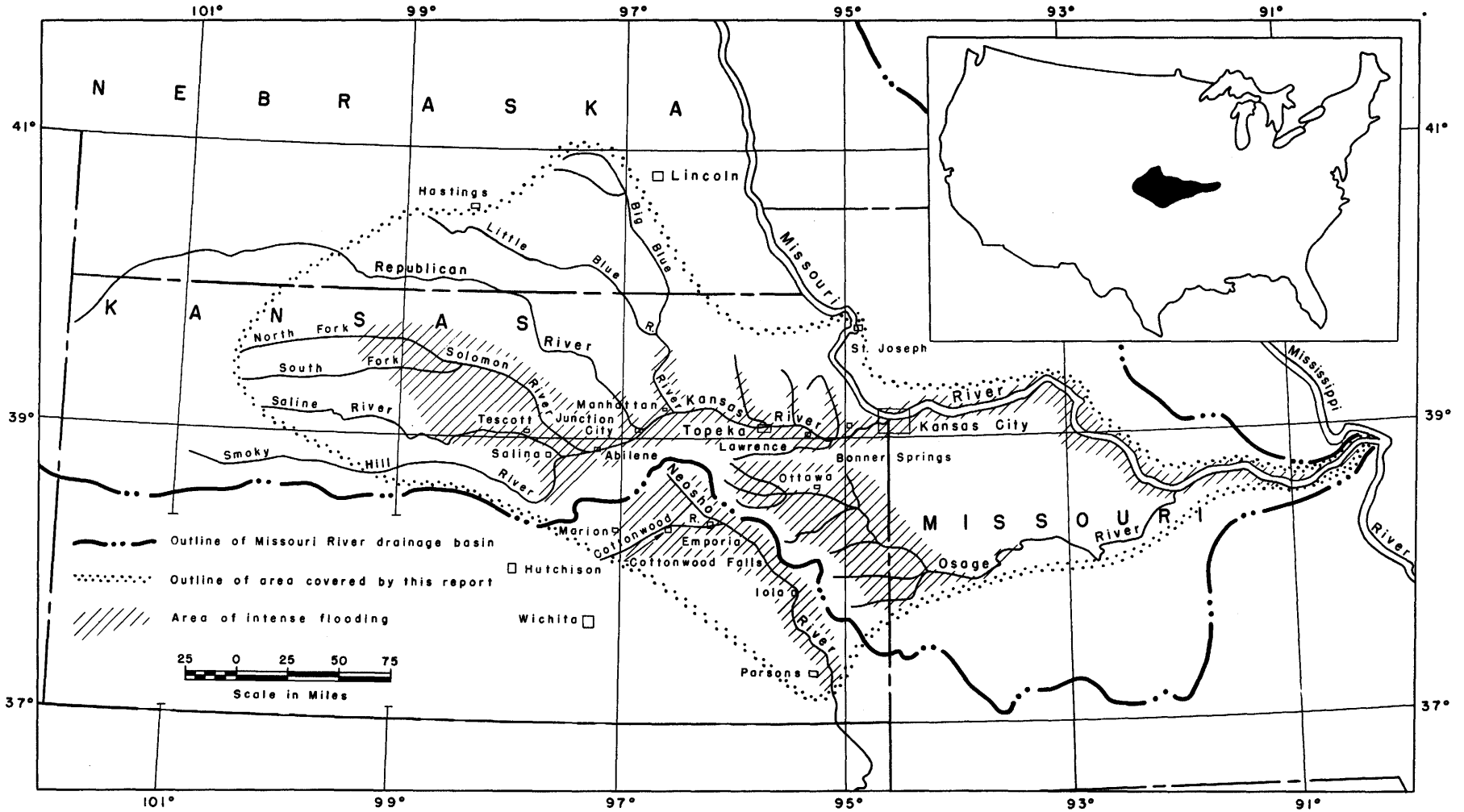

Figure 1.--Map showing location of area covered by this report.

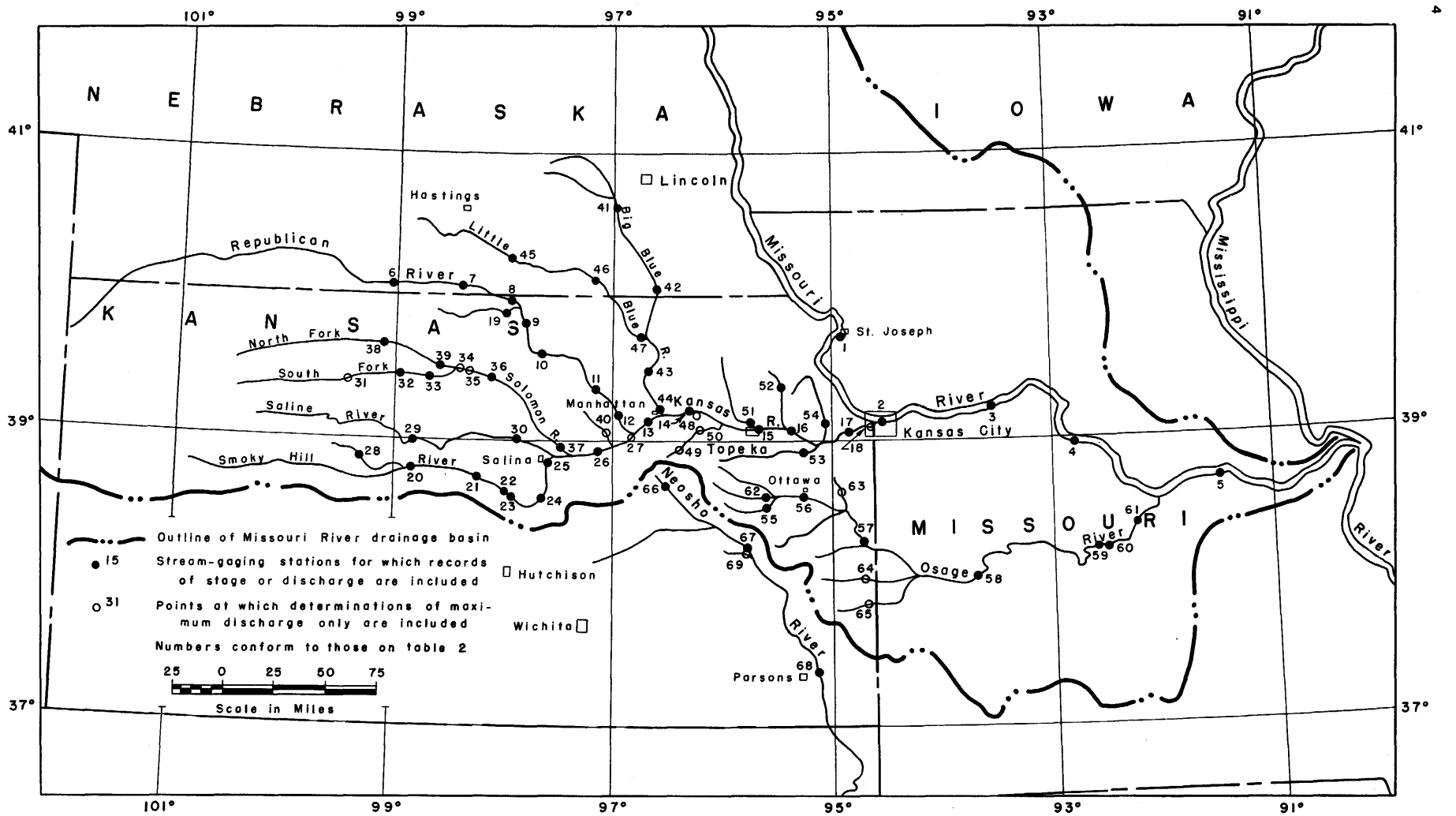

Figure 2.--Map showing location of flood determinations included in this report.

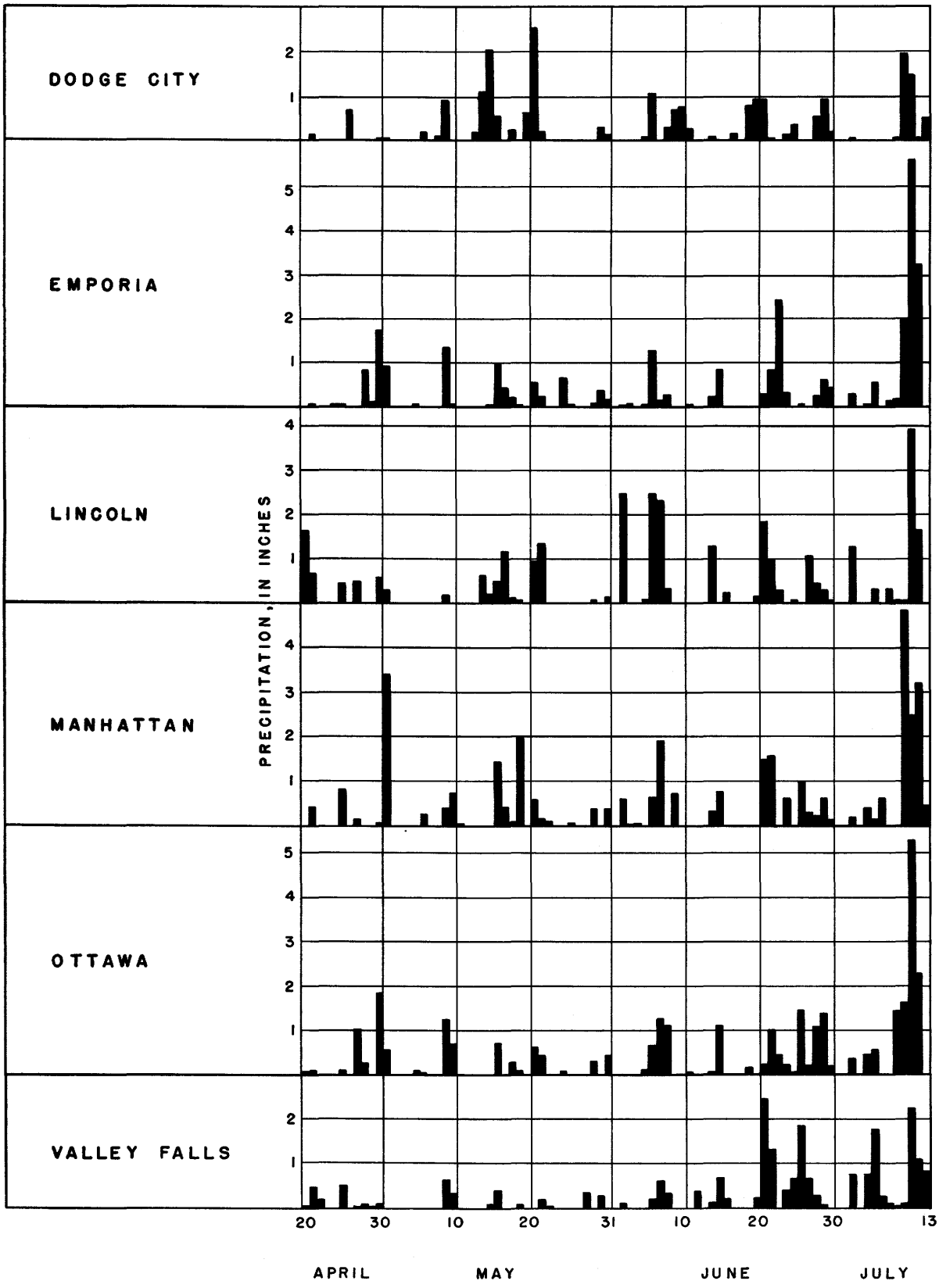

Figure 3.—— Precipitation for April 20 to July 13, 1951 at 6 weather stations in Kansas.

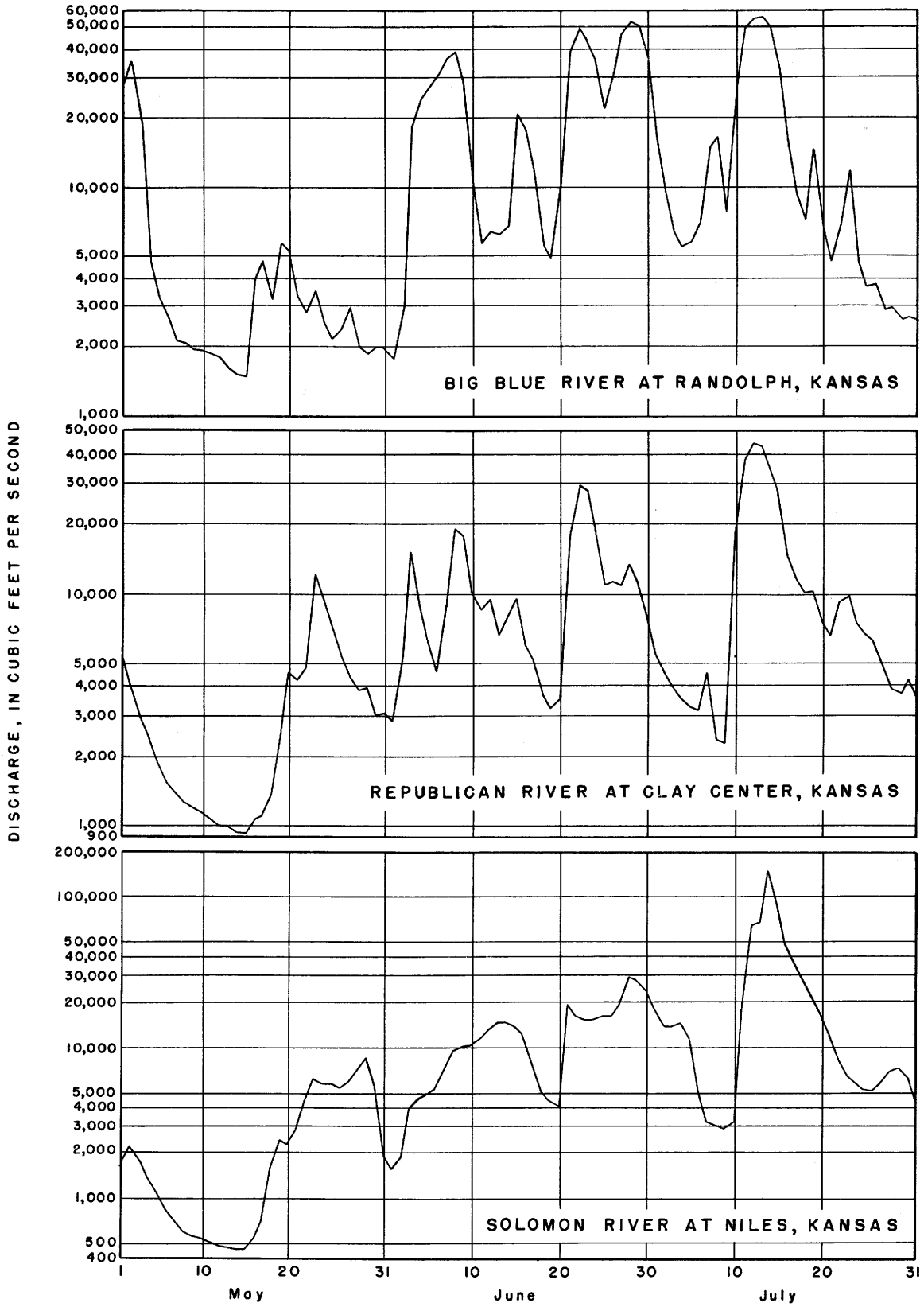

Figure 4.-- Hydrographs of mean daily discharge for Big Blue, Republican, and Solomon Rivers for period May 1 - July 31, 1951.

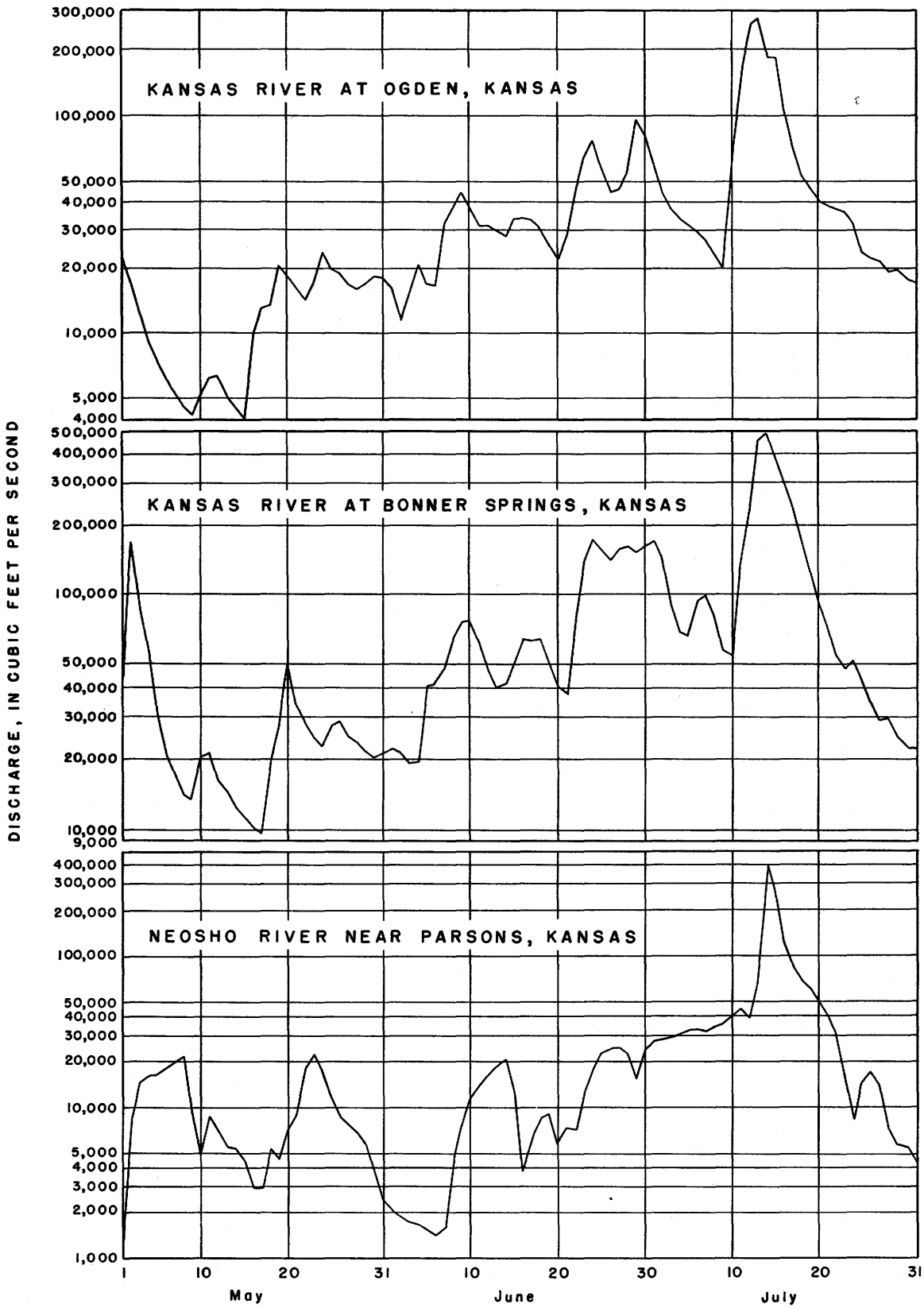

Figure 5.-- Hydrographs of mean daily discharge for Kansas and Neosho Rivers for period May 1 - July 31, 1951.

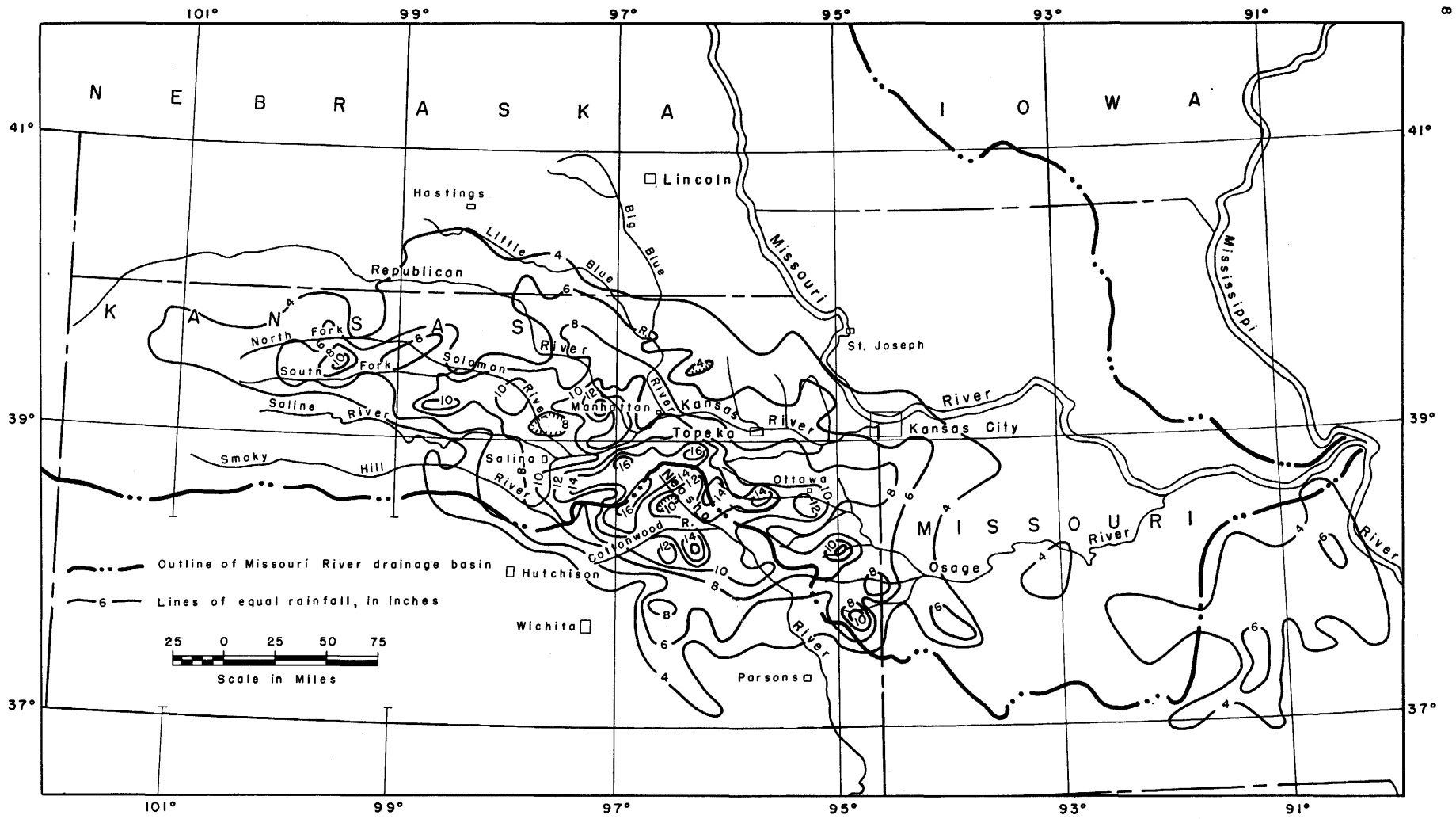

Figure 6.--Isohyetal map of July 9-13, 1951 storm in Kansas.

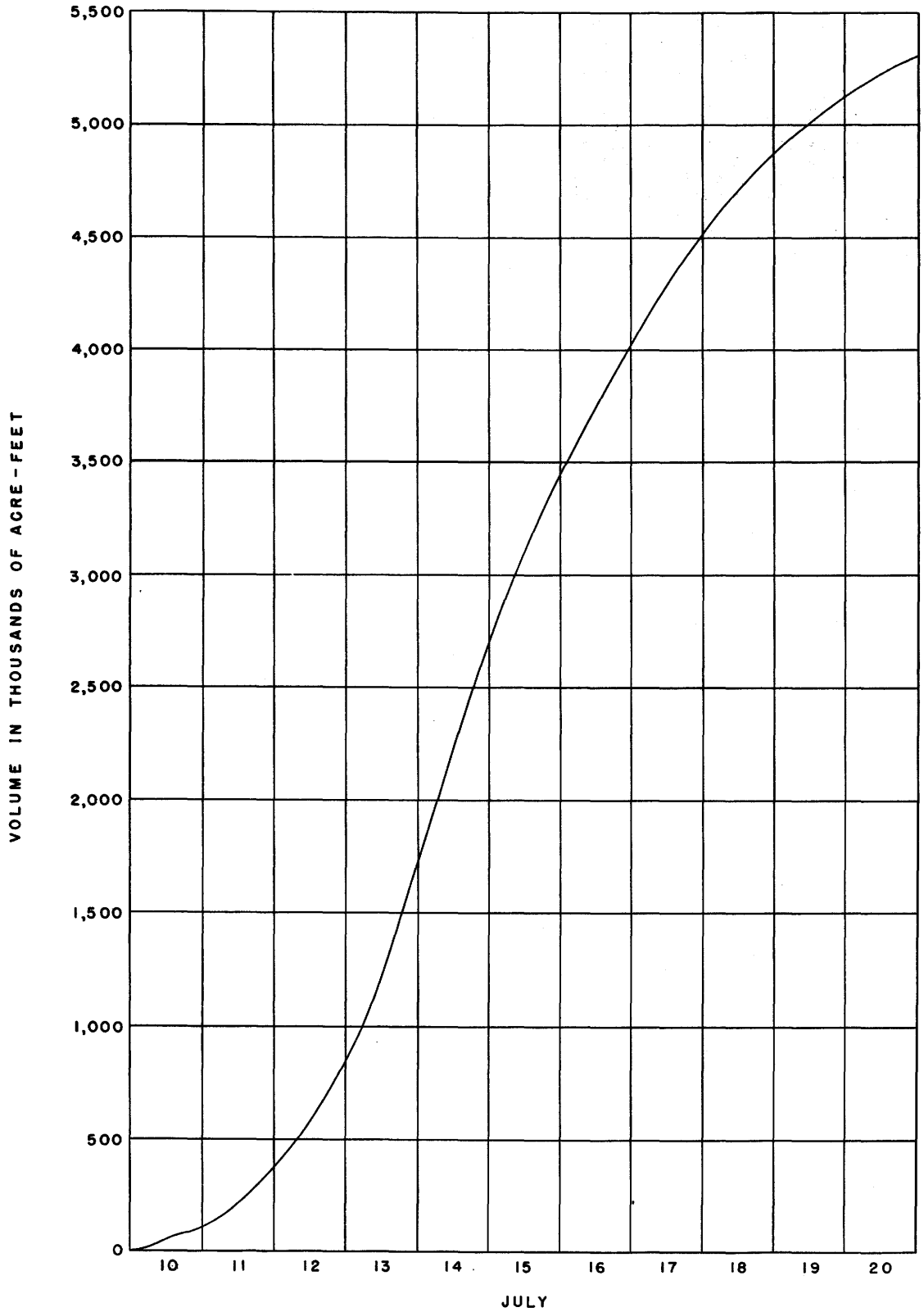

Figure 7.-- Cumulative volume of runoff for Kansas River at Bonner Springs, Kansas, July 10-20, 1951.

and 5 show the relative magnitudes of mean daily discharges for the July flood in relation to the period May-July. Neosho River at Parsons had an instantaneous peak discharge of 439,000 cfs--more than five times the highest previously recorded discharge for a period of record of 30 years, from a drainage area of 4,817 square miles. This compares with a peak discharge of 478,000 cfs from 56,710 square miles for Kansas River at Topeka. The peak discharge of Kansas River at Topeka, Kans., 478,000 cfs, exceeded the previous peak, obtained in 34 years of record, by more than three times.

Figure 7, a mass curve of volume of runoff for Kansas River at Bonner Springs for the period July 10-20, 1951, shows the tremendous volume discharged by the Kansas River. The total volume of flow for that period was 5,300,000 acre-feet, which is about 12 times the total capacity of Kanopolis Reservoir, and about one-third that of Fort Peck Reservoir in Montana.

MEASUREMENT OF FLOOD DISCHARGES

At many gaging stations in the flood area, measurement of the peak discharge with a current meter was impossible. At most gaging stations a large part of the discharge was overbank flow that bypassed the cableway or bridge from which measurements are normally made. Some measuring structures were destroyed or rendered unsafe to use during the height of the flood. For stations where current-meter measurements at or near the peak discharge were not made, or where extension of the rating curve was not practicable, the peak discharge was computed by slope-area or contracted-opening methods based on reliable flood marks.

Missouri River at St. Joseph, Mo.

Location.- Lat 39°45'10", long. 94°51'28", in sec. 17, T. 57 N., R. 35 W., at St. Joseph and Grand Island Railroad bridge in St. Joseph. Datum of gage is 788.19 ft above mean sea level, datum of 1929.
Drainage area.- 424,300 square miles.
Gage-height record.- Water-stage recorder graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Gage heights used to half-tenths.
Maxima.- May-July 1951: Discharge, 198,000 cfs 6 a.m. May 3 (gage height, 19.9 ft).
1928 to April 1951: Discharge, 196,000 cfs June 4, 1929; maximum gage height, 21.35 ft March 7, 1949 (ice jam).
1881 to 1927: Discharge known, about 370,000 cfs April 29, 1881 (gage height, 27.2 ft), computed by Corps of Engineers.
Remarks.- Drainage basin above station contains many reservoirs with total usable capacity in excess of 27,175,000 acre-feet.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	147,000	73,800	103,000	11	80,200	97,300	99,800	21	69,400	148,000	60,700
2	181,000	145,000	91,400	12	70,500	101,000	100,000	22	74,400	149,000	66,500
3	189,000	161,000	104,000	13	63,000	97,300	85,300	23	75,600	138,000	70,800
4	128,000	177,000	138,000	14	61,000	88,200	74,200	24	70,500	108,000	68,400
5	96,000	143,000	128,000	15	63,600	88,800	69,700	25	66,700	90,000	60,500
6	84,400	109,000	142,000	16	72,200	111,000	67,900	26	81,400	101,000	57,000
7	75,600	123,000	159,000	17	77,900	86,300	68,400	27	77,900	113,000	56,600
8	70,000	131,000	121,000	18	67,200	74,400	79,100	28	64,600	120,000	56,100
9	65,700	116,000	89,500	19	71,600	94,000	83,600	29	61,500	121,000	56,600
10	73,300	98,000	77,000	20	75,600	108,000	64,200	30	58,000	114,000	55,200
								31	59,000		52,800
Monthly mean discharge, in second-feet									82,960	114,200	84,070
Runoff, in thousands of acre-feet									5,101	6,794	5,170
Runoff, in inches									0.23	0.30	0.23

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	18.51	147,000	15.31	98,600	13.92	81,400	13.43	76,200	16.21	113,000	14.34	88,200
4	18.31	143,000	15.20	97,300	13.83	80,200	13.62	78,400	16.04	111,000	14.29	87,500
6	17.96	138,000	15.00	94,600	13.74	79,000	13.86	81,400	15.86	108,000	14.21	86,300
8	17.66	133,000	14.88	92,600	13.66	78,400	14.14	84,400	15.74	106,000	14.21	86,300
10	17.25	126,000	14.77	91,400	13.63	77,900	14.66	91,400	15.55	103,000	14.23	86,900
N	16.86	120,000	14.68	90,000	13.55	77,300	15.29	99,300	15.36	101,000	14.24	86,900
2	16.56	116,000	14.53	88,200	13.46	76,200	15.90	108,000	15.16	98,000	14.24	86,900
4	16.26	111,000	14.43	86,900	13.43	75,600	16.27	113,000	15.06	96,600	14.20	86,300
6	16.00	107,000	14.28	85,000	13.36	75,000	16.50	116,000	14.88	94,600	14.06	84,400
8	15.82	105,000	14.20	84,400	13.32	74,400	16.56	118,000	14.77	93,300	13.93	83,200
10	15.64	103,000	14.10	83,200	13.32	74,400	16.49	116,000	14.65	91,400	13.77	80,800
12	15.46	98,600	14.00	82,000	13.34	74,400	16.38	115,000	14.49	89,400	13.69	80,200
	July 14		July 15		July 16		July 17		July 18		July 19	
2	13.57	79,000	12.79	70,500	12.59	68,800	12.53	68,800	12.08	64,100	14.71	96,000
4	13.46	77,900	12.77	70,500	12.55	68,300	12.56	68,800	12.20	65,700	14.56	94,000
6	13.36	76,700	12.75	70,500	12.55	68,300	12.65	70,000	12.11	64,600	14.43	92,000
8	13.29	76,200	12.71	70,000	12.54	68,300	12.67	70,000	12.20	65,700	14.26	90,000
10	13.18	74,400	12.69	69,400	12.52	68,300	12.68	70,500	12.47	68,300	14.07	87,500
N	13.13	73,800	12.68	69,400	12.52	68,300	12.62	69,400	12.86	72,700	13.91	85,600
2	13.06	73,300	12.68	69,400	12.51	67,800	12.56	68,800	13.44	79,600	13.69	82,600
4	13.00	72,700	12.67	69,400	12.49	67,800	12.51	68,300	14.01	86,300	13.46	80,200
6	12.94	72,200	12.66	69,400	12.48	67,800	12.43	67,800	14.57	93,300	13.26	77,900
8	12.89	71,600	12.65	69,400	12.46	67,200	12.37	66,800	14.78	96,000	13.01	75,000
10	12.88	71,000	12.67	69,400	12.44	67,200	12.28	66,200	14.86	97,300	12.81	72,700
12	12.86	71,000	12.64	68,800	12.43	67,200	12.24	65,700	14.77	96,000	12.59	70,000
	July 20		July 21		July 22		July 23		July 24		July 25	
2	12.41	68,800	11.73	62,000	11.49	60,000	13.18	78,400	12.38	70,000	11.77	64,100
4	12.30	67,200	11.71	61,500	11.47	59,500	13.00	76,700	12.43	70,500	11.69	63,000
6	12.21	66,700	11.68	61,500	11.46	59,500	12.72	73,300	12.41	70,500	11.62	62,500
8	12.11	65,700	11.66	61,000	11.46	59,500	12.56	71,600	12.40	70,000	11.54	61,500
10	12.02	64,600	11.64	61,000	11.48	59,500	12.40	70,000	12.36	70,000	11.48	61,000
N	11.95	63,600	11.63	61,000	11.49	60,000	12.33	68,800	12.31	69,400	11.42	60,500
2	11.88	63,000	11.58	60,500	11.66	61,500	12.27	68,300	12.26	68,800	11.34	59,500
4	11.83	62,500	11.57	60,500	12.16	66,700	12.25	68,300	12.22	68,300	11.29	59,000
6	11.78	62,000	11.55	60,000	12.76	73,300	12.26	68,300	12.14	67,200	11.30	59,000
8	11.77	62,000	11.54	60,000	13.19	78,400	12.29	68,300	12.04	66,200	11.27	59,000
10	11.76	62,000	11.53	60,000	13.38	80,200	12.33	68,800	11.95	65,200	11.24	58,500
12	11.76	62,000	11.51	59,500	13.36	80,200	12.37	69,400	11.86	64,600	11.23	58,500

Missouri River at Kansas City, Mo.

Location.- Lat 39°06'43", long. 94°35'16", in sec. 32, T. 50 N., R. 33 W., at Chicago, Burlington & Quincy Railroad bridge at Kansas City, 1 mile downstream from Kansas River. Datum of gage is 715.79 ft above mean sea level, datum of 1929.
Drainage area.- 489,200 square miles.
Gage-height record.- Water-stage recorder graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Gage heights used to half-tenths.
Maxima.- May-July 1951: Discharge, 573,000 cfs 1 p.m. July 14; gage height, 36.2 ft 5 to 7 a.m. July 14.
1905-6, 1928 to April 1951: Discharge, 336,000 cfs June 18, 1943; gage height, 29.10 ft June 19, 1943.
1844 to 1927: Discharge known, about 625,000 cfs June 16, 1844 (gage height, 38.0 ft), computed by Corps of Engineers.
Flood of June 2, 1903 reached a stage of 34.95 ft.
Remarks.- Drainage basin above station contains many reservoirs with total usable capacity in excess of 27,640,000 acre-feet.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	154,000	77,200	268,000	11	104,000	171,000	249,000	21	114,000	171,000	151,000
2	241,000	131,000	247,000	12	99,200	155,000	343,000	22	103,000	231,000	130,000
3	257,000	176,000	195,000	13	89,000	141,000	431,000	23	106,000	277,000	130,000
4	241,000	179,000	202,000	14	80,600	134,000	559,000	24	101,000	281,000	128,000
5	170,000	200,000	210,000	15	76,200	122,000	492,000	25	96,600	263,000	120,000
6	134,000	174,000	237,000	16	78,400	162,000	394,000	26	102,000	245,000	99,800
7	110,000	162,000	255,000	17	82,400	164,000	324,000	27	115,000	260,000	87,800
8	89,600	190,000	260,000	18	90,200	141,000	257,000	28	102,000	270,000	86,000
9	80,600	200,000	219,000	19	91,400	132,000	224,000	29	90,800	268,000	81,200
10	86,000	186,000	183,000	20	121,000	143,000	180,000	30	84,200	269,000	79,400
								31	76,700		76,700
Monthly mean discharge, in second-feet									115,100	189,200	222,500
Runoff, in thousands of acre-feet									7,080	11,260	13,680
Runoff, in inches									0.27	0.43	0.52

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	25.60	261,000	24.76	247,000	21.45	193,000	20.98	187,000	27.48	295,000	31.00	371,000
4	25.64	262,000	24.44	241,000	21.23	191,000	21.71	197,000	27.90	303,000	31.27	377,000
6	25.75	268,000	24.12	236,000	21.13	188,000	22.86	216,000	28.40	313,000	31.54	383,000
8	25.75	268,000	23.80	231,000	20.87	185,000	23.88	232,000	28.80	322,000	31.66	387,000
10	25.75	268,000	23.40	224,000	20.71	183,000	24.70	242,000	29.35	333,000	32.00	393,000
N	25.68	263,000	23.06	218,000	20.63	182,000	25.32	256,000	29.94	347,000	32.50	406,000
2	25.60	261,000	22.76	213,000	20.47	181,000	25.76	263,000	30.36	355,000	33.10	425,000
4	25.50	259,000	22.47	209,000	20.38	179,000	26.04	269,000	30.68	363,000	33.70	444,000
6	25.30	256,000	22.29	206,000	20.37	178,000	26.30	274,000	30.88	368,000	34.40	469,000
8	25.08	252,000	22.09	203,000	20.32	177,000	26.52	278,000	31.02	371,000	34.85	488,000
10	25.00	251,000	21.87	200,000	20.37	178,000	26.86	283,000	31.10	372,000	35.20	504,000
12	24.88	248,000	21.66	197,000	20.55	181,000	27.10	288,000	31.12	373,000	35.75	528,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	36.02	542,000	34.80	525,000	32.17	437,000	30.00	350,000	28.15	283,000	25.46	233,000
4	36.18	557,000	34.65	520,000	31.87	427,000	29.84	343,000	27.93	278,000	25.43	232,000
6	36.20	565,000	34.55	516,000	31.66	420,000	29.73	340,000	27.63	271,000	25.37	232,000
8	36.18	569,000	34.35	510,000	31.42	412,000	29.65	337,000	27.40	266,000	25.34	231,000
10	36.16	571,000	34.25	506,000	31.15	402,000	29.50	332,000	27.19	262,000	25.27	230,000
N	36.14	572,000	34.10	500,000	30.92	393,000	29.40	327,000	26.91	257,000	25.14	228,000
2	36.11	572,000	33.92	494,000	30.75	386,000	29.31	323,000	26.74	253,000	24.95	226,000
4	36.08	571,000	33.65	487,000	30.62	382,000	29.20	320,000	26.51	249,000	24.76	223,000
6	35.90	565,000	33.33	476,000	30.48	375,000	29.13	317,000	26.24	246,000	24.54	220,000
8	35.62	555,000	33.01	466,000	30.38	368,000	28.93	310,000	25.98	241,000	24.25	216,000
10	35.18	538,000	32.71	456,000	30.30	365,000	28.66	300,000	25.81	238,000	23.93	212,000
12	34.95	531,000	32.40	446,000	30.22	362,000	28.47	293,000	25.64	236,000	23.60	208,000
	July 20		July 21		July 22		July 23		July 24		July 25	
2	23.04	202,000	19.52	161,000	17.22	137,000	16.04	126,000	16.16	127,000	16.52	129,000
4	22.68	197,000	19.39	159,000	17.06	135,000	16.25	127,000	16.11	126,000	16.42	128,000
6	22.26	192,000	19.23	158,000	16.90	134,000	16.53	128,000	16.10	126,000	16.29	128,000
8	21.89	187,000	19.09	156,000	16.78	132,000	16.75	132,000	16.12	126,000	16.12	126,000
10	21.60	184,000	18.92	154,000	16.62	131,000	16.91	134,000	16.18	127,000	15.93	124,000
N	21.21	180,000	18.75	153,000	16.49	128,000	16.93	134,000	16.29	128,000	15.51	120,000
2	20.91	177,000	18.58	151,000	16.39	128,000	16.88	133,000	16.38	129,000	15.36	118,000
4	20.61	173,000	18.36	148,000	16.29	127,000	16.79	132,000	16.48	129,000	15.14	117,000
6	20.34	169,000	18.12	146,000	16.19	127,000	16.66	131,000	16.57	130,000	14.92	115,000
8	20.12	167,000	17.89	143,000	16.08	126,000	16.53	130,000	16.61	131,000	14.70	113,000
10	19.93	165,000	17.69	142,000	15.99	125,000	16.40	129,000	16.62	131,000	14.50	111,000
12	19.68	162,000	17.50	140,000	16.00	125,000	16.30	128,000	16.57	130,000	14.31	108,000

Missouri River at Waverly, Mo.

Location.- Lat 39°12'51", long. 93°30'57", in sec. 14, T. 51 N., R. 24 W., at bridge on U. S. Highway 65 at Waverly. Datum of gage is 645.49 ft above mean sea level, datum of 1929.
Drainage area.- 491,200 square miles.
Gage-height record.- Water-stage recorder graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Gage heights used to half-tenths except for July 8-25, which were computed from discharge hydrograph based on current-meter measurements.
Maxima.- May-July 1951: Discharge, 532,000 cfs 8 to 11 a.m. July 16; gage height, 28.20 ft 6 a.m. to 1 p.m. July 14.
1929 to April 1951: Discharge, 347,000 cfs April 24, 1944; gage height, 25.14 ft June 24, 1947.
Remarks.- Drainage basin above station contains reservoirs with total usable capacity in excess of 27,640,000 acre-feet.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	124,000	75,900	287,000	11	101,000	184,000	223,000	21	127,000	159,000	233,000
2	198,000	93,700	266,000	12	107,000	172,000	286,000	22	105,000	197,000	195,000
3	230,000	166,000	235,000	13	93,700	160,000	336,000	23	102,000	229,000	159,000
4	240,000	170,000	214,000	14	83,700	150,000	369,000	24	102,000	256,000	135,000
5	208,000	184,000	225,000	15	77,700	139,000	480,000	25	95,000	281,000	126,000
6	160,000	187,000	248,000	16	74,100	153,000	526,000	26	97,600	275,000	117,000
7	130,000	164,000	281,000	17	83,700	181,000	471,000	27	109,000	266,000	104,000
8	105,000	176,000	302,000	18	91,800	157,000	398,000	28	109,000	275,000	97,600
9	86,700	199,000	281,000	19	95,000	142,000	329,000	29	93,700	298,000	93,000
10	84,300	199,000	233,000	20	106,000	147,000	273,000	30	85,500	290,000	86,700
								31	80,100		82,500
Monthly mean discharge, in second-feet									115,700	190,900	248,100
Runoff, in thousands of acre-feet									7,112	11,360	15,260
Runoff, in inches									0.27	0.43	0.58

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	27.22	307,000	26.81	295,000	26.13	254,000	24.48	212,000	25.46	249,000	27.44	326,000
4	27.20	307,000	26.81	296,000	25.97	249,000	24.40	212,000	25.63	256,000	27.51	331,000
6	27.18	307,000	26.82	296,000	25.35	245,000	24.36	213,000	25.79	262,000	27.57	333,000
8	27.11	307,000	26.83	293,000	25.71	241,000	24.35	214,000	25.99	268,000	27.65	335,000
10	27.06	307,000	26.84	290,000	25.58	237,000	24.40	216,000	26.15	276,000	27.82	337,000
N	27.00	304,000	26.80	288,000	25.44	234,000	24.50	219,000	26.33	283,000	27.77	338,000
2	26.96	302,000	26.76	282,000	25.28	232,000	24.60	223,000	26.50	289,000	27.87	338,000
4	26.93	299,000	26.70	270,000	25.14	228,000	24.70	227,000	26.71	296,000	27.95	338,000
6	26.89	297,000	26.64	273,000	24.99	224,000	24.81	230,000	26.87	304,000	28.03	338,000
8	26.84	295,000	26.55	267,000	24.82	220,000	24.99	233,000	27.03	310,000	28.10	338,000
10	26.82	294,000	26.43	262,000	24.71	217,000	25.13	238,000	27.19	315,000	28.16	339,000
12	26.82	294,000	26.29	258,000	24.60	214,000	25.28	243,000	27.32	320,000	28.18	341,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	28.19	343,000	27.86	423,000	27.51	527,000	26.83	503,000	25.82	431,000	24.81	358,000
4	28.19	346,000	27.83	433,000	27.51	529,000	26.74	496,000	25.73	425,000	24.71	354,000
6	28.20	349,000	27.87	444,000	27.51	531,000	26.64	491,000	25.65	420,000	24.60	348,000
8	28.20	352,000	27.85	456,000	27.50	532,000	26.54	485,000	25.56	413,000	24.48	342,000
10	28.20	356,000	27.77	468,000	27.47	532,000	26.50	480,000	25.48	406,000	24.42	336,000
N	28.20	361,000	27.70	480,000	27.40	531,000	26.41	474,000	25.41	400,000	24.34	331,000
2	28.18	367,000	27.64	490,000	27.26	530,000	26.30	468,000	25.32	395,000	24.26	325,000
4	28.17	373,000	27.63	500,000	27.14	528,000	26.21	462,000	25.23	390,000	24.20	321,000
6	28.15	380,000	27.62	508,000	27.15	525,000	26.13	456,000	25.14	385,000	24.14	315,000
8	28.05	390,000	27.56	514,000	27.11	521,000	26.03	450,000	25.02	378,000	24.06	311,000
10	27.96	401,000	27.56	519,000	27.00	516,000	25.98	445,000	24.93	372,000	24.03	306,000
12	27.87	412,000	27.55	523,000	26.90	508,000	25.90	440,000	24.82	365,000	23.95	301,000
	July 20		July 21		July 22		July 23		July 24		July 25	
2	23.86	296,000	22.88	250,000	21.39	211,000	19.86	176,000	19.60	140,000	19.17	131,000
4	23.82	291,000	22.79	247,000	21.24	208,000	19.82	173,000	19.57	137,000	19.17	131,000
6	23.76	286,000	22.65	244,000	21.10	205,000	19.82	169,000	19.52	136,000	19.16	130,000
8	23.69	282,000	22.52	241,000	20.97	202,000	19.77	166,000	19.46	135,000	19.15	128,000
10	23.62	277,000	22.41	237,000	20.85	200,000	19.74	163,000	19.40	133,000	19.13	127,000
N	23.54	273,000	22.29	234,000	20.74	196,000	19.74	160,000	19.33	133,000	19.09	126,000
2	23.45	269,000	22.16	231,000	20.60	194,000	19.74	157,000	19.29	134,000	19.04	126,000
4	23.39	266,000	22.02	229,000	20.46	190,000	19.76	153,000	19.25	135,000	18.97	125,000
6	23.30	263,000	21.90	225,000	20.31	187,000	19.75	150,000	19.23	134,000	18.90	124,000
8	23.21	260,000	21.79	222,000	20.19	184,000	19.74	148,000	19.21	134,000	18.80	123,000
10	23.12	256,000	21.66	219,000	20.02	182,000	19.71	145,000	19.20	133,000	18.72	122,000
12	23.02	252,000	21.53	215,000	19.96	178,000	19.67	143,000	19.18	132,000	18.63	121,000

Missouri River at Boonville, Mo.

Location.- Lat 38°58'40", long. 92°45'15", in sec. 35, T. 49 N., R. 17 W., at Missouri-Kansas-Texas Railroad bridge at Boonville. Datum of gage is 565.02 ft above mean sea level, datum of 1929.
Drainage area.- 505,700 square miles.
Gage-height record.- Water-stage recorder graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Gage heights used to half-tenths.
Maxima.- May-July 1951: Discharge, 550,000 cfs at 2 p.m. July 17; gage height, 32.82 ft 11 p.m. July 17.
1925 to April 1951: Discharge, 504,000 cfs April 27, 1944; gage height, 32.02 ft June 27, 1947.
1844 to 1924: Discharge known, about 710,000 cfs June 21, 1844 (gage height, 32.7 ft) computed by Corps of Engineers.
The flood of June 6, 1903 reached 30.5 ft.
Remarks.- Drainage basin above station contains many reservoirs with total usable capacity in excess of 27,640,000 acre-feet.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	118,000	89,600	369,000	11	108,000	194,000	329,000	21	117,000	167,000	338,000
2	178,000	90,200	355,000	12	135,000	180,000	323,000	22	121,000	203,000	294,000
3	223,000	132,000	336,000	13	133,000	171,000	321,000	23	108,000	241,000	259,000
4	240,000	183,000	312,000	14	120,000	164,000	344,000	24	106,000	271,000	227,000
5	248,000	192,000	284,000	15	105,000	157,000	372,000	25	104,000	291,000	196,000
6	227,000	197,000	275,000	16	93,600	155,000	432,000	26	98,300	316,000	170,000
7	168,000	191,000	284,000	17	89,600	179,000	537,000	27	99,500	328,000	140,000
8	132,000	177,000	314,000	18	93,600	184,000	524,000	28	118,000	330,000	116,000
9	107,000	190,000	336,000	19	98,900	161,000	472,000	29	112,000	339,000	104,000
10	100,000	200,000	329,000	20	100,000	155,000	400,000	30	98,300	369,000	98,900
								31	93,000		93,600
Monthly mean discharge, in second-feet									128,800	206,600	299,500
Runoff, in thousands of acre-feet									7,920	12,290	18,420
Runoff, in inches									0.29	0.46	0.68

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	27.28	298,000	28.22	331,000	28.46	335,000	28.29	325,000	28.42	330,000	27.86	317,000
4	27.40	302,000	28.25	333,000	28.44	333,000	28.27	325,000	28.40	328,000	27.83	317,000
6	27.48	304,000	28.26	335,000	28.40	331,000	28.25	323,000	28.38	328,000	27.82	317,000
8	27.51	306,000	28.30	336,000	28.40	330,000	28.25	323,000	28.34	327,000	27.80	317,000
10	27.55	307,000	28.34	338,000	28.40	330,000	28.39	328,000	28.30	325,000	27.79	319,000
N	27.73	312,000	28.36	339,000	28.39	328,000	28.55	333,000	28.20	322,000	27.79	319,000
2	27.86	316,000	28.34	338,000	28.38	328,000	28.54	333,000	28.14	322,000	27.79	320,000
4	27.94	319,000	28.32	336,000	28.36	327,000	28.53	333,000	28.07	320,000	27.80	322,000
6	27.99	322,000	28.38	336,000	28.34	327,000	28.48	331,000	28.02	319,000	27.86	323,000
8	28.05	323,000	28.40	336,000	28.34	327,000	28.46	331,000	27.98	319,000	27.88	325,000
10	28.14	328,000	28.42	336,000	28.32	325,000	28.46	331,000	27.94	319,000	27.92	327,000
12	28.16	328,000	28.41	335,000	28.32	325,000	28.44	330,000	27.89	317,000	27.93	328,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	27.97	330,000	28.52	359,000	29.14	394,000	31.40	499,000	32.60	536,000	32.19	502,000
4	28.03	333,000	28.55	362,000	29.25	400,000	31.72	515,000	32.61	536,000	32.09	497,000
6	28.09	336,000	28.59	364,000	29.36	406,000	32.00	528,000	32.62	536,000	32.02	492,000
8	28.13	338,000	28.62	365,000	29.49	412,000	32.10	531,000	32.61	534,000	31.91	486,000
10	28.22	343,000	28.67	369,000	29.59	419,000	32.35	542,000	32.59	531,000	31.84	481,000
N	28.24	343,000	28.70	370,000	29.72	425,000	32.50	547,000	32.57	528,000	31.77	476,000
2	28.25	344,000	28.72	372,000	29.90	431,000	32.62	550,000	32.51	526,000	31.67	469,000
4	28.31	347,000	28.74	374,000	30.12	442,000	32.63	547,000	32.43	520,000	31.59	464,000
6	28.35	351,000	28.78	375,000	30.35	451,000	32.70	547,000	32.40	518,000	31.46	458,000
8	28.36	351,000	28.84	379,000	30.56	460,000	32.71	547,000	32.33	512,000	31.35	451,000
10	28.39	352,000	28.94	384,000	30.76	469,000	32.74	547,000	32.27	507,000	31.27	447,000
12	28.45	355,000	29.01	388,000	30.99	479,000	32.75	547,000	32.19	502,000	31.21	442,000
	July 20		July 21		July 22		July 23		July 24		July 25	
2	31.02	431,000	29.61	362,000	28.28	311,000	26.92	273,000	25.47	241,000	24.04	209,000
4	30.95	427,000	29.52	359,000	28.22	308,000	26.80	270,000	25.36	238,000	23.90	207,000
6	30.85	423,000	29.39	352,000	28.10	304,000	26.72	268,000	25.25	235,000	23.78	204,000
8	30.74	417,000	29.30	349,000	27.99	302,000	26.68	267,000	25.13	233,000	23.67	202,000
10	30.62	410,000	29.20	344,000	27.88	298,000	26.52	263,000	25.02	231,000	23.52	200,000
N	30.54	404,000	29.08	339,000	27.77	295,000	26.41	260,000	24.91	228,000	23.41	197,000
2	30.38	398,000	28.95	335,000	27.65	291,000	26.29	258,000	24.80	226,000	23.27	195,000
4	30.20	388,000	28.87	331,000	27.52	288,000	26.17	256,000	24.69	224,000	23.18	193,000
6	30.08	383,000	28.76	327,000	27.42	286,000	26.06	253,000	24.56	221,000	23.06	191,000
8	29.98	379,000	28.64	322,000	27.33	284,000	25.94	250,000	24.43	217,000	22.95	189,000
10	29.84	372,000	28.54	319,000	27.25	282,000	25.82	247,000	24.34	216,000	22.81	186,000
12	29.77	369,000	28.44	315,000	27.10	278,000	25.67	244,000	24.23	214,000	22.70	184,000

Missouri River at Hermann, Mo.

Location.- Lat 38°42'36", long. 91°26'21", in SW¼ sec. 25, T. 46 N., R 5 W., at bridge on State Highway 19 at Hermann. Datum of gage is 481.40 ft above mean sea level, datum of 1929.
Drainage area.- 528,200 square miles.
Gage-height record.- Water-stage recorder graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Gage heights used to half-tenths.
Maxima.- May-July 1951: Discharge, 618,000 cfs 8 a.m. to 12 m. July 19 (gage height, 33.33 ft).
1928 to April 1951: Discharge, 577,000 cfs April 28, 1944; gage height, 31.20 ft May 21, 1943, June 29, 1947.
1844 to 1927: Discharge known, about 892,000 cfs June 1844 (gage height, 35.5 ft), computed by Corps of Engineers.
Remarks.- Drainage basin above station contains many reservoirs with total usable capacity in excess of 28,875,000 acre-feet.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	130,000	106,000	470,000	11	117,000	231,000	502,000	21	122,000	179,000	554,000
2	147,000	104,000	505,000	112	132,000	237,000	502,000	22	156,000	201,000	497,000
3	215,000	103,000	500,000	13	152,000	223,000	514,000	23	170,000	244,000	442,000
4	246,000	159,000	508,000	14	145,000	203,000	509,000	24	157,000	290,000	389,000
5	249,000	203,000	508,000	15	136,000	187,000	503,000	25	147,000	313,000	343,000
6	242,000	204,000	491,000	16	122,000	178,000	502,000	26	137,000	344,000	307,000
7	225,000	213,000	479,000	17	109,000	174,000	516,000	27	123,000	372,000	270,000
8	172,000	204,000	471,000	18	107,000	192,000	588,000	28	120,000	387,000	234,000
9	137,000	226,000	478,000	19	112,000	191,000	614,000	29	139,000	410,000	196,000
10	119,000	228,000	494,000	20	119,000	178,000	600,000	30	132,000	439,000	164,000
								31	111,000		142,000
Monthly mean discharge, in second-feet									150,100	230,800	444,900
Runoff, in thousands of acre-feet									9,229	13,730	27,360
Runoff, in inches									0.33	0.49	0.97

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	30.35	470,000	30.38	474,000	30.38	479,000	30.85	500,000	30.84	495,000	31.18	505,000
4	30.35	470,000	30.38	477,000	30.38	481,000	30.87	503,000	30.87	498,000	31.23	508,000
6	30.35	470,000	30.38	477,000	30.38	481,000	30.90	503,000	30.91	498,000	31.29	510,000
8	30.35	470,000	30.38	477,000	30.38	481,000	30.85	500,000	30.97	500,000	31.33	512,000
10	30.35	470,000	30.38	477,000	30.38	481,000	30.90	503,000	31.01	503,000	31.37	515,000
N	30.35	472,000	30.38	477,000	30.80	503,000	30.92	503,000	31.03	503,000	31.38	515,000
2	30.35	472,000	30.38	477,000	39.79	500,000	30.95	503,000	31.06	503,000	31.40	515,000
4	30.35	472,000	30.38	479,000	30.83	503,000	30.97	505,000	31.10	505,000	31.41	518,000
6	30.35	472,000	30.38	479,000	30.84	503,000	30.90	500,000	31.13	508,000	31.41	518,000
8	30.35	472,000	30.38	479,000	30.85	503,000	30.92	500,000	31.13	505,000	31.41	518,000
10	30.35	472,000	30.38	479,000	30.87	503,000	30.90	500,000	31.14	505,000	31.41	518,000
12	30.35	474,000	30.38	479,000	30.90	505,000	30.98	503,000	31.15	505,000	31.39	515,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	31.37	515,000	31.15	503,000	31.15	503,000	31.14	500,000	32.13	552,000	33.22	613,000
4	31.34	512,000	31.17	503,000	31.14	503,000	31.15	503,000	32.21	557,000	33.24	613,000
6	31.32	512,000	31.20	505,000	31.13	500,000	31.15	503,000	32.37	565,000	33.28	616,000
8	31.31	510,000	31.21	505,000	31.12	500,000	31.19	503,000	32.55	574,000	33.33	618,000
10	31.29	510,000	31.18	505,000	31.13	500,000	31.23	505,000	32.69	582,000	33.33	618,000
N	31.27	510,000	31.15	503,000	31.14	503,000	31.32	510,000	32.81	590,000	33.33	618,000
2	31.25	508,000	31.14	503,000	31.15	503,000	31.41	515,000	32.93	596,000	33.25	613,000
4	31.24	508,000	31.12	500,000	31.15	503,000	31.51	520,000	33.02	602,000	33.19	610,000
6	31.23	508,000	31.13	503,000	31.14	503,000	31.59	523,000	33.09	604,000	33.21	610,000
8	31.22	508,000	31.12	500,000	31.13	500,000	31.69	528,000	33.16	610,000	33.22	613,000
10	31.19	505,000	31.13	503,000	31.13	500,000	31.85	538,000	33.19	610,000	33.22	613,000
12	31.16	503,000	31.14	503,000	31.14	503,000	31.94	541,000	33.20	610,000	33.21	613,000
	July 20		July 21		July 22		July 23		July 24		July 25	
2	33.23	610,000	32.66	576,000	31.61	515,000	30.50	465,000	29.57	412,000	28.56	361,000
4	33.22	610,000	32.57	571,000	31.56	515,000	30.41	460,000	29.51	407,000	28.49	358,000
6	33.21	610,000	32.54	571,000	31.46	510,000	30.36	458,000	29.43	403,000	28.40	355,000
8	33.19	607,000	32.50	568,000	31.40	508,000	30.27	453,000	29.37	399,000	28.31	352,000
10	33.15	607,000	32.41	563,000	31.32	503,000	30.21	448,000	29.30	395,000	28.21	347,000
N	33.08	602,000	32.33	557,000	31.26	500,000	30.14	446,000	29.26	393,000	28.13	344,000
2	33.03	599,000	32.23	552,000	31.15	495,000	30.06	441,000	29.13	387,000	28.04	341,000
4	33.01	599,000	32.11	546,000	31.06	491,000	29.98	437,000	29.05	383,000	27.97	338,000
6	33.00	599,000	32.05	544,000	30.99	488,000	29.90	432,000	28.95	378,000	27.88	334,000
8	32.88	590,000	31.95	538,000	30.91	484,000	29.83	427,000	28.85	374,000	27.80	331,000
10	32.81	588,000	31.90	536,000	30.81	479,000	29.76	423,000	28.77	369,000	27.72	328,000
12	32.75	585,000	31.79	530,000	30.72	474,000	29.69	418,000	28.67	366,000	27.63	326,000

Republican River near Bloomington, Nebr.

Location.- Lat 40°04'00", long. 99°02'05", in NW¼SE¼ sec. 8, T. 1 N., R. 15 W., 600 feet downstream from county highway bridge, 2 miles south of Bloomington, and 9½ miles downstream from Turkey Creek. Datum of gage is 1,824.15 feet above mean sea level, datum of 1929.

Drainage area.- 20,800 square miles, of which only 15,100 square miles contribute directly to surface runoff.

Gage-height record.- Water-stage recorder graph except period 7 a.m. June 20 to 8 a.m. June 29, when there was no gage-height record. The graph was estimated on parts of several other days.

Discharge record.- Stage-discharge relation defined by current-meter measurements. Shifting-control method used. Shifting-control adjustments fairly well defined except during period May 18-21.

Maxima.- May-July 1951: Discharge, 11,000 cfs 4 p.m. July 14 (gage height, 7.04 ft). 1929 to April 1951: Discharge, 260,000 cfs June 1, 1935 (gage height, 20.4 ft, from floodmarks, site then in use), by slope-area method.

Remarks.- Natural flow affected by reservoirs above station.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	738	1,330	2,080	11	290	2,630	4,090	21	7,400	2,500	3,600
2	582	1,540	1,760	12	278	3,290	8,650	22	10,100	2,000	2,640
3	496	1,380	1,660	13	278	3,300	8,590	23	4,880	2,500	2,120
4	452	1,210	1,390	14	318	2,280	9,720	24	3,780	4,000	2,520
5	405	1,080	1,220	15	318	1,950	9,650	25	3,440	3,500	2,690
6	367	1,250	1,140	16	3,930	1,800	7,160	26	3,410	3,000	2,240
7	336	1,280	1,050	17	4,920	1,720	5,570	27	1,820	3,000	1,880
8	314	1,350	978	18	3,000	1,540	3,730	28	1,610	3,000	1,850
9	310	4,150	922	19	2,400	3,510	5,540	29	1,560	2,550	2,560
10	302	3,830	908	20	1,800	3,120	5,070	30	1,300	2,520	1,840
								31	831		1,860
Monthly mean discharge, in second-feet									1,999	2,404	3,441
Runoff, in acre-feet									122,900	143,000	211,600
Runoff, in inches									0.11	0.13	0.19

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2							2.84	1,130	6.05	8,640	5.74	7,920
4							2.97	1,320	6.12	8,810	5.75	7,940
6							3.03	1,410	6.16	8,900	5.75	7,940
8							3.17	1,580	6.18	8,950	5.81	8,080
10							3.50	2,000	6.18	8,950	5.79	8,030
N							4.98	4,400	6.17	8,930	6.00	8,520
2							5.20	5,120	6.12	8,810	6.17	8,930
4							5.40	5,860	6.05	8,640	6.21	9,020
6							5.57	6,590	6.01	8,540	6.39	9,470
8							5.71	7,200	5.88	8,240	6.35	9,370
10							5.85	7,830	5.82	8,100	6.27	9,170
12							5.96	8,310	5.89	8,260	6.22	9,050
	July 14		July 15		July 16		July 17		July 18		July 19	
2	6.17	8,810	6.74	10,200	6.25	8,760	5.73	5,730	4.99	3,860	5.05	3,950
4	6.14	8,740	6.68	10,100	6.22	8,450	5.70	5,670	4.88	3,700	5.09	4,010
6	6.12	8,690	6.63	9,950	6.16	8,080	5.68	5,630	4.81	3,590	5.14	4,090
8	6.19	8,830	6.58	9,820	6.08	7,680	5.67	5,610	4.81	3,590	5.77	5,160
10	6.22	8,930	6.54	9,720	5.97	7,220	5.66	5,590	4.83	3,620	6.33	6,210
N	6.31	9,140	6.49	9,600	5.91	6,880	5.64	5,560	4.85	3,650	6.45	6,450
2	6.95	10,500	6.45	9,500	5.86	6,570	5.66	5,590	4.86	3,660	6.46	6,470
4	7.04	11,000	6.42	9,420	5.84	6,430	5.69	5,650	4.87	3,680	6.41	6,370
6	6.98	10,900	6.38	9,320	5.81	6,270	5.72	5,710	4.91	3,740	6.37	6,290
8	6.95	10,800	6.35	9,240	5.78	6,110	5.72	5,710	4.92	3,760	6.35	6,250
10	6.87	10,600	6.33	9,200	5.76	5,970	5.65	5,390	4.98	3,840	6.33	6,210
12	6.81	10,400	6.29	9,100	5.74	5,840	5.17	4,220	5.02	3,900	6.24	6,030
	July 20		July 21		July 22		July 23		July 24		July 25	
2	6.09	5,750	5.25	4,250	4.42	3,000						
4	6.00	5,580	5.20	4,170	4.40	2,980						
6	5.90	5,390	5.12	4,050	4.36	2,920						
8	5.79	5,190	5.01	3,880	4.36	2,920						
10	5.73	5,080	4.87	3,660	4.36	2,920						
N	5.68	4,990	4.77	3,520	4.37	2,940						
2	5.65	4,940	4.69	3,400	4.34	2,900						
4	5.59	4,840	4.60	3,280	4.31	2,860						
6	5.52	4,720	4.54	3,190	3.95	2,410						
8	5.47	4,630	4.47	3,090	3.51	1,930						
10	5.41	4,530	4.41	3,020	3.22	1,650						
12	5.34	4,410	4.36	2,950	3.17	1,600						

Republican River near Guide Rock, Nebr.

Location.- Lat 40°03'50", long. 98°22'40", in SE¼NE¼ sec. 7, T. 1 N., R. 9 W., 300 ft upstream from Willow Creek, a quarter of a mile downstream from Courtland diversion dam, and 2 miles west of Guide Rock.
Gage-height record.- Water-stage recorder graph. Accuracy of graph on July 11, 12 is questionable. The graph was estimated during parts of several days.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 14,000 cfs.
Maxima.- May-July 1951: Discharge, 14,300 cfs 2 p.m. May 22 (gage height, 9.82 ft).
August 1950 to April 1951: Discharge, 10,200 cfs Sept 20, 1950 (gage height, 8.46 ft).
Remarks.- Natural flow affected by reservoirs above station.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	1,100	2,510	3,670	11	395	4,430	12,000	21	4,890	2,460	5,510
2	842	8,540	2,240	12	372	3,260	12,100	22	12,600	3,720	5,130
3	669	2,360	1,990	13	351	4,870	8,310	23	5,880	2,580	3,110
4	588	1,890	1,800	14	390	3,330	7,900	24	3,940	5,580	2,840
5	549	1,660	1,510	15	404	3,220	8,730	25	3,730	5,150	3,210
6	506	2,240	1,380	16	706	2,380	6,640	26	3,550	5,080	2,980
7	461	7,140	1,260	17	3,700	2,050	6,000	27	3,370	4,600	2,650
8	428	2,480	1,100	18	3,080	1,840	5,490	28	2,600	4,280	2,210
9	413	3,670	1,010	19	2,140	1,580	4,850	29	2,250	2,960	2,330
10	413	6,400	3,930	20	1,810	3,440	7,320	30	1,770	2,800	2,960
								31	1,590		2,040
Monthly mean discharge, in second-feet									2,112	3,617	4,329
Runoff, in acre-feet									129,900	215,200	266,200
Runoff, in inches											

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					3.03	983	7.77	9,280	7.87	10,500	8.43	10,200
4					3.03	983	8.20	10,900	8.06	10,800	8.25	9,720
6					3.07	1,010	8.57	12,600	8.33	11,000	8.04	9,200
8					3.92	1,830	8.84	14,000	8.68	11,400	7.83	8,680
10					4.79	3,000	8.81	14,200	9.07	12,300	7.65	8,250
N					5.78	4,500	8.65	14,000	9.50	13,300	7.49	7,880
2					6.25	5,340	8.38	13,800	9.70	13,900	7.35	7,560
4					6.73	6,260	8.02	13,000	9.62	13,700	7.22	7,270
6					6.81	6,420	7.64	11,600	9.48	13,200	7.17	7,170
8					6.67	6,140	7.51	10,900	9.28	12,600	7.19	7,210
10					6.80	6,400	7.64	10,700	9.01	11,800	7.26	7,360
12					7.26	7,580	7.74	10,400	8.69	10,900	7.34	7,540
	July 14		July 15		July 16		July 17		July 18		July 19	
2											5.74	4,430
4			7.87	8,780							5.72	4,390
6											5.73	4,410
8			8.01	9,120							5.74	4,430
10											5.76	4,460
N			8.08	9,300							5.78	4,500
2											5.80	4,530
4			8.04	9,200							5.82	4,560
6											5.87	4,650
8			7.67	8,300							6.13	5,200
10											6.82	6,640
12			7.30	7,450							7.25	7,600
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4	7.44	8,080										
6												
8	7.38	7,950										
10												
N	7.19	7,520										
2												
4	6.94	6,980										
6												
8	6.73	6,540										
10												
12	6.57	6,220										

Republican River near Hardy, Nebr.

Location.- Lat 40°00', long. 97°56', in sec. 6, T. 1 S., R. 5 W., 1¼ miles southwest of Hardy. Datum of gage is 1,501.46 ft above mean sea level, datum of 1929.
Drainage area.- 22,400 square miles, of which 5,700 square miles are largely non-contributing.
Gage-height record.- Water-stage recorder graph except for periods May 1-16, 20, May 28 to June 1, June 4-6, 9, 16-20, June 28 to July 19, July 23-31, for which a graph was drawn based on twice-daily wire-weight gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Shifting-control method used June 2 to July 31.
Maxima.- May-July 1951: Discharge, 18,600 cfs 11:45 a.m. June 2 (gage height, 12.59 ft). 1932 to April 1951: Discharge, 225,000 cfs June 2, 1935 (gage height, 19.4 ft), by slope-area method.
Remarks.- Some regulation at low flow by power plant 8 miles above. Many diversions above station for irrigation.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	1,080	1,480	3,210	11	457	5,600	16,300	21	3,150	4,460	5,760
2	1,310	13,300	2,940	12	420	3,770	14,600	22	12,000	5,900	5,460
3	820	4,330	2,570	13	396	4,150	11,400	23	7,370	5,300	4,560
4	670	2,020	2,440	14	432	4,750	6,180	24	3,840	4,970	2,640
5	576	1,570	2,350	15	478	4,170	7,880	25	2,970	6,640	3,100
6	541	1,940	2,110	16	499	3,210	6,810	26	2,810	6,000	3,210
7	506	12,300	2,070	17	2,260	2,730	5,120	27	2,910	6,360	3,770
8	464	4,200	1,880	18	4,090	2,460	5,140	28	2,000	4,220	3,390
9	414	2,300	1,780	19	2,760	2,270	4,080	29	2,070	3,580	1,660
10	464	6,220	6,240	20	2,110	3,050	6,010	30	1,560	3,180	2,020
								31	1,310		1,990
Monthly mean discharge, in second-feet									2,024	4,548	4,796
Runoff, in acre-feet									124,400	270,600	294,900
Runoff, in inches									0.10	0.23	0.25

Republican River at Scandia, Kans.

Location.- Lat 39°48', long. 97°47', in NE¼ sec. 17, T. 3 S., R. 4 W., at bridge on U. S. Highway 36 at Scandia, 4 miles downstream from Dry Creek, and 4 miles upstream from School Creek. Datum of gage is 1,422.91 ft above mean sea level (1929 general adjustment, levels by Corps of Engineers).
Drainage area.- 22,930 square miles, of which 5,700 square miles is largely non-contributing.
Gage-height record.- Graph drawn on basis of wire-weight gage readings made once daily at low stages, more frequently at high stages.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 27,000 cfs and extended to peak stage on basis of shape of previous rating curve.
Maxima.- May-July 1951: Discharge, 38,200 cfs 8 a.m. July 11 (gage height, 11.60 ft). 1919-25, 1928-44, November 1950 to April 1951: Discharge, 215,000 cfs June 2, 1935 (gage height, 17.8 ft, from floodmarks).
Stage known prior to flood of June 2, 1935, 14.2 ft June 20, 1915.
Remarks.- Gage-height record collected in cooperation with U. S. Weather Bureau.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	2,100	2,110	3,300	11	599	6,920	28,600	21	3,600	5,800	6,760
2	1,910	17,700	3,160	12	564	4,560	25,000	22	11,600	7,120	6,000
3	1,250	7,980	2,700	13	501	4,100	25,900	23	9,120	8,180	4,640
4	886	4,420	2,400	14	494	6,200	11,900	24	5,500	5,340	3,250
5	795	2,520	2,260	15	550	3,750	10,500	25	4,230	8,020	3,090
6	711	3,080	1,970	16	585	3,780	8,850	26	3,970	6,440	3,160
7	683	16,800	1,800	17	648	2,870	6,680	27	3,280	7,480	3,270
8	648	10,400	1,630	18	3,720	2,500	6,040	28	3,970	5,180	4,700
9	641	7,040	1,470	19	3,270	2,380	5,360	29	2,840	4,180	3,460
10	536	6,520	2,390	20	2,400	2,340	6,700	30	2,700	3,460	2,710
								31	2,350		3,140
Monthly mean discharge, in second-feet									2,473	5,972	6,542
Runoff, in acre-feet									152,000	355,400	402,200
Runoff, in inches									0.12	0.29	0.33

Republican River at Concordia, Kans.

Location.- Lat 39°35'40", long. 97°38'55", in sec. 27, T. 5 S., R. 3 W., at bridge on U. S. Highway 81, half a mile north of Concordia and 7 miles downstream from Buffalo Creek. Datum of gage is 1,333.68 ft above mean sea level, adjustment of 1929.
Drainage area.- 23,540 square miles, of which 5,700 square miles are largely non-contributing.
Gage-height record.- Water-stage recorder graph except for periods May 6, 8-12, 17, 18, 20, May 30 to June 1, June 5, 6, 17-20, June 30 to July 10, July 25-31, for which a graph was drawn based on once-daily wire-weight gage readings. No gage-height record May 29.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Shifting-control method used June 29 to July 31. Discharge for day of no gage-height record computed on basis of records for station at Clay Center.
Maxima.- May-July 1951: Discharge, 33,600 cfs 2 p.m. July 13 (gage height, 11.23 ft).
1946 to April 1951: Discharge, 75,000 cfs June 25, 1947 (gage height, 14.90 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	1,580	2,800	3,410	11	735	8,940	19,300	21	3,920	10,000	6,250
2	2,300	10,500	3,350	12	772	5,960	24,200	22	9,810	13,200	6,520
3	1,980	8,090	3,280	13	682	4,220	30,400	23	12,800	16,400	6,140
4	1,370	5,780	3,020	14	668	6,290	19,200	24	6,620	9,980	4,620
5	1,110	3,350	2,690	15	712	4,800	11,600	25	4,740	9,080	4,010
6	966	2,840	2,440	16	772	4,400	10,400	26	4,140	7,420	3,590
7	914	10,800	2,220	17	840	3,720	7,050	27	3,740	8,120	3,590
8	872	12,000	1,920	18	2,990	2,620	6,220	28	3,820	6,980	3,950
9	840	10,000	1,790	19	4,440	2,460	5,640	29	2,900	5,560	4,120
10	795	6,600	1,930	20	3,320	3,460	4,880	30	2,860	4,200	3,170
								31	2,660		3,200
Monthly mean discharge, in second-feet									2,796	7,019	6,906
Runoff, in acre-feet									171,900	417,700	424,700
Runoff, in inches									0.14	0.33	0.34

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					3.74	1,760	5.85	4,500	9.65	17,900	10.67	28,000
4					3.74	1,760	8.50	11,100	9.75	18,800	10.77	29,000
6	3.92	1,970	3.78	1,800	3.73	1,750	9.65	17,900	9.97	21,000	10.87	30,000
8					3.73	1,750	10.25	23,800	10.20	23,300	10.98	31,100
10					3.73	1,750	10.52	26,500	10.70	28,300	11.07	32,000
N	3.87	1,910	3.76	1,780	3.73	1,750	10.47	26,000	10.90	30,300	11.20	33,300
2					3.73	1,750	10.33	24,600	10.72	28,500	11.23	33,600
4					3.73	1,750	10.27	24,000	10.46	25,900	11.15	32,800
6	3.83	1,860	3.75	1,770	3.80	1,830	10.16	22,900	10.34	24,700	10.97	31,000
8					4.00	2,080	10.00	21,300	10.31	24,400	10.80	29,300
10					4.40	2,600	9.75	18,800	10.42	25,500	10.70	28,300
12	3.80	1,830	3.74	1,760	5.10	3,500	9.65	17,900	10.55	26,800	10.55	26,800
	July 14		July 15		July 16		July 17		July 18		July 19	
2	10.35	24,800	9.28	15,200	8.75	12,200	7.40	7,850	6.50	6,200	6.30	5,900
4	10.25	23,800	9.15	14,400	8.85	12,800	7.27	7,610	6.53	6,260	6.30	5,900
6	10.12	22,500	8.93	13,200	8.85	12,800	7.20	7,420	6.58	6,380	6.30	5,900
8	9.95	20,800	8.71	12,000	8.74	12,200	7.13	7,380	6.62	6,480	6.30	5,900
10	9.80	19,300	8.44	10,900	8.56	11,300	7.06	7,200	6.61	6,450	6.27	5,840
N	9.68	18,100	8.25	10,100	8.36	10,500	6.95	7,050	6.56	6,320	6.21	5,820
2	9.55	17,100	8.12	9,780	8.12	9,780	6.87	6,850	6.49	6,180	6.10	5,700
4	9.42	16,100	8.06	9,540	7.89	9,120	6.80	6,800	6.43	6,160	5.97	5,540
6	9.40	16,000	8.10	9,700	7.73	8,560	6.72	6,600	6.41	6,120	5.84	5,380
8	9.35	15,600	8.23	10,000	7.68	8,300	6.65	6,420	6.38	6,060	5.72	5,240
10	9.35	15,600	8.40	10,700	7.53	8,090	6.57	6,350	6.34	5,980	5.58	5,060
12	9.33	15,500	8.58	11,400	7.43	7,940	6.54	6,280	6.32	5,940	5.47	4,940
	July 20		July 21		July 22		July 23		July 24		July 25	
2	5.40	4,900	6.65	6,420	5.98	5,560	6.40	6,100	5.82	5,340		
4	5.36	4,820	6.77	6,720	6.01	5,620	6.40	6,100	5.67	5,240	4.59	3,780
6	5.32	4,740	6.80	6,800	6.16	5,820	6.47	6,180	5.51	5,020		
8	5.30	4,700	6.78	6,750	6.57	6,350	6.52	6,240	5.41	4,920	4.50	3,650
10	5.30	4,700	6.73	6,620	6.91	6,950	6.53	6,260	5.30	4,700		
N	5.29	4,680	6.63	6,380	7.13	7,380	6.56	6,320	5.19	4,580	4.97	4,240
2	5.29	4,680	6.50	6,200	7.18	7,500	6.55	6,300	5.08	4,460		
4	5.30	4,700	6.38	6,060	7.15	7,420	6.52	6,240	4.98	4,260	4.94	4,180
6	5.34	4,780	6.24	5,880	7.00	7,050	6.45	6,160	4.88	4,160		
8	5.46	4,920	6.12	5,740	6.77	6,720	6.34	5,980	4.81	4,040	4.93	4,160
10	5.87	5,440	6.02	5,640	6.61	6,450	6.18	5,860	4.74	3,940		
12	6.37	6,040	5.97	5,540	6.47	6,240	5.99	5,580	4.69	3,900	4.93	4,160

Supplemental records.- July 11, 3 p.m., 10.38 ft, 25,100 cfs; July 11, 5 p.m., 10.10 ft, 22,300 cfs; July 13, 1 a.m., 10.52 ft, 26,500 cfs; July 18, 3 a.m., 6.49 ft, 6,180 cfs.

Republican River at Clay Center, Kans.

Location.- Lat 39°21', long. 97°08', in SW¼ sec. 17, T. 8 S., R. 3 E., at bridge on State Highway 15, 1 mile south of Clay Center, and 4 miles downstream from Five Creeks. Datum of gage is 1,159.32 feet above mean sea level, datum of 1929.
Drainage area.- 24,570 square miles, of which 1,900 square miles are largely non-contributing.
Gage-height record.- Water-stage recorder graph except for periods June 19 to 12 m. June 20, July 2 to 2 a.m. July 10, July 22 to July 31, for which graph was drawn based on daily wire-weight gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements.
Maxima.- May-July 1951: Discharge, 51,500 cfs 6 p.m. July 12 (gage height, 22.20 ft).
1917 to April 1951: Maximum stage, 25.74 ft June 3, 1935, from floodmarks.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	5,460	2,860	5,480	11	1,070	8,360	37,800	21	4,140	18,200	6,500
2	4,170	5,220	4,570	12	1,000	9,600	46,000	22	4,770	30,400	9,220
3	2,880	15,400	4,060	13	1,000	6,620	44,500	23	12,300	28,800	9,820
4	2,390	9,060	3,620	14	949	8,020	36,300	24	9,780	19,200	7,760
5	1,850	6,180	3,290	15	935	9,700	27,400	25	6,780	11,100	6,840
6	1,530	4,740	3,120	16	1,080	6,030	15,200	26	5,370	11,500	6,280
7	1,370	9,060	4,600	17	1,120	5,230	12,000	27	4,380	11,100	4,910
8	1,260	19,300	2,380	18	1,310	3,770	10,200	28	3,860	14,000	3,970
9	1,200	18,000	2,280	19	2,490	3,220	10,300	29	3,970	11,400	3,800
10	1,130	10,300	17,200	20	4,670	3,430	7,470	30	3,070	8,030	4,380
								31	3,190		3,430
Monthly mean discharge, in second-feet									3,241	10,930	11,760
Runoff, in acre-feet									199,300	650,300	723,300
Runoff, in inches									0.15	0.50	0.55

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					11.42	4,140	19.93	30,500	21.17	40,500	22.01	49,100
4					12.37	5,800	20.31	33,200	21.22	41,000	21.93	48,200
6	10.15	2,420	9.90	2,140	13.47	7,960	20.50	34,700	21.17	40,500	21.82	47,000
8					14.86	10,700	20.74	36,700	21.33	42,100	21.90	47,900
10					16.55	14,700	21.07	39,600	21.50	43,800	21.81	46,900
N	10.05	2,300	9.91	2,150	17.73	18,800	21.25	41,300	21.77	43,500	21.64	45,200
2					18.55	22,700	21.18	40,600	21.97	48,700	21.51	43,900
4					18.95	24,700	21.17	40,500	22.10	50,200	21.31	41,900
6	9.98	2,230	10.01	2,260	19.15	25,800	21.12	40,100	22.20	51,500	21.18	40,600
8					19.29	26,600	21.22	41,000	22.17	51,100	21.08	39,700
10					19.58	28,300	21.14	40,300	22.13	50,600	20.98	38,800
12	9.92	2,160	10.65	3,020	19.74	29,300	21.18	40,600	22.16	51,000	20.90	38,100
	July 14		July 15		July 16		July 17		July 18		July 19	
2	20.83	37,500									15.48	12,100
4	20.78	37,000	20.18	32,300	17.25	16,800			14.38	9,780	15.40	11,900
6	20.73	36,600					16.02	13,300			15.29	11,700
8	20.68	36,200	19.86	30,100	16.67	15,000			14.28	9,580	15.10	11,200
10	20.67	36,100									14.86	10,700
N	20.68	36,200	19.46	27,600	16.41	14,300	15.37	11,800	14.32	9,660	14.62	10,300
2	20.69	36,300									14.38	9,780
4	20.73	36,600	18.98	24,900	16.38	14,200			14.60	10,200	14.18	9,380
6	20.63	35,800					14.95	10,900			14.05	9,120
8	20.62	35,700	18.48	22,300	16.41	14,300			15.08	11,200	13.94	8,900
10	20.57	35,300									13.85	8,720
12	20.56	35,200	17.94	19,700	16.34	14,100	14.58	10,200	15.40	11,900	13.78	8,580
	July 20		July 21		July 22		July 23		July 24		July 25	
2			12.62	6,280								
4			12.58	6,200	13.78	8,580	14.84	10,700				
6	13.56	8,140	12.56	6,130					13.48	7,980	12.98	8,080
8			12.54	6,130	13.85	8,720	14.78	10,600				
10			12.53	6,110								
N	13.21	7,440	12.53	6,110	13.74	8,500	14.44	9,900	13.36	7,740	12.90	8,820
2			12.58	6,220								
4			12.27	5,810	14.27	9,560	14.15	9,320				
6	12.90	6,820	13.07	7,160					13.23	7,480	12.83	8,680
8			13.32	7,660	14.73	10,500	13.90	8,820				
10			13.49	8,000								
12	12.66	8,350	13.62	8,260	14.82	10,700	13.74	8,500	13.10	7,820	12.78	8,580

Supplemental record.- July 11, 3 p.m., 21.25 ft , 41,300 cfs, 5 p.m., 21.07 ft, 39,600 cfs; July 12, 1 a.m., 21.22 ft, 41,000 cfs, 9 p.m., 22.06 ft, 49,700 cfs.

Republican River at Milford, Kans.

Location.- Lat 39°10', long. 96°55', in SW¼ sec. 19, T. 10 S., R. 5 E., at bridge on state highway 82 on southwest boundary of Milford city limits, Geary county, Kansas.
Drainage area.- 24,900 square miles, of which 5,700 square miles is largely non-contributing.
Gage-height record.- Graph based on one or more daily wire-weight gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 39,000 cfs and extended to peak stage on basis of velocity-area study.
Maxima.- May-July 1951: Discharge, 62,900 cfs 12 m. July 12 (gage height, 19.70 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	4,700	2,790	9,740	11	1,250	7,200	45,000	21	4,660	22,000	6,620
2	4,800	4,380	3,500	12	1,230	10,100	54,900	22	4,100	33,900	8,100
3	2,660	14,600	3,080	13	1,190	6,680	46,300	23	9,300	31,200	8,190
4	2,260	9,850	2,690	14	1,150	5,820	35,800	24	10,800	20,800	7,820
5	2,050	5,920	2,360	15	1,120	11,200	30,500	25	6,680	11,600	5,840
6	1,760	4,800	2,390	16	3,920	6,320	19,300	26	4,960	10,000	5,610
7	1,590	9,960	2,280	17	3,130	4,700	14,100	27	4,120	11,300	4,320
8	1,440	18,900	1,980	18	1,600	3,520	12,500	28	3,570	16,500	3,700
9	1,390	18,000	3,330	19	3,550	3,090	12,200	29	3,040	12,900	3,640
10	1,320	11,000	29,200	20	4,640	3,300	7,940	30	3,230	7,220	5,050
								31	2,750		4,350
Monthly mean discharge, in second-feet									3,354	11,320	12,980
Runoff, in acre-feet									206,200	673,500	798,000
Runoff, in inches									0.15	0.51	0.60

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2			6.80	1,870	12.75	14,500			18.62	47,900		
4			6.77	1,840	13.95	19,200	18.17	43,200	18.82	50,600		
6			6.75	1,830	14.93	23,600			19.07	54,100	18.70	48,900
8			6.74	1,820	15.80	28,000	18.40	45,500	19.40	58,700		
10			6.73	1,810	16.63	32,700			19.68	62,600		
N	6.92	1,970	6.74	1,820	16.75	33,400	18.51	46,600	19.70	62,900	18.55	47,100
2			6.95	2,000	16.60	32,500			19.55	60,800		
4			7.75	2,750	16.60	32,500	18.48	46,300	19.29	57,200		
6			8.62	3,910	16.80	33,700			19.03	53,500	18.25	44,000
8			9.55	5,700	17.25	36,400	18.38	45,300	18.91	51,800		
10			10.55	8,180	17.63	38,700			18.84	50,900		
12	6.81	1,880	11.60	10,900	17.85	40,300	18.49	46,400	18.79	50,200	17.85	40,300
	July 14		July 15		July 16		July 17		July 18		July 19	
2									10.50	11,100		
4	17.55	38,200	16.75	33,500	13.92	21,400			10.39	10,800		
6							11.95	15,400	10.30	10,500	11.21	13,200
8	17.26	36,500	16.65	33,000	13.45	20,000			10.30	10,500		
10									10.50	11,100		
N	17.02	35,000	16.42	31,700	13.09	18,900	11.55	14,200	10.92	12,400	10.90	12,300
2									11.32	13,600		
4	16.86	34,100	15.96	29,400	12.80	18,000			11.54	14,200		
6							11.10	12,900	11.60	14,400	10.52	11,200
8	16.80	33,800	15.35	26,600	12.54	17,200			11.57	14,300		
10									11.53	14,200		
12	16.79	33,700	14.65	23,800	12.30	16,500	10.62	11,500	11.46	14,000	10.10	9,900
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4			8.53	5,980							8.65	6,280
6	9.68	8,850			9.34	8,000	9.45	8,280	9.38	8,100		
8			8.48	5,850							8.42	5,700
10												
N	9.28	7,850	8.53	5,980	9.43	8,220	9.41	8,180	9.35	8,020	8.35	5,550
2												
4			8.66	6,300							8.36	5,570
6	8.92	6,950			9.48	8,350	9.37	9,080	9.20	7,650		
8			8.87	8,820							8.39	5,630
10												
12	8.65	6,280	9.08	7,350	9.48	8,350	9.39	8,120	8.90	6,900	8.42	5,700

Kansas River at Ogden, Kans.

Location.- Lat 39°07', long. 96°42', in SW¼ sec. 12, T. 11 S., R. 6 E., three-quarters of a mile south of Ogden and 10 miles downstream from confluence of Smoky Hill and Republican Rivers. Datum of gage is 1,020.83 ft above mean sea level (levels by Corps of Engineers).

Drainage area.- 45,240 square miles.

Gage-height record.- Water-stage recorder graph except for periods May 1-5, 7-9, 11, 12, 14, 16-19, 21, July 18-25, 28-31, for which graph was drawn based on once or twice-daily wire-weight gage readings, and May 6, 10, 13, 15, 20, 10 a.m. July 13 to July 17, July 26, 27, when there was no gage-height record.

Discharge record.- Stage-discharge relation defined by current-meter measurements below 60,000 cfs and by slope-area measurement of peak discharge. Discharge for periods of no gage-height record computed on basis of records for station at Wamego and Big Blue River near Manhattan, supplemented for period 10 a.m. July 13 to July 17 by recession study and observed secondary peak stage on July 15.

Maxima.- May-July 1951: Discharge, 314,000 cfs 10 p.m. July 12 (gage height, 30.53 ft). 1917 to April 1951: Discharge, 170,000 cfs June 3, 1935 (gage height, 28.03 ft), from rating curve extended above 30,000 cfs on basis of velocity-area studies.

Flood in May 1903 reached a stage of about 28.5 ft, from information by Corps of Engineers.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	21,400	16,100	58,300	11	6,260	30,800	153,000	21	13,500	27,100	38,400
2	16,800	11,600	44,200	12	6,410	30,800	257,000	22	14,200	45,200	37,800
3	11,900	15,900	36,700	13	5,200	29,600	278,000	23	16,200	62,300	36,200
4	9,380	20,200	33,100	14	4,480	27,800	186,000	24	23,800	76,500	31,800
5	7,430	16,800	31,200	15	4,000	33,200	186,000	25	20,000	56,000	23,800
6	6,200	16,400	29,400	16	9,950	33,500	108,000	26	19,000	44,200	22,000
7	5,240	31,600	27,000	17	12,900	32,900	72,000	27	16,700	45,100	21,500
8	4,540	37,800	23,100	18	13,400	30,200	54,000	28	16,000	54,500	19,200
9	4,140	43,900	19,500	19	20,500	25,600	45,400	29	16,800	94,600	19,400
10	5,100	37,100	61,700	20	18,000	21,200	40,500	30	18,000	78,200	17,800
								31	17,700		17,000
Monthly mean discharge, in second-feet									12,520	37,560	65,450
Runoff, in thousands of acre-feet									769.8	2,235	4,024
Runoff, in inches									0.32	0.93	1.67

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					13.95	21,000	21.75	83,200	27.29	199,000	30.38	308,000
4			13.84	20,600	15.64	28,200	22.03	87,400	27.51	206,000	20.41	309,000
6					17.24	36,900	22.59	95,800	27.82	215,000	30.43	310,000
8			13.68	19,900	18.45	44,600	24.55	134,000	28.20	226,000	30.43	310,000
10					19.54	54,400	25.71	158,000	28.75	246,000	30.37	307,000
N	14.48	23,100	13.50	19,200	21.05	72,800	26.18	170,000	29.23	263,000		300,000
2					21.89	85,400	26.57	179,000	29.51	273,000		278,000
4			13.39	18,800	22.22	90,300	27.02	191,000	29.59	276,000		262,000
6					22.14	89,100	27.32	200,000	30.26	303,000		245,000
8			13.30	18,400	21.88	85,200	27.40	202,000	30.49	312,000		230,000
10					21.71	82,600	27.35	201,000	30.53	314,000		217,000
12	14.00	21,200	13.33	18,600	21.65	81,800	27.27	199,000	30.50	312,000		205,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4		186,000		228,000		125,000		80,000				
6									19.50	57,000	17.13	46,800
8		173,000		205,000		115,000		75,000				
10												
N		170,000		184,000		107,000		72,000	18.78	53,600	16.77	45,300
2												
4		176,000		165,000		99,000		67,500				
6									18.05	50,500	16.44	43,900
8		197,000		150,000		92,000		64,000				
10												
12		228,000		137,000		86,000	20.14	61,000	17.55	48,500	16.14	42,600
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4												
6	15.82	41,200	15.25	38,600	15.08	37,900	14.88	36,900	14.16	33,300	12.98	26,400
8												
10												
N	15.60	40,200	15.17	38,300	15.08	37,900	14.78	36,400	13.91	32,000	12.57	23,900
2												
4												
6	15.50	39,800	15.10	38,000	15.02	37,600	14.60	35,500	13.65	30,400	12.15	21,600
8												
10												
12	15.38	39,200	15.09	37,900	14.97	37,400	14.40	34,500	13.34	28,500	11.44	17,800

Supplemental records.- July 15, 2 a.m., 230,000 cfs.

Kansas River at Wamego, Kans.

Location.- Lat 39°12', long. 96°18', in SE¼ sec. 9, T. 10 S., R. 10 E., at Wamego, 3 miles downstream from Antelope Creek. Datum of gage is 953.51 ft above mean sea level, datum of 1929.
Drainage area.- 55,240 square miles.
Gage-height record.- Water-stage recorder graph except for period May 4, 7-10, May 12 to 3 p.m. May 16, for which a graph was drawn based on daily wire-weight gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 170,000 cfs and by slope-area and contracted-opening measurements of peak discharge.
Maxima.- May-July 1951: Discharge, 340,000 cfs 5:30 a.m. July 13 (gage height, 27.56 ft).
1919 to April 1951: Discharge, 177,000 cfs June 4, 1935 (gage height, 23.79 ft, from graph based on gage readings).
Flood in May 1903 reached a stage of 26.3 ft, determined by U. S. Weather Bureau from floodmarks.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	42,300	17,600	104,000	11	9,550	45,100	147,000	21	20,100	43,600	55,700
2	52,900	13,600	67,100	12	7,610	39,100	265,000	22	17,600	94,900	46,100
3	48,300	20,000	51,200	13	7,100	41,700	329,000	23	17,000	119,000	51,500
4	20,600	44,400	43,300	14	6,230	36,700	251,000	24	25,300	115,000	44,100
5	11,600	43,300	41,100	15	5,480	46,700	214,000	25	22,800	105,000	32,200
6	8,930	45,300	42,400	16	7,320	61,900	155,000	26	21,000	79,500	26,400
7	7,450	56,200	44,800	17	15,100	68,700	109,000	27	18,900	87,900	26,700
8	6,270	71,300	44,800	18	19,100	51,600	91,000	28	17,100	107,000	22,100
9	6,230	81,800	37,900	19	25,400	36,400	80,200	29	16,500	132,000	21,200
10	7,280	65,900	66,200	20	24,200	32,400	72,000	30	17,500	135,000	21,500
								31	18,300		23,500
Monthly mean discharge, in second-feet									17,780	64,620	84,740
Runoff, in thousands of acre-feet									1,093	3,845	5,211
Runoff, in inches									0.37	1.31	1.77

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					12.03	35,200	21.64	121,000	25.12	215,000		
4			13.35	43,100	13.03	41,200	21.98	127,000	25.41	226,000	27.55	339,000
6					13.88	46,300	22.20	131,000	25.63	236,000		
8			13.09	41,500	14.46	49,800	22.37	134,000	25.82	245,000	27.52	337,000
10					15.23	54,400	22.53	138,000	26.10	258,000		
N	13.65	44,900	12.63	38,800	16.23	60,600	22.65	141,000	26.24	266,000	27.47	334,000
2					17.18	67,900	22.80	144,000	26.39	273,000		
4			12.03	35,200	18.12	76,200	23.02	150,000	26.60	284,000	27.42	331,000
6					19.12	86,900	23.40	160,000	26.82	296,000		
8			11.45	31,700	20.00	97,500	23.84	172,000	27.03	308,000	27.20	318,000
10					20.66	106,000	24.31	186,000	27.15	315,000		
12	13.51	44,100	11.22	30,300	21.20	114,000	24.70	199,000	27.30	324,000	26.94	303,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4	26.58	283,000	25.37	225,000							17.96	81,700
6					23.85	172,000	21.21	114,000				
8	26.17	262,000	25.38	225,000							17.65	79,600
10												
N	25.80	244,000	25.25	220,000	23.16	154,000	20.62	107,000	19.07	90,600	17.45	78,200
2												
4	25.52	231,000	25.00	210,000							17.58	79,100
6					22.46	136,000	20.14	102,000				
8	25.30	222,000	24.72	200,000							17.75	80,200
10												
12	25.26	220,000	24.40	189,000	21.82	124,000	19.90	98,900	18.24	83,900	17.82	80,700
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4	17.63	79,400	14.70	59,000	12.96	48,300	12.89	47,900				
6									12.92	48,000	10.50	34,400
8	17.15	76,000	14.35	56,800	12.69	46,700	13.45	51,200				
10												
N	16.63	72,400	14.14	55,400	12.44	45,300	13.82	53,400	12.22	44,000	10.10	32,300
2												
4	16.06	68,400	14.02	54,600	12.31	44,500	13.92	54,000				
6									11.50	39,900	9.62	29,900
8	15.56	64,900	13.65	52,400	12.30	44,400	13.86	53,700				
10												
12	15.10	61,700	13.26	50,100	12.42	45,100	13.56	51,900	10.94	36,800	9.12	27,400

Supplemental record.- July 13, 5:30 a.m., 27.56 ft, 340,000 cfs; July 23, 6 p.m., 13.94 ft, 54,100 cfs.

Kansas River at Topeka, Kans.

Location.- Lat 39°04', long. 95°40', in SE¼ sec. 30, R. 16 E., T. 11 S. at Topeka Avenue bridge in Topeka, 2 miles upstream from Soldier Creek. Datum of gage is 854.08 ft above mean sea level, datum of 1929.

Drainage area.- 56,710 square miles.

Gage-height record.- Water-stage recorder graph except for periods May 6 to 1 p.m. May 18, May 28 to June 3, for which a graph was drawn based on once-daily wire-weight gage readings.

Discharge record.- Stage-discharge relation defined by current-meter measurements. Shifting-control method used May 6 to June 4, 1 a.m. to 5 a.m. July 12. Shifting-control corrections July 12 based on record of levee breaks.

Maxima.- May-July 1951: Discharge, 478,000 cfs 6:30 a.m. July 13 (gage height, 36.34 ft). 1917 to April 1951: Maximum discharge, 154,000 cfs June 5, 1935 (gage height, 26.65 ft, site and datum then in use).

Flood of May 30, 1903 reached a stage of 32.7 ft, from floodmarks, referred to U. S. Weather Bureau gage and datum 0.5 mile downstream. Flood in spring of 1844 is believed to have been higher, according to data of Corps of Engineers.

Remarks.- Dikes at Topeka first broke at 1:05 a.m. July 12, 1951, followed by general failure of dikes at 3 a.m. From time of failure through July 20, when Kansas River returned within banks at 21-ft stage, discharges below include flow of Soldier Creek.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	50,100	22,700	118,000	11	11,600	51,100	136,000	21	26,800	46,000	60,000
2	70,700	20,000	79,400	12	12,300	40,400	338,000	22	23,700	97,200	50,200
3	52,100	16,800	59,900	13	9,410	41,300	471,000	23	21,400	121,000	48,900
4	36,000	35,900	49,700	14	9,080	39,200	414,000	24	24,200	116,000	49,800
5	18,800	42,800	53,200	15	7,760	46,800	321,000	25	30,200	105,000	38,600
6	14,000	42,600	59,500	16	7,460	58,600	269,000	26	24,600	106,000	30,100
7	11,000	51,100	56,400	17	15,500	60,700	178,000	27	23,700	98,800	30,100
8	9,250	63,400	47,900	18	22,300	58,600	114,000	28	21,800	96,900	25,800
9	8,450	70,800	44,500	19	30,600	42,400	86,000	29	19,800	116,000	22,700
10	13,100	69,300	60,300	20	35,300	34,500	76,400	30	20,600	134,000	21,700
								31	22,600		23,300
Monthly mean discharge, in second-feet									22,720	64,860	110,800
Runoff, in thousands of acre-feet									1,397	3,860	6,810
Runoff, in inches									0.46	1.28	2.25

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					15.91	40,500	25.97	106,000	31.04	179,000	36.23	473,000
4			17.18	46,200	15.94	40,600	26.85	114,000	31.40	235,000	36.29	476,000
6					16.35	42,500	27.90	126,000	31.71	248,000	36.33	478,000
8			17.08	45,800	17.27	46,600	28.79	136,000	32.49	280,000	36.32	477,000
10					18.40	51,900	29.29	142,000	33.30	320,000	36.28	476,000
N	17.55	47,900	16.95	45,200	19.53	57,200	29.14	141,000	33.93	354,000	36.28	476,000
2					20.60	62,400	29.13	141,000	34.46	386,000	36.19	472,000
4			16.70	44,000	21.58	67,300	29.44	144,000	34.85	408,000	36.22	473,000
6					22.57	74,100	29.93	150,000	35.17	425,000	36.12	468,000
8			16.33	42,400	23.50	82,500	30.16	153,000	35.55	443,000	36.04	465,000
10					24.27	89,400	30.32	155,000	35.85	456,000	35.90	458,000
12	17.25	46,600	15.94	40,600	25.00	96,000	30.36	156,000	36.08	467,000	35.77	453,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	35.70	450,000										
4	35.58	444,000	33.60	336,000	32.90	298,000	30.45	207,000	26.75	127,000	23.81	92,300
6	35.45	438,000										
8	35.36	434,000	33.30	320,000	32.60	285,000	29.89	191,000	26.27	120,000	23.42	88,900
10	35.25	429,000										
N	35.12	422,000	33.20	314,000	32.31	272,000	29.27	176,000	25.74	113,000	22.96	85,200
2	34.92	412,000										
4	34.75	403,000	33.18	313,000	31.90	254,000	28.71	163,000	25.20	106,000	22.60	82,300
6	34.52	389,000										
8	34.34	378,000	33.16	312,000	31.44	238,000	28.03	149,000	24.75	101,000	22.27	79,700
10	34.14	366,000										
12	33.91	353,000	33.10	308,000	30.95	222,000	27.35	137,000	24.28	96,500	22.20	79,100
	July 20		July 21		July 22		July 23		July 24		July 25	
2									18.00	53,300		
4	22.24	79,400			18.10	53,800	16.58	46,500	17.98	53,200		
6			19.84	62,700					17.90	52,800	15.42	40,900
8	22.30	79,900			17.62	51,500	16.65	46,800	17.77	52,200		
10									17.59	51,300		
N	22.14	78,600	19.16	59,100	17.24	49,700	16.89	48,000	17.40	50,400	14.88	38,300
2									17.20	49,500		
4	21.77	75,700			16.99	48,500	17.38	50,300	16.97	48,400		
6			18.69	56,800					16.72	47,200	14.43	36,200
8	21.24	71,700			16.72	47,200	17.77	52,200	16.48	46,000		
10									16.22	44,800		
12	20.63	67,400	18.35	55,000	16.59	46,500	17.98	53,200	15.99	43,700	14.00	34,100

Supplemental records.- July 12, 1 a.m., 30.72 ft, 160,000 cfs, 3 a.m., 31.31 ft, 230,000 cfs, 5 a.m., 31.50 ft, 240,000 cfs; July 13, 6:30 a.m., 36.34 ft, 478,000 cfs.

Kansas River at Lecompton, Kans.

Location.- Lat 39°03', long. 95°24', in NE¼ sec. 34, T. 11 S., R. 18 E., at Lecompton, half a mile downstream from Delaware River. Datum of gage is 821.26 ft above mean sea level, datum of 1929.
Drainage area.- 58,420 square miles.
Gage-height record.- Graph drawn on basis of one to eight daily readings of gage, with the more frequent readings at high stages. Wire-weight gage used except for periods June 23 to 12 m. June 24, July 13 to 8 a.m., July 17, when an improvised staff gage was used.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 120,000 cfs and by slope-area measurement of peak discharge.
Maxima.- May-July 1951: Discharge, 483,000 cfs 4 p.m. July 13 (gage height, 30.23 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	65,200	22,300	178,000	11	14,500	55,000	188,000	21	29,100	50,800	58,800
2	106,000	20,800	109,000	12	14,400	41,800	320,000	22	25,800	150,000	48,300
3	63,700	17,300	64,200	13	11,100	41,900	476,000	23	22,500	213,000	44,300
4	45,600	28,200	52,700	14	10,100	39,800	413,000	24	22,200	194,000	47,800
5	22,900	43,300	57,400	15	8,820	49,600	333,000	25	26,200	146,000	37,200
6	16,700	42,700	81,400	16	8,140	66,300	293,000	26	26,000	167,000	29,900
7	13,500	51,000	78,600	17	12,600	64,300	214,000	27	24,300	166,000	28,800
8	11,300	69,200	56,800	18	21,600	63,600	144,000	28	22,100	145,000	26,400
9	10,400	82,400	45,300	19	33,000	44,300	103,000	29	20,900	170,000	23,100
10	14,700	82,400	52,500	20	44,200	36,000	77,900	30	20,700	189,000	22,300
								31	21,900		22,600
Monthly mean discharge, in second-feet									26,130	85,100	120,200
Runoff, in thousands of acre-feet									1,607	5,064	7,393
Runoff, in inches									0.52	1.63	2.37

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2							19.48	98,700	25.36	249,000		
4					13.45	43,500	20.50	116,000	25.40	251,000	30.08	474,000
6			13.98	46,700			21.46	136,000	25.48	254,000		
8					13.59	44,300	22.41	159,000	25.62	260,000	30.14	478,000
10							23.39	187,000	25.88	270,000		
N	15.42	56,100	13.66	44,800	14.00	46,800	24.28	213,000	26.74	307,000	30.21	482,000
2							24.67	225,000	27.20	330,000		
4					14.82	52,000	24.90	232,000	27.60	350,000	30.23	483,000
6			13.47	43,600			25.04	237,000	27.82	361,000		
8					16.49	63,900	25.14	241,000	28.45	392,000	30.10	476,000
10							25.22	244,000	29.70	455,000		
12	14.38	49,200	13.42	43,300	18.48	85,800	25.30	247,000	28.92	466,000	29.86	463,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	29.68	454,000	27.57	348,000	26.85	312,000			22.54	163,000		
4	29.53	446,000	27.46	343,000	26.83	312,000	25.10	239,000	22.30	156,000		
6	29.40	440,000	27.40	340,000	26.80	310,000			22.08	150,000	20.46	115,000
8	29.35	438,000	27.43	342,000	26.76	308,000	24.83	230,000	21.93	146,000		
10	29.08	424,000	27.46	343,000	26.68	304,000			21.90	146,000		
N	28.92	416,000	27.28	334,000	26.61	300,000	24.45	218,000	21.84	144,000	19.80	103,000
2	28.66	403,000	27.16	328,000	26.48	294,000			21.67	140,000		
4	28.54	397,000	27.10	325,000	26.34	289,000	23.98	204,000	21.58	136,000		
6	28.40	390,000	27.05	322,000	26.18	282,000			21.50	136,000	18.98	91,800
8	28.08	374,000	26.98	319,000	25.85	269,000	23.38	186,000	21.38	134,000		
10	27.88	364,000	26.92	316,000	25.56	257,000			21.22	130,000		
12	27.70	355,000	26.88	314,000	25.37	250,000	22.80	170,000	21.04	126,000	18.12	81,400
	July 20		July 21		July 22		July 23		July 24		July 25	
2	18.00	80,000	17.03	69,300			13.28	42,500	14.58	50,500		
4	17.98	79,800	16.78	66,800	14.95	52,900	13.27	42,400	14.62	50,800		
6	17.99	79,900	16.46	63,600			13.29	42,500	14.59	50,600		
8	17.99	79,900	15.94	59,600	14.47	49,800	13.33	42,800	14.44	49,600		
10	17.96	79,600	15.40	55,900			13.37	43,000	14.32	49,200		
N	17.88	78,700	15.14	54,200	14.16	47,800	13.43	43,400	14.28	48,600	12.25	36,600
2	17.82	78,000	15.12	54,000			13.52	43,900	14.16	47,800		
4	17.77	77,500	15.18	54,400	13.89	46,100	13.60	44,400	14.00	46,800		
6	17.70	76,700	15.24	54,800			13.74	45,200	13.82	45,700		
8	17.56	75,200	15.23	55,100	13.62	44,500	13.99	46,700	13.62	44,500		
10	17.40	73,400	15.27	55,000			14.21	48,100	13.44	43,400		
12	17.22	71,400	15.22	54,700	13.36	43,000	14.49	49,900	13.28	42,500	11.58	33,000

Kansas River at Bonner Springs, Kans.

Location.- Lat 39°03', long. 94°52', NE¼ sec. 32, T. 11 S., R. 23 E., at Bonner Springs, half a mile downstream from Wolf Creek. Datum of gage is 747.01 ft above mean sea level, datum of 1929.
Drainage area.- 59,890 square miles.
Gage-height record.- Water-stage recorder graph except for periods May 6-18, 23, 24, May 27 to June 4, 7 a.m. July 13 to 5 p.m. July 17, for which a graph was drawn based on a floodmark, generally twice-daily wire-weight gage readings, and frequent staff-gage readings July 13, 14.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 230,000 cfs and by slope-area measurement of peak discharge. Shifting-control method used May 1-5, 19-28.
Maxima.- May-July 1951: Discharge, 510,000 cfs 12 p.m. July 13 (gage height, 38.58 ft). 1917 to April 1951: Discharge, 147,000 cfs June 18, 1943 (gage height, 25.23 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	43,200	22,000	169,000	11	21,400	63,900	132,000	21	34,000	37,700	72,900
2	107,000	21,200	143,000	12	16,400	46,200	241,000	22	28,900	82,700	55,600
3	88,200	19,200	90,700	13	14,700	39,600	441,000	23	25,000	138,000	47,900
4	55,500	19,600	69,300	14	12,300	41,100	486,000	24	22,600	171,000	52,200
5	32,100	40,800	66,300	15	11,400	39,600	382,000	25	28,000	155,000	43,700
6	21,200	41,600	95,200	16	10,200	64,800	299,000	26	29,000	140,000	34,300
7	16,800	48,500	100,000	17	9,640	63,500	247,000	27	25,000	154,000	29,500
8	14,200	65,800	80,200	18	19,000	65,800	175,000	28	23,400	158,000	29,800
9	13,400	75,300	58,500	19	26,900	52,900	126,000	29	21,600	151,000	25,000
10	20,100	77,600	55,800	20	48,200	40,700	92,000	30	20,200	162,000	22,900
								31	21,300		22,400
Monthly mean discharge, in second-feet									28,410	76,640	128,600
Runoff, in thousands of acre-feet									1,747	4,560	7,905
Runoff, in inches									0.55	1.43	2.48

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2												
4					13.72	52,200	18.97	97,200	26.68	198,000	34.37	371,000
6	18.30	90,500										
8					13.63	51,600	21.33	123,000	28.20	225,000	35.94	418,000
10												
N	17.23	80,600	14.64	58,700	13.65	51,800	22.64	139,000	29.30	246,000	37.13	458,000
2												
4					13.97	54,000	23.62	151,000	29.81	256,000	37.84	483,000
6	15.99	69,400										
8					14.97	61,300	24.26	160,000	30.61	273,000	38.36	502,000
10												
12	15.21	63,200	13.90	53,500	16.47	73,700	25.20	173,000	32.56	321,000	38.58	510,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4	38.53	508,000										
6			35.78	413,000	32.09	308,000	30.22	265,000	26.41	193,000	22.25	134,000
8	38.37	502,000										
10												
N	38.08	492,000	34.76	382,000	31.67	298,000	29.37	247,000	25.26	174,000	21.57	126,000
2												
4	37.69	477,000										
6			33.60	349,000	31.27	288,000	28.47	230,000	24.08	157,000	20.80	117,000
8	37.23	461,000										
10												
12	36.71	443,000	32.69	324,000	30.82	278,000	27.47	211,000	23.08	144,000	19.89	107,000
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4												
6	18.86	96,100	17.12	79,600	14.56	58,100	13.19	48,500	13.70	52,100	12.96	46,900
8												
10												
N	18.24	89,900	16.33	72,500	14.20	55,600	13.00	47,200	13.97	54,000	12.42	43,200
2												
4												
6	17.86	86,200	15.60	66,300	13.83	53,000	12.99	47,100	13.88	53,400	11.93	40,200
8												
10												
12	17.66	84,400	15.02	61,700	13.41	50,100	13.07	47,700	13.50	50,700	11.57	38,000

White Rock Creek at Lovewell, Kans.

Location.- Lat 39°53', long. 97°59', in SW¼ sec. 15, T. 2 S., R. 6 W., on county bridge half a mile northwest of Lovewell, Kans.
Drainage area.- 358 square miles.
Gage-height record.- Graph drawn on basis of wire-weight gage readings made generally three times daily, more frequently during high stages.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 5,200 cfs and extended to peak stage on basis of logarithmic plotting and current-meter measurements made in 1950 about 7 miles upstream at State Highway 14 bridge.
Maxima.- May-July 1951: Discharge, 26,600 cfs 7:30 p.m. June 7 (gage height, 21.40 ft). 1946 to April 1951: Discharge, 23,300 cfs July 10, 1950 (gage height, 21.62 ft, site and datum then in use).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	558	84	119	11	16	290	2,390	21	459	1,310	160
2	312	1,540	108	12	16	261	5,630	22	468	1,860	223
3	103	2,080	89	13	15	387	4,270	23	466	1,620	363
4	47	723	72	14	16	413	1,500	24	198	724	455
5	25	176	59	15	25	365	350	25	102	247	153
6	20	168	57	16	20	190	252	26	54	204	106
7	18	10,200	53	17	53	122	198	27	27	177	130
8	17	6,280	46	18	190	111	192	28	21	151	1,080
9	17	1,380	34	19	162	88	200	29	70	129	358
10	17	484	574	20	79	84	210	30	201	128	163
								31	192		87
Monthly mean discharge, in second-feet									129	1,066	635
Runoff, in acre-feet									7,902	63,420	39,040
Runoff, in inches									0.41	3.32	2.04

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					4.64	30	16.00	2,040	17.23	2,380		
4					4.64	30	16.59	2,170	17.29	2,410		
6					4.65	30	16.93	2,270	17.52	2,500	19.33	4,770
8					4.77	42	17.18	2,360	18.18	2,950		
10					5.50	122	17.35	2,430	18.90	3,710		
N	4.81	46	4.69	33	6.80	266	17.52	2,500	19.35	4,840	18.84	3,630
2					8.12	435	17.63	2,570	19.72	6,750		
4					9.75	674	17.68	2,600	20.00	8,790		
6					11.75	1,040	17.68	2,600	20.12	9,820	18.51	3,260
8					13.80	1,520	17.55	2,520	20.08	9,470		
10					14.65	1,730	17.40	2,450	20.00	8,790		
12	4.76	41	4.64	30	15.40	1,920	17.28	2,400	19.88	7,860	18.21	2,980
	July 14		July 15		July 16		July 17		July 18		July 19	
2	18.06	2,860										
4	17.80	2,670										
6	17.45	2,470	7.65	372			6.10	188			6.00	177
8	16.50	2,140										
10	14.00	1,560										
N	12.10	1,110	7.38	337	6.66	250	6.13	191	6.13	191	6.19	198
2	11.05	900										
4	10.25	754										
6	9.65	658	7.18	312			6.21	200			6.39	220
8	9.20	590										
10	8.75	523										
12	8.35	467	6.98	288	6.37	218	6.25	204	6.05	182	6.50	232
	July 20		July 21		July 22		July 23		July 24		July 25	
2							6.83	270	10.00	714		
4					5.68	142	6.64	247	9.55	642		
6	6.46	228					6.50	232	9.06	569	6.02	179
8					5.91	167	6.37	218	8.77	526		
10							6.33	213	8.69	515		
N	6.29	209	5.84	159	6.41	222	6.37	218	8.63	506	5.83	158
2							6.90	278	8.30	460		
4					6.87	274	7.70	379	7.20	314		
6	6.17	196					8.50	488	6.84	271	5.63	136
8					7.22	317	9.27	600	6.61	244		
10							9.90	698	6.46	228		
12	6.06	184	5.65	138	7.03	294	10.10	730	6.31	211	5.00	67

Smoky Hill River near Russell, Kans.

Location.- Lat 38°47', long. 98°51', in NW¼ sec. 2, T. 15 S., R. 14 W., a quarter of a mile upstream from Landon Creek and 7.7 miles south of Russell. Datum of gage is 1,689.74 ft above mean sea level, datum of 1929.
Drainage area.- 6,965 square miles.
Gage-height record.- Water-stage recorder graph, except for period 4 p.m. May 22 to 7 a.m. May 23, for which graph was drawn based on gage readings around peak.
Discharge record.- Stage-discharge relation defined by current-meter measurements.
Maxima.- May-July 1951: Discharge, 39,500 cfs 6:30 p.m. May 23(gage height, 23.26 ft).
1939 to April 1951: Discharge,22,300 cfs June 18, 1942 (gage height, 18.70 ft).
The flood of May 30,1938 reached a stage of 30.3 ft (discharge not determined) from information by nearby resident.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	205	701	3,660	11	91	2,230	2,440	21	971	1,540	1,360
2	139	2,870	2,830	12	91	3,210	5,670	22	15,900	9,080	1,450
3	111	4,560	2,470	13	93	2,070	4,690	23	14,700	15,700	3,040
4	105	2,430	2,330	14	105	5,280	2,710	24	4,710	10,300	2,610
5	101	1,280	2,240	15	744	6,430	2,090	25	2,520	6,900	1,740
6	93	4,650	2,140	16	635	2,700	1,820	26	1,720	3,260	1,580
7	88	10,800	2,070	17	435	1,520	1,680	27	1,240	2,490	1,590
8	86	5,740	2,040	18	560	1,260	1,580	28	1,010	4,480	1,500
9	88	3,330	1,940	19	635	1,130	1,500	29	881	3,110	1,440
10	100	3,810	1,880	20	641	845	1,430	30	809	5,730	1,400
								31	743		1,730
Monthly mean discharge, in second-feet									1,624	4,415	2,215
Runoff, in acre-feet									99,870	262,700	136,200
Runoff, in inches									0.27	0.71	0.37

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2							6.43	1,840	10.94	5,230	12.11	6,350
4	6.93	2,080	6.68	1,960	6.57	1,900	6.44	1,840	10.94	5,230	11.74	5,980
6							6.45	1,840	10.66	4,970	11.23	5,490
8	6.93	2,080	6.66	1,950	6.56	1,900	6.47	1,860	10.56	4,880	10.71	5,020
10							6.50	1,870	10.90	5,190	10.27	4,630
N	6.86	2,050	6.66	1,950	6.54	1,890	6.70	1,970	11.21	5,470	9.96	4,370
2							7.08	2,160	11.54	5,780	9.72	4,160
4	6.77	2,000	6.63	1,940	6.43	1,840	7.36	2,330	11.69	5,930	9.55	4,020
6							7.81	2,630	12.04	6,280	9.41	3,900
8	6.73	1,980	6.59	1,920	6.46	1,850	8.87	3,460	12.41	6,650	9.23	3,750
10							9.76	4,200	12.42	6,660	9.10	3,640
12	6.69	1,960	6.58	1,910	6.44	1,840	10.50	4,830	12.28	6,520	8.93	3,500
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4	8.56	3,210	7.06	2,150	6.54	1,890	6.18	1,710	5.97	1,600		
6												
8	8.20	2,920	7.08	2,160	6.48	1,860	6.18	1,710	5.94	1,590	5.79	1,520
10												
N	7.83	2,640	7.04	2,140	6.42	1,830	6.14	1,690	5.93	1,590		
2												
4	7.51	2,420	6.90	2,070	6.34	1,790	6.09	1,660	5.91	1,580	5.73	1,480
6												
8	7.26	2,270	6.76	2,000	6.26	1,750	6.04	1,640	5.88	1,560		
10												
12	7.06	2,150	6.63	1,940	6.20	1,720	6.00	1,620	5.81	1,520	5.69	1,460
	July 20		July 21		July 22		July 23		July 24		July 25	
2							6.46	1,850	8.81	3,410		
4					5.49	1,360	6.93	2,080	8.56	3,210	6.49	1,860
6							7.44	2,380	8.31	3,010		
8					5.53	1,380	7.84	2,650	8.07	2,820	6.32	1,790
10							8.19	2,910	7.85	2,660		
N	5.65	1,440	5.48	1,360	5.58	1,410	8.58	3,220	7.67	2,530	6.19	1,720
2							8.97	3,540	7.45	2,380		
4					5.70	1,470	9.24	3,750	7.27	2,270	6.07	1,660
6							9.32	3,820	7.08	2,160		
8					5.90	1,570	9.37	3,860	6.93	2,080	5.99	1,620
10							9.24	3,750	6.81	2,020		
12	5.52	1,380	5.40	1,320	6.21	1,720	9.07	3,620	6.70	1,970	5.97	1,600

Supplemental records.- July 12, 3 a.m., 11.00 ft, 5,280 cfs; July 12, 9 p.m., 12.47 ft, 6,720 cfs.

Smoky Hill River at Ellsworth, Kans.

Location.- Lat 38°44', long. 98°14', in SE¼ sec. 20, T. 15 S., R. 8 W., at bridge on State Highway 14 in Ellsworth, 2 miles downstream from Turkey Creek.
Drainage area.- 7,580 square miles.
Gage-height record.- Water-stage recorder graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements.
Maxima.- May-July 1951: Discharge, 30,000 cfs 9:15 p.m. May 23 (gage height, 24.12 ft). 1895-1905, 1918-25, 1928 to April 1951: Discharge, 61,000 cfs June 1, 1938 (gage height, 27.2 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	666	996	5,720	11	390	3,780	7,400	21	3,010	9,930	1,540
2	410	4,450	3,870	12	206	2,860	11,600	22	4,740	6,980	1,490
3	285	4,740	3,380	13	154	3,400	11,100	23	15,600	11,800	1,780
4	194	4,300	2,950	14	152	3,610	5,330	24	18,100	19,200	3,480
5	154	2,270	2,680	15	595	7,470	3,110	25	4,440	12,500	2,460
6	138	4,820	2,540	16	1,180	6,030	2,500	26	2,800	7,060	1,820
7	124	18,300	2,400	17	1,390	2,630	2,090	27	1,900	4,180	1,690
8	115	13,500	2,330	18	924	1,790	1,870	28	1,480	4,190	1,660
9	165	5,930	2,240	19	762	1,520	1,740	29	1,260	7,230	1,540
10	833	3,980	2,130	20	728	1,320	1,630	30	1,140	7,320	1,480
								31	1,070		2,050
Monthly mean discharge, in second-feet									2,100	6,270	3,213
Runoff, in acre-feet									129,100	373,100	197,600
Runoff, in inches									0.32	0.92	0.49

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2							7.73	2,580	17.21	9,990		
4			7.12	2,270			8.30	2,910	17.01	9,810	18.94	12,400
6					6.94	2,180	9.77	3,830	16.76	9,580		
8			7.06	2,240			12.45	5,760	16.90	9,710	18.55	11,600
10							14.13	7,220	17.30	10,100		
N	7.25	2,340	6.99	2,200	6.82	2,120	15.13	8,120	18.00	10,700	18.17	10,900
2							16.52	9,370	18.78	12,100		
4			7.07	2,240			18.13	10,800	19.40	13,300	17.90	10,600
6					6.75	2,080	18.18	10,900	19.83	14,300		
8			7.07	2,240			17.85	10,600	19.80	14,200	17.38	10,100
10							17.67	10,400	19.70	14,000		
12	7.18	2,300	7.00	2,210	6.78	2,100	17.43	10,200	19.48	13,500	16.05	8,940
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4	13.76	6,880										
6			9.00	3,330	7.87	2,650	6.97	2,200	6.48	1,950		
8	12.00	5,400										
10												
N	11.22	4,820	8.46	3,010	7.55	2,480	6.77	2,100	6.39	1,900	6.06	1,740
2												
4	10.68	4,440										
6			8.17	2,830	7.31	2,360	6.65	2,040	6.27	1,840		
8	10.14	4,070										
10												
12	9.68	3,770	8.07	2,770	7.11	2,260	6.08	1,750	6.20	1,810	5.92	1,670
	July 20		July 21		July 22		July 23		July 24		July 25	
2	5.90	1,660					5.67	1,560	8.18	2,840		
4	5.88	1,660					5.72	1,580	8.64	3,110	8.19	2,840
6	5.86	1,650					5.75	1,600	9.11	3,400		
8	5.83	1,630					5.78	1,610	9.50	3,660	7.75	2,580
10	5.81	1,620					5.82	1,630	9.73	3,800		
N	5.78	1,610	5.62	1,540	5.48	1,480	5.87	1,650	9.85	3,880	7.37	2,400
2	5.85	1,640					5.95	1,690	9.87	3,900		
4	5.80	1,620					6.10	1,760	9.75	3,820	7.05	2,240
6	5.78	1,610					6.31	1,860	9.57	3,700		
8	5.77	1,610					6.65	2,040	9.28	3,510	6.82	2,120
10	5.75	1,600					7.16	2,290	9.00	3,330		
12	5.73	1,590	5.48	1,480	5.58	1,520	7.68	2,550	8.72	3,160	6.62	2,020

Supplemental records.- July 11, 5 p.m., 18.32 ft, 11,100 cfs; July 12, 7 p.m., 19.87 ft, 14,400 cfs; July 20, 1 p.m., 5.77 ft, 1,610 cfs.

Kanopolis Reservoir near Kanopolis, Kans.

Location.- Lat 38°37', long. 97°58', in NE¼ sec. 3, T. 17 S., R. 6 W., in shaft of control tower at dam on Smoky Hill River, 12 miles southeast of Kanopolis, 25 miles southwest of Salina, 207.8 miles above the mouth of the Smoky Hill River. Datum of gage is at mean sea level, adjustment of 1929.
Drainage area.- 7,857 square miles.
Gage-height record.- Water-stage recorder graph.
Maxima.- May-July 1951: Contents, 434,000 acre-feet July 14 (elevation, 1,506.90 ft).
1948 to April 1951: Contents, 248,400 acre-feet Sept. 1, 2, 1950 (elevation, 1,491.03 ft).
Remarks.- Reservoir is formed by earth-fill dam; dam completed in 1948. Capacity, 450,000 acre-feet between elevation 1415 (sill of outlet gate) and 1508 ft. Crest of uncontrolled spillway is at elevation 1507 ft. Storage capacity of 397,000 acre-feet above elevation 1459 ft is provided for flood control. Storage capacity of 53,000 acre-feet below elevation 1459 ft is provided for conservation and recreation. Elevations and contents furnished by Corps of Engineers.

Elevation, in feet, and contents, in acre-feet, at 12 p.m. of indicated day

Day	May		June		July	
	Elevation	Acre-feet	Elevation	Acre-feet	Elevation	Acre-feet
1	1,459.34	54,280	1,474.32	124,000	1,503.10	381,400
2	1,459.57	55,140	1,474.12	128,600	1,502.99	380,000
3	1,459.70	55,630	1,476.14	135,100	1,502.95	379,500
4	1,459.78	55,930	1,477.24	142,200	1,502.69	376,000
5	1,459.83	56,120	1,477.65	144,800	1,502.51	373,700
6	1,459.86	56,240	1,478.89	152,800	1,502.04	367,500
7	1,459.84	56,160	1,483.73	187,100	1,501.67	362,700
8	1,459.60	55,260	1,486.90	212,400	1,501.31	358,000
9	1,459.73	55,740	1,488.32	224,400	1,500.91	352,700
10	1,460.75	59,600	1,488.90	229,200	1,500.55	348,000
11	1,460.87	60,040	1,489.54	234,600	1,502.74	376,700
12	1,460.72	59,490	1,489.86	237,300	1,505.55	414,300
13	1,460.53	58,760	1,490.64	244,600	1,506.87	433,500
14	1,460.45	58,460	1,491.06	248,700	1,506.90	434,000
15	1,460.34	58,040	1,492.20	259,600	1,506.60	429,600
16	1,460.63	59,140	1,493.30	270,200	1,506.22	424,000
17	1,461.78	63,500	1,493.58	272,900	1,505.73	416,900
18	1,462.15	64,910	1,493.50	272,100	1,505.18	408,900
19	1,462.27	65,370	1,493.07	268,000	1,504.92	405,200
20	1,462.35	65,670	1,492.58	263,300	1,504.65	401,700
21	1,463.40	69,770	1,494.25	279,300	1,504.59	400,900
22	1,465.50	78,720	1,495.84	295,600	1,504.54	400,300
23	1,470.05	100,100	1,497.45	313,100	1,504.53	400,100
24	1,475.50	131,000	1,499.75	338,100	1,504.70	402,400
25	1,476.95	140,300	1,501.37	358,800	1,504.86	404,500
26	1,477.01	140,700	1,501.90	365,700	1,504.77	403,300
27	1,476.85	139,700	1,501.86	365,200	1,504.57	400,700
28	1,476.40	136,800	1,501.95	366,400	1,504.35	397,800
29	1,475.75	132,600	1,502.43	372,600	1,504.11	394,600
30	1,475.00	127,800	1,502.87	378,400	1,503.85	391,200
31	1,474.68	126,000			1,503.64	388,500

Smoky Hill River near Langley, Kans.

Location.- Lat 38°37', long. 97°57', in SE¼ sec. 35, T. 16 S., R. 6 W., half a mile below Kanopolis Dam, 1½ miles west of Ellsworth-McPherson county line, 3 miles downstream from Bluff Creek, and 5 miles north of Langley.
Drainage area.- 7,857 square miles.
Gage-height record.- Water-stage recorder graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements.
Maxima.- May-July 1951: Discharge, 5,570 cfs 8 a.m. July 15 (gage height, 15.29 ft).
1941 to April 1951: Discharge, 17,200 cfs Oct. 20, 1941 (gage height, 23.47 ft).
Remarks.- Flow regulated by Kanopolis Reservoir(see page 30).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	153	1,860	4,560	11	434	980	1,970	21	515	2,100	1,790
2	65	1,360	4,550	12	431	984	2,240	22	371	1,140	1,720
3	65	866	4,050	13	427	987	3,210	23	302	1,040	1,670
4	66	872	4,550	14	420	1,000	5,250	24	717	2,500	1,660
5	67	875	4,620	15	416	1,000	5,550	25	1,340	3,900	1,650
6	68	890	4,610	16	420	1,010	5,530	26	2,390	4,120	2,100
7	166	990	4,590	17	494	1,010	5,370	27	2,400	4,120	2,960
8	407	956	4,620	18	484	1,760	4,810	28	2,690	4,130	2,970
9	405	971	4,600	19	489	3,500	4,790	29	3,280	4,170	3,030
10	429	977	4,590	20	491	3,480	3,540	30	3,250	4,360	3,020
								31	2,700		3,290
Monthly mean discharge, in second-feet									850	1,930	3,660
Runoff, in acre-feet									52,270	114,900	225,000
Runoff, in inches									0.12	0.27	0.54

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2							9.63	2,770	6.30	1,330	6.43	1,380
4	13.14	4,600					6.45	1,380	6.55	1,420	6.39	1,360
6			13.15	4,610	13.11	4,590	6.32	1,340	6.65	1,450	6.37	1,350
8	13.21	4,630					6.85	1,520	7.75	1,890	6.35	1,350
10							7.60	1,820	9.35	2,620	10.08	3,010
N	13.19	4,630	13.13	4,600	13.10	4,580	7.95	1,980	10.50	3,240	11.53	3,830
2							8.72	2,320	11.79	3,970	11.68	3,910
4	13.18	4,620					8.34	2,150	10.88	3,450	13.58	4,800
6			13.12	4,590	13.10	4,580	7.48	1,770	9.43	2,660	13.83	4,910
8	13.18	4,620					6.85	1,720	7.95	1,980	13.87	4,930
10							6.50	1,400	6.98	1,570	13.87	4,930
12	13.18	4,620	13.11	4,590	13.14	4,600	6.34	1,340	6.57	1,420	13.88	4,940
	July 14		July 15		July 16		July 17		July 18		July 19	
2	13.88	4,940					15.18	5,520				
4	13.88	4,940	15.17	5,520			15.17	5,520				
6	13.87	4,930			15.23	5,540	15.16	5,510	13.60	4,810	13.57	4,800
8	13.86	4,930	15.29	5,570			15.16	5,510				
10	13.85	4,920					15.15	5,510				
N	15.08	5,480	15.25	5,550	15.20	5,530	15.12	5,490	13.60	4,810	13.55	4,790
2	15.18	5,520					15.10	5,480				
4	15.21	5,530	15.24	5,550			15.08	5,480				
6	15.22	5,540			15.18	5,520	15.07	5,470	13.58	4,800	13.54	4,780
8	15.21	5,530	15.25	5,550			13.90	4,940				
10	15.20	5,530					13.73	4,870				
12	15.19	5,530	15.25	5,550	15.18	5.520	13.67	4,840	13.58	4,800	13.53	4,780
	July 20		July 21		July 22		July 23		July 24		July 25	
2	13.53	4,780										
4	13.53	4,780										
6	13.53	4,780	7.55	1,800	7.46	1,760	7.25	1,680				
8	13.52	4,770										
10	13.51	4,770										
N	13.50	4,760	7.52	1,790	7.30	1,700	7.23	1,670	7.19	1,660	7.17	1,650
2	9.40	2,650										
4	7.78	1,900										
6	7.60	1,820	7.48	1,770	7.25	1,680	7.21	1,660				
8	7.57	1,810										
10	7.57	1,810										
12	7.56	1,800	7.47	1,770	7.25	1,680	7.20	1,660	7.17	1,650	7.15	1,640

Supplemental records.- July 8, 6 a.m., 13,20 ft, 4,630 cfs; July 11, 1 a.m., 13.15 ft, 4,610 cfs; July 12, 3 a.m., 6.30 ft, 1,330 cfs; July 12, 5 a.m. 6.53 ft, 1,410 cfs; July 13, 9 a.m., 6.35 ft, 1,350 cfs; July 15, 5 a.m., 15.28 ft, 5,570 cfs; July 20, 1 p.m., 13.50 ft, 4,760 cfs; July 22, 10 a.m., 7.45 ft, 1,760 cfs; July 22, 11 a.m., 7.14 ft, 1,640 cfs.

Smoky Hill River at Lindsborg, Kans.

Location.- Lat 38°34', long. 97°40', in SE¼ sec. 17, T. 17 S., R. 3 W., at bridge 300 ft downstream from mill dam in Lindsborg. Datum of gage is 1,297.19 ft above mean sea level, datum of 1929.
Drainage area.- 8,110 square miles.
Gage-height record.- Water-stage recorder graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 4,500 cfs, by shape of previous discharge rating curve above, and by slope-area measurement of peak discharge. Shifting-control method used May 1-9, July 14, 19-31.
Maxima.- May-July, 1951: Discharge, 18,700 cfs 4 p.m. July 12 (gage height, 29.32 ft).
1930 to April 1951: Discharge, 26,000 cfs June 3, 1938 (gage height, 32.55 ft).
Flood of May 1903 reached a stage of 33.9 ft, from floodmarks (discharge, 32,000 cfs).
Remarks.- Flow partially regulated by Kanopolis Reservoir (see page30).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	908	1,930	4,690	11	685	1,230	9,470	21	1,270	3,460	2,840
2	376	2,240	4,610	12	579	1,220	16,700	22	1,180	2,310	2,060
3	175	1,180	4,800	13	561	1,220	13,800	23	886	1,740	1,980
4	137	1,100	4,480	14	549	1,660	5,490	24	587	1,420	1,900
5	119	1,080	4,550	15	545	1,410	5,700	25	985	3,210	1,850
6	107	1,210	4,630	16	698	1,260	6,280	26	1,890	3,820	1,810
7	97	3,670	4,630	17	2,770	1,240	6,390	27	2,350	4,020	2,380
8	192	1,400	4,620	18	1,450	1,240	6,300	28	2,370	4,100	2,770
9	758	1,360	4,660	19	1,160	2,610	5,540	29	2,900	5,460	2,800
10	1,510	1,240	4,650	20	752	3,360	5,120	30	3,150	5,410	2,810
								31	3,170		2,820
Monthly mean discharge, in second-feet									1,125	2,260	4,940
Runoff, in acre-feet									69,160	134,500	303,700
Runoff, in inches									0.16	0.31	0.70

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					19.90	4,640	20.32	4,890	27.70	13,600	29.20	18,200
4	19.87	4,630			19.90	4,640	20.97	5,310	27.79	13,800	29.11	17,900
6			19.95	4,670	19.89	4,640	22.25	6,320	28.07	14,500	28.97	17,400
8	19.80	4,590			19.90	4,640	23.49	7,490	28.40	15,500	28.77	16,700
10					19.91	4,650	24.70	8,770	28.77	16,700	28.49	15,800
N	19.85	4,620	19.93	4,660	19.89	4,640	25.84	10,200	29.10	17,900	28.14	14,700
2					19.89	4,640	26.55	11,200	29.27	18,500	27.58	13,200
4	19.85	4,620			19.88	4,640	26.98	12,000	29.32	18,700	26.94	11,900
6			19.91	4,650	19.88	4,640	27.22	12,400	29.29	18,600	26.04	10,500
8	19.87	4,630			19.89	4,640	27.38	12,800	29.28	18,500	25.04	9,180
10					19.92	4,660	27.54	13,200	29.27	18,500	23.90	7,900
12	19.90	4,640	19.90	4,640	20.08	4,750	27.64	13,400	29.24	18,400	22.78	6,800
	July 14		July 15		July 16		July 17		July 18		July 19	
2	21.95	6,060										
4	21.40	5,620										
6	21.10	5,400	21.27	5,520	22.12	6,210			22.31	6,380	21.55	5,740
8	20.96	5,300										
10	20.93	5,270										
N	20.94	5,280	21.46	5,670	22.23	6,310	22.33	6,400	22.29	6,360	21.23	5,490
2	20.98	5,310										
4	21.03	5,350										
6	21.06	5,370	21.69	5,850	22.29	6,360			22.15	6,240	21.00	5,330
8	21.09	5,390										
10	21.13	5,420										
12	21.15	5,440	21.94	6,050	22.32	6,390	22.31	6,380	21.90	6,020	20.85	5,210
	July 20		July 21		July 22		July 23		July 24		July 25	
2			20.13	4,680								
4			19.21	4,080								
6	20.78	5,160	17.85	3,250								
8			16.90	2,740								
10			16.40	2,460								
N	20.73	5,110	16.09	2,330	15.28	2,050	15.03	1,970	14.81	1,900	14.64	1,850
2			15.90	2,260								
4			15.77	2,220								
6	20.71	5,100	15.67	2,190								
8			15.65	2,180								
10			15.58	2,160								
12	20.56	5,000	15.52	2,130	15.18	2,020	14.92	1,940	14.73	1,880	14.58	1,830

Smoky Hill River near Mentor, Kans.

Location.- Lat 38°48', long. 97°35', in sec. 31, T. 14 S., R. 2 W., 1 mile south of Salina and 1¾ miles east of U. S. Highway 81. Datum of gage is 1,211.74 ft above mean sea level (levels by Corps of Engineers).
Drainage area.- 8,230 square miles.
Gage-height record.- Water-stage recorder graph except for periods May 10, 16-18, May 22 to June 1, June 7, 20-22, 26-30, July 22-28, for which a graph was drawn based on one to three times daily wire-weight gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 4,500 cfs and by slope-area measurement of peak discharge.
Maxima.- May-July 1951: Discharge, 24,000 cfs 10 a.m. July 13 (gage height, 24.93 ft). 1923-32, 1947 to April 1951: Discharge, 7,450 cfs Aug. 17, 1927 (gage height, 25.8 ft, site and datum then in use).
Remarks.- Flow partially regulated by Kanopolis Reservoir (see page 30).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	1,570	2,880	10,300	11	1,420	1,170	16,200	21	900	3,300	7,640
2	961	1,760	5,810	12	630	1,150	23,400	22	1,380	3,380	2,870
3	420	1,860	4,920	13	544	1,140	23,800	23	1,440	2,580	2,420
4	227	1,050	5,450	14	518	1,250	22,600	24	820	1,540	2,320
5	189	996	4,460	15	502	1,740	19,000	25	662	1,680	2,240
6	172	1,170	4,300	16	947	1,270	13,600	26	1,250	3,260	2,200
7	161	3,280	4,330	17	1,510	1,170	12,600	27	2,170	3,490	2,230
8	155	4,210	4,270	18	3,230	1,150	13,600	28	2,350	3,570	3,000
9	245	1,420	4,250	19	1,410	1,210	13,600	29	2,430	3,970	3,140
10	1,360	1,270	4,490	20	1,150	2,760	11,400	30	3,000	9,250	3,170
								31	3,110		3,190
Monthly mean discharge, in second-feet									1,188	2,331	8,285
Runoff, in acre-feet									73,060	138,700	509,500
Runoff, in inches									0.17	0.32	1.16

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2												
4												
6					21.55	4,350	23.72	12,700	24.89	23,500		
8												
10												
N	21.46	4,260	21.44	4,240	21.59	4,390	24.37	17,900	24.90	23,600	24.92	23,900
2												
4												
6					21.65	4,480	24.62	20,400	24.92	23,900		
8												
10												
12	21.43	4,230	21.49	4,290	22.33	5,990	24.76	22,000	24.92	23,900	24.88	23,400
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4												
6												
8												
10												
N	24.83	22,800	24.50	19,200	23.79	13,100	23.69	12,500	23.87	13,700	23.88	13,800
2												
4												
6												
8												
10												
12	24.73	21,600	24.17	16,000	23.66	12,300	23.79	13,100	23.89	13,800	23.80	13,200
	July 20		July 21		July 22		July 23		July 24		July 25	
2					20.70	3,670						
4					19.64	3,450						
6			23.06	8,900	18.58	3,240						
8					17.51	2,920						
10			22.95	8,380	16.94	2,720						
N	23.53	11,500	22.85	7.920	16.62	2,610	16.08	2,420	15.74	2,310	15.49	2,240
2					16.46	2,550						
4			22.73	7,420	16.33	2,510						
6					16.27	2,480						
8			22.44	6,340	16.23	2,470						
10					16.20	2,460						
12	23.17	9,450	21.56	4,360	16.18	2,450	15.95	2,380	15.60	2,270	15.43	2,220

Supplemental records.- July 10, 11 a.m., 21.55 ft, 4,350 cfs; 9 p.m., 21.65 ft, 4,480 cfs; July 12, 4 a.m., 24.80 ft, 22,400 cfs; July 13, 10 a.m., 24.93 ft, 24,000 cfs.

Smoky Hill River at Enterprise, Kans.

Location.- Lat 38°54', long. 97°07', in NE¼ sec. 20, T. 13 S., R. 3 E., in Enterprise, at Atchison, Topeka & Santa Fe Railroad bridge, and 14 miles upstream from Chapman Creek. Datum of gage is 1,098.14 ft above mean sea level, datum of 1929.
Drainage area.- 19,200 square miles.
Gage-height record.- Water-stage recorder graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 55,000 cfs and by slope-area measurement of peak discharge.
Maxima.- May-July 1951: Discharge, 240,000 cfs 2 p.m. July 14 (gage height, 33.96 ft).
1934 to April 1951: Discharge, 37,800 cfs Oct. 20, 1941 (gage height, 30.20 ft).
1903-33: Discharge, 90,000 cfs in May 1903 (stage, about 32 ft) from information by Corps of Engineers.
Remarks.- Flow partially regulated by Kanopolis Reservoir (see page 30).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	6,850	7,360	45,400	11	3,830	21,900	51,000	21	6,320	13,400	21,600
2	7,090	6,410	27,400	12	3,680	21,500	146,000	22	7,410	19,100	20,100
3	5,330	6,360	25,000	13	2,450	23,200	186,000	23	10,400	27,500	18,200
4	3,550	9,100	25,400	14	1,840	25,900	213,000	24	12,000	27,400	14,200
5	2,640	9,910	24,300	15	1,680	26,700	170,000	25	11,700	27,300	12,100
6	2,200	10,500	22,000	16	2,540	24,900	101,000	26	11,000	27,200	11,200
7	1,880	19,100	19,500	17	5,640	21,100	60,200	27	10,900	31,600	11,500
8	1,580	22,400	17,300	18	7,480	18,700	37,000	28	11,900	53,400	12,100
9	1,450	21,200	14,300	19	9,660	15,100	28,600	29	13,200	54,600	13,000
10	3,250	22,400	17,800	20	8,360	12,300	24,600	30	14,300	45,400	14,000
								31	13,000		13,400
Monthly mean discharge, in second-feet									6,616	22,430	45,720
Runoff, in thousands of acre-feet									406.8	1,335	2,811
Runoff, in inches									0.40	1.30	2.75

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	27.90	18,200	26.04	15,500	26.09	15,500	30.16	27,600	31.35	59,000	33.78	222,000
4	27.80	18,100	25.81	15,100	26.92	16,800	30.32	29,300	31.68	74,000	33.68	212,000
6	27.68	17,900	25.61	14,800	27.18	17,200	30.45	31,200	32.05	94,000	33.59	204,000
8	27.58	17,800	25.37	14,600	27.28	17,300	30.63	34,600	32.47	119,000	33.47	193,000
10	27.45	17,600	25.17	14,400	27.36	17,400	30.91	42,300	32.69	134,000	33.36	184,000
N	27.33	17,400	24.95	14,200	27.46	17,600	31.32	57,800	32.88	148,000	33.28	177,000
2	27.18	17,200	24.72	13,900	27.59	17,800	31.63	71,500	33.06	160,000	33.23	173,000
4	27.04	17,000	24.50	13,700	27.71	18,000	31.72	76,000	33.20	171,000	33.19	170,000
6	26.86	16,700	24.30	13,500	27.86	18,200	31.66	73,000	33.48	194,000	33.15	167,000
8	26.66	16,400	24.16	13,400	27.96	18,300	31.53	66,500	33.76	220,000	33.13	165,000
10	26.47	16,100	24.21	13,400	28.97	20,400	31.40	61,000	33.89	233,000	33.12	165,000
12	26.26	15,800	24.82	14,000	29.72	23,700	31.33	58,200	33.84	228,000	33.12	165,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	33.16	168,000	33.59	204,000	32.55	124,000						
4	33.26	176,000	33.53	199,000	32.47	119,000	31.61	70,500				
6	33.48	194,000	33.44	191,000	32.38	114,000						
8	33.69	213,000	33.36	184,000	32.30	109,000	31.48	64,200	30.80	39,000	30.31	29,200
10	33.86	230,000	33.27	177,000	32.24	105,000						
N	33.95	239,000	33.18	169,000	32.16	101,000	31.37	59,800				
2	33.96	240,000	33.08	162,000	32.09	96,400						
4	33.94	238,000	32.99	155,000	32.03	92,800	31.25	55,000	30.60	34,000	30.16	27,600
6	33.88	232,000	32.89	148,000	31.94	87,400						
8	33.79	223,000	32.83	144,000	31.86	83,000	31.14	50,600				
10	33.73	217,000	32.72	136,000	31.79	79,500						
12	33.16	210,000	32.63	130,000	31.75	77,500	31.00	45,000	30.45	31,200	30.08	26,800
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4												
6			29.47	22,000			28.21	18,800	25.74	15,000	23.18	12,400
8												
10												
N	29.83	24,500	29.36	21,500	28.85	20,100	27.93	18,300	24.80	14,000	22.88	12,100
2												
4												
6			29.27	21,200			27.44	17,600	24.06	13,300	22.60	11,800
8												
10												
12	29.58	22,700	29.13	20,800	28.43	19,300	26.76	16,500	23.57	12,800	22.34	11,500

Supplemental record.- July 9, 9 p.m., 24.08 ft, 13,300 cfs.

Big Creek near Hays, Kans.

Location.- Lat 38°51', long. 99°19', in SW¼ sec. 10, T. 14 S., R. 18 W., at highway bridge half a mile above concrete dam, 3 miles southeast of Hays, and 25 miles upstream from mouth.
Gage-height record.- Water-stage recorder graph except July 30, for which a graph was drawn based on one wire-weight gage reading, and July 31, when there was no gage-height record.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 7,400 cfs and extended to peak stage on basis of logarithmic plotting of main-channel flow and slope-area measurement of the overflow.
Maxima.- May-July, 1951: Discharge, 21,100 cfs 4 a.m. May 22 (gage height, 21.46 ft). 1946 to April 1951: Discharge observed, 4,000 cfs Oct. 6, 1946 (gage height, 19.65 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	14	93	546	11	21	468	333	21	158	1,760	114
2	16	1,570	406	12	17	605	486	22	6,980	5,450	1,720
3	15	209	339	13	14	1,090	464	23	1,580	7,610	1,050
4	15	187	306	14	34	3,560	368	24	1,100	5,610	347
5	14	104	236	15	26	1,060	248	25	415	1,270	248
6	13	1,340	301	16	17	356	203	26	225	567	255
7	12	1,620	250	17	16	243	172	27	146	2,680	168
8	12	1,740	211	18	16	213	150	28	114	4,480	139
9	16	2,960	182	19	16	163	137	29	95	4,540	125
10	16	624	166	20	26	213	122	30	81	1,190	104
								31	73		90
Monthly mean discharge, in second-feet									365	1,786	322
Runoff, in acre-feet									22,440	106,300	19,810
Runoff, in inches											

Saline River near Russell, Kans.

Location.- Lat 38°58', long. 98°51', between secs. 34 and 35, T. 12 S., R. 14 W., 2 miles downstream from Salt Creek and 5 miles north of Russell.
Drainage area.- 1,502 square miles.
Gage-height record.- Water-stage recorder graph except for period July 30, 31, for which a graph was drawn based on daily wire-weight gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements.
Maxima.- May-July 1951: Discharge, 17,000 cfs 9 p.m. June 28 (gage height, 19.12 ft). 1946 to April 1951: Discharge, 14,300 cfs July 26, 1950 (gage height, 18.40 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	247	272	1,870	11	65	804	5,270	21	672	4,100	498
2	108	971	1,330	12	61	1,360	4,940	22	4,850	10,400	1,510
3	85	1,050	1,450	13	56	2,350	3,890	23	6,130	10,600	1,890
4	75	408	1,200	14	67	1,580	2,360	24	3,350	9,140	1,670
5	69	293	872	15	165	1,700	1,510	25	1,280	4,580	1,990
6	67	756	717	16	107	1,810	1,020	26	747	2,270	1,700
7	64	1,350	627	17	110	651	781	27	531	2,760	903
8	63	1,760	568	18	252	493	668	28	428	9,830	672
9	63	4,350	531	19	373	421	595	29	394	9,080	553
10	65	1,080	531	20	244	389	537	30	357	3,710	508
								31	295		472
Monthly mean discharge, in second-feet									692	3,011	1,408
Runoff, in acre-feet									42,530	179,100	86,540
Runoff, in inches									0.53	2.24	1.08

Saline River at Tescott, Kans.

Location.- Lat 39°00', long. 97°53', in SE¼ sec. 16, T. 12 S., R. 5 W., at highway bridge, half a mile south of Tescott and half a mile upstream from Dry Creek.
Drainage area.- 2,820 square miles.
Gage-height record.- Water-stage recorder graph, except for periods May 1, 2, June 2, 14, July 7-10, July 21 to 4 p.m. July 24, July 30, 31, for which a graph was drawn based on once-daily wire-weight gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 12,000 cfs and by slope-area measurement of peak discharge.
Maxima.- May-July 1951: Discharge, 61,400 cfs 4 a.m. July 13 (gage height, 30.06 ft).
1919 to April 1951: Discharge, 6,850 cfs June 3, 1935 (gage height, 29.57 ft, from graph based on gage readings).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	307	843	6,100	11	336	6,550	5,800	21	1,220	4,380	1,660
2	501	2,300	6,150	12	163	5,940	11,400	22	3,440	5,980	1,460
3	360	3,860	6,060	13	137	4,310	35,700	23	4,280	6,100	1,460
4	412	2,580	5,760	14	137	3,120	8,570	24	4,140	6,440	1,810
5	257	2,390	4,700	15	143	4,070	6,110	25	4,420	7,000	2,910
6	186	2,400	3,640	16	183	4,540	5,860	26	4,910	6,480	3,300
7	160	6,240	2,980	17	1,010	4,600	5,620	27	5,220	6,340	2,870
8	146	13,500	2,720	18	1,460	4,350	4,680	28	4,030	6,250	2,800
9	140	18,100	2,340	19	621	2,940	3,080	29	1,340	6,090	2,370
10	354	12,000	2,260	20	350	1,870	2,070	30	1,010	6,000	1,500
								31	875		1,190
Monthly mean discharge, in second-feet									1,363	5,585	4,998
Runoff, in acre-feet									83,800	332,400	307,300
Runoff, in inches									0.56	2.21	2.04

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					16.82	2,210	22.80	4,150	29.27	6,270	30.02	52,800
4	19.01	2,910	17.51	2,410	16.77	2,190	25.60	4,890	29.32	6,340	30.06	61,400
6					16.70	2,170	27.78	5,480	29.35	6,400	30.02	52,800
8	18.84	2,850	17.36	2,370	16.64	2,150	28.80	5,950	29.42	6,600	29.98	45,400
10					16.59	2,140	29.25	6,250	29.51	7,400	29.96	42,300
N	18.47	2,720	17.25	2,340	16.56	2,130	29.36	6,420	29.57	9,800	29.90	33,000
2					16.50	2,110	29.36	6,420	29.60	11,000	29.87	30,000
4	18.14	2,610	17.12	2,300	16.47	2,100	29.32	6,340	29.65	13,500	29.82	25,000
6					16.50	2,110	29.29	6,290	29.66	14,000	29.80	23,000
8	17.89	2,530	16.99	2,260	16.67	2,160	29.28	6,280	29.69	15,500	29.76	20,200
10					18.85	2,860	29.28	6,280	29.77	20,900	29.73	18,100
12	17.67	2,460	16.87	2,220	20.50	3.440	29.28	6,280	29.90	33,000	29.70	16,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2									28.45	5,280	25.05	3,750
4	29.61	11,500	29.31	6,220	29.11	5,910	28.95	5,750	28.35	5,200	24.62	3,600
6									28.21	5,090	24.21	3,450
8	29.55	9,000	29.28	6,160	29.10	5,900	28.90	5,700	28.04	4,960	23.76	3,310
10									27.85	4,850	23.31	3,170
N	29.48	6,880	29.26	6,120	29.08	5,880	28.85	5,650	27.59	4,690	22.88	3,040
2									27.31	4,560	22.48	2,920
4	29.42	6,520	29.22	6,040	29.04	5,840	28.78	5,580	26.97	4,430	22.08	2,800
6									26.63	4,300	21.69	2,690
8	29.38	6,360	29.19	5,990	29.00	5,800	28.68	5,480	26.26	4,170	21.35	2,580
10									25.86	4,030	21.02	2,490
12	29.36	6,320	29.16	5,960	28.96	5,760	28.55	5,360	25.43	3,880	20.75	2,400
	July 20		July 21		July 22		July 23		July 24		July 25	
2											20.97	2,470
4	20.31	2,270	18.57	1,750	17.58	1,500	17.36	1,440	17.73	1,530	21.31	2,570
6											21.67	2,680
8	19.90	2,150	18.39	1,700	17.45	1,460	17.37	1,440	17.96	1,590	21.99	2,780
10											22.29	2,870
N	19.53	2,040	18.21	1,650	17.37	1,440	17.41	1,450	18.50	1,730	22.57	2,950
2											22.82	3,030
4	19.24	1,950	18.04	1,610	17.37	1,440	17.43	1,460	19.12	1,920	23.02	3,090
6											23.27	3,160
8	19.02	1,890	17.89	1,570	17.37	1,440	17.50	1,480	19.86	2,140	23.44	3,210
10											23.59	3,260
12	18.77	1,810	17.72	1,530	17.36	1,440	17.60	1,500	20.59	2,360	23.71	3,290

South Fork Solomon River at Alton, Kans.

Location.- Lat 39°27', long. 98°57', in SW¼ sec. 12, T. 7 S., R. 15 W., 1.1 miles south of Missouri Pacific Railroad in Alton, Osborne County. Datum of gage is 1,598.20 ft above mean sea level, datum of 1929 (levels by Bureau of Reclamation).

Drainage area.- 1,720 square miles.

Gage-height record.- Water-stage recorder graph prior to July 12, except for periods May 24-29, June 10, 11, 16-20, July 5-7, for which graph was drawn based on once-daily wire-weight gage readings. No gage-height record May 30, June 26, July 1-4, 8, 9, 12-31.

Discharge record.- Stage-discharge relation defined by current-meter measurements below 25,000 cfs and extended to peak stage on basis of contracted-opening and slope-area measurements. Discharge for periods of no gage-height record prior to July 12, when gage was destroyed, computed on basis of records for station at Osborne and North Fork Solomon River near Downs.

Maxima.- May-July 1951: Discharge, 91,900 cfs, between 7 and 9 p.m., July 12 (gage height, 27.10, from floodmarks).
1919-25, 1928-32, 1942 to April 1951: Discharge, 11,500 cfs June 16, 1943; gage height, 21.5 ft Sept. 19, 1919, present datum.
Maximum stage known prior to 1951, 24.5 ft Aug. 1, 1928.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	90	370	950	11	38	1,100	14,600	21	2,570	803	
2	67	810	750	12	38	1,780		22	11,600	13,100	
3	58	482	700	13	38	1,430		23	5,300	13,900	
4	48	300	850	14	40	2,500		24	1,220	3,700	
5	44	247	634	15	44	3,060		25	778	1,750	
6	41	1,370	522	16	76	915		26	574	1,100	
7	38	7,950	448	17	206	632		27	465	1,650	
8	38	4,290	550	18	259	503		28	408	4,700	
9	41	2,190	1,100	19	170	454		29	382	3,270	
10	41	1,080	692	20	142	408		30	350	1,540	
								31	314		
Monthly mean discharge, in second-feet									823	2,579	
Runoff, in acre-feet									50,610	153,500	
Runoff, in inches									0.55	1.67	

South Fork Solomon River at Osborne, Kans.

Location.- Lat 39°26', long. 98°42', on line between secs. 19 and 20, T. 7 S., R. 12 W., at bridge on U. S. Highway 281, half a mile south of Osborne, and 0.6 mile downstream from mouth of Covert Creek.
Drainage area.- 2,024 square miles.
Gage-height record.- Water-stage recorder graph except for periods May 21, 25-29, June 1-4, 6, 11, 12, 17-21, 27, July 2-4, 6-10, July 19 to 7 a.m. July 23, July 27-31, for which a graph was drawn based on wire-weight gage readings made one or more times daily, and May 30, 31, June 5, July 5, when there was no gage-height record.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 16,000 cfs and by contracted-opening and slope-area measurements of peak discharge.
Maxima.- May-July 1951: Discharge, 76,800 cfs 2 a.m. July 13 (gage height, 27.65 ft).
1946 to April 1951: Discharge, 10,000 cfs Aug. 29, 1950 (gage height, 20.13 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	178	438	1,900	11	75	1,540	17,400	21	3,480	1,440	892
2	124	1,710	1,160	12	71	2,130	51,000	22	8,500	12,100	1,630
3	98	908	902	13	69	2,100	38,900	23	11,800	19,400	5,150
4	90	499	1,000	14	86	1,940	6,640	24	2,990	5,750	4,500
5	84	370	1,100	15	172	4,380	3,810	25	1,260	3,350	2,560
6	80	2,300	718	16	106	1,820	2,660	26	830	1,930	1,460
7	74	8,380	632	17	192	904	1,940	27	619	2,880	950
8	72	9,720	817	18	283	681	1,580	28	506	5,790	791
9	77	4,800	1,620	19	238	589	1,260	29	442	5,870	707
10	84	2,060	1,020	20	182	567	1,030	30	400	3,600	645
								31	350		594
Monthly mean discharge, in second-feet									1,084	3,665	5,063
Runoff, in acre-feet									66,670	218,100	311,300
Runoff, in inches									0.62	2.02	2.89

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2			11.70	1,480			10.80	1,240	23.40	24,300	27.65	76,800
4	8.32	708	12.27	1,640	10.19	1,100	19.00	6,900	24.52	32,900	27.46	73,000
6			12.65	1,760			22.15	17,600	25.65	43,800	26.92	62,600
8	8.47	735	12.93	1,860	9.76	1,010	22.41	18,800	26.40	54,800	26.16	51,200
10			13.07	1,900			22.85	21,000	27.00	63,800	25.33	40,600
N	8.71	782	12.92	1,850	9.42	932	23.03	22,100	27.18	67,400	24.47	32,500
2			12.66	1,760			22.95	21,600	26.91	62,400	23.59	25,400
4	8.97	834	12.35	1,660	9.27	899	22.92	21,400	26.46	55,700	22.75	20,600
6			11.96	1,550			23.03	22,100	26.16	51,200	22.00	16,800
8	9.39	926	11.55	1,430	9.60	972	23.08	22,400	26.20	51,800	21.36	14,300
10			11.17	1,330			23.04	22,100	26.65	58,600	20.82	12,400
12	10.50	1,170	10.83	1,250	10.28	1,120	23.06	22,300	27.29	69,600	20.35	10,800
	July 14		July 15		July 16		July 17		July 18		July 19	
2									13.81	1,620		
4									13.78	1,610		
6	19.27	7,580							13.73	1,590		
8									13.76	1,600		
10									13.78	1,610		
N	18.57	6,040	17.04	3,740	15.77	2,620	14.56	1,930	13.76	1,600	12.67	1,260
2									13.75	1,600		
4									13.77	1,610		
6	18.08	5,220							13.70	1,580		
8									13.55	1,520		
10									13.36	1,460		
12	17.67	4,600	16.44	3,150	15.19	2,250	13.88	1,650	13.23	1,420	12.14	1,120
	July 20		July 21		July 22		July 23		July 24		July 25	
2							15.75	2,600	16.98	3,680		
4					11.80	1,050	16.20	2,960	17.26	3,990		
6			11.15	920			17.50	4,350	17.95	5,020	16.27	3,020
8					12.86	1,310	18.81	6,520	18.40	5,700		
10							19.32	7,700	18.34	5,610		
N	11.72	1,030	10.94	881	13.65	1,560	19.19	7,380	18.12	5,280	15.58	2,490
2							18.85	6,600	17.83	4,840		
4					14.15	1,760	18.42	5,740	17.67	4,600		
6			10.73	850			18.00	5,100	17.34	4,110	14.82	2,060
8					15.44	2,400	17.63	4,540	17.14	3,840		
10							17.33	4,100	16.97	3,670		
12	11.34	958	10.89	874	15.66	2,540	17.09	3,790	16.80	3,500	14.30	1,820

Supplemental records.- July 12, 7 p.m., 26.11 ft, 50,400 cfs.

Solomon River at Beloit, Kans.

Location.- Lat 39°27', long. 98°07', in SW¼ sec. 9, T. 7 S., R. 7 W., in Beloit, 150 ft upstream from dam at city water plant and 1½ miles upstream from Leban Creek. Auxiliary wire-weight gage at bridge on State Highway 14, 450 ft downstream from recorder. Datum of both gages is 1,339.11 ft above mean sea level, datum of 1929.

Drainage area.- 5,430 square miles.

Gage-height record.- Water-stage recorder graph except for periods May 1-8, 15-22, June 1, 2, 12-21, 1 p.m. July 7 to 5 p.m. July 9, 12 m. July 12 to July 31, for which a graph was drawn based on wire-weight gage readings made three times daily.

Discharge record.- Stage-discharge relation defined by current-meter measurements below 31,000 cfs and extended to peak stage on basis of study of relationship of peak discharges to drainage areas at adjacent sites.

Maxima.- May-July 1951: Discharge, 125,000 cfs 4 a.m. July 13 (gage height, 39.30 ft). 1895-97, 1929 to April 1951: Discharge, 37,800 cfs June 3, 1935 (gage height, 34.5 ft, from graph based on gage readings and floodmarks) from rating curve extended above 25,000 cfs on basis of velocity-area studies.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	775	1,500	9,740	11	200	13,400	11,200	21	1,940	2,340	3,450
2	873	3,850	6,210	12	187	7,580	72,200	22	4,630	10,400	4,050
3	562	6,700	3,010	13	204	4,630	113,000	23	7,320	25,800	4,990
4	397	8,230	2,160	14	226	4,500	67,000	24	14,000	38,200	7,210
5	308	3,570	1,890	15	318	3,910	25,400	25	12,000	27,900	8,580
6	259	1,880	2,400	16	574	4,160	12,500	26	6,450	14,200	7,380
7	231	6,020	1,820	17	824	5,140	9,160	27	2,100	9,140	5,220
8	222	13,100	1,500	18	1,160	3,040	6,920	28	1,450	7,030	3,390
9	250	22,200	1,520	19	960	2,120	5,510	29	1,180	7,110	3,620
10	222	19,300	2,500	20	782	1,530	4,410	30	1,170	9,880	5,310
								31	1,180		3,980
Monthly mean discharge, in second-feet									2,031	9,612	13,460
Runoff, in acre-feet									124,900	572,000	827,600
Runoff, in inches									0.43	1.97	2.86

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					16.10	1,720	24.73	7,680	32.63	25,200	39.18	121,000
4			15.78	1,380	16.10	1,720	25.78	8,760	34.30	32,800	39.30	125,000
6					16.14	1,770	26.52	9,640	35.55	43,000	39.25	124,000
8			15.80	1,400	16.17	1,800	26.99	10,300	36.46	58,300	39.20	122,000
10					16.23	1,880	27.30	10,700	37.17	72,400	39.14	120,000
N	15.89	1,490	15.88	1,480	16.30	1,960	27.48	11,000	37.60	81,200	38.98	115,000
2					16.43	2,130	27.64	11,300	37.86	86,900	38.86	112,000
4			15.98	1,590	16.48	2,190	27.84	11,700	38.06	91,400	38.73	108,000
6					16.56	2,300	28.12	12,200	38.24	95,800	38.59	105,000
8			16.07	1,690	18.30	3,690	28.67	13,300	38.50	102,000	38.46	101,000
10					21.63	5,300	29.72	15,700	38.76	109,000	38.32	97,700
12	15.81	1,410	16.10	1,720	21.72	5,350	31.08	19,600	39.00	116,000	38.17	94,100
	July 14		July 15		July 16		July 17		July 18		July 19	
2	38.02	90,500									22.44	5,810
4	37.86	86,900	34.47	33,700	29.22	14,500	26.63	9,780			22.27	5,690
6	37.68	83,000							24.43	7,410	22.12	5,590
8	37.49	78,800	33.69	29,800	28.62	13,200	26.28	9,340			21.97	5,500
10	37.24	73,800									21.90	5,460
N	36.91	67,200	32.57	24,900	28.06	12,100	26.03	9,040	23.86	6,890	21.94	5,480
2	36.56	60,200									22.10	5,580
4	36.32	55,900	31.12	19,700	27.65	11,300	25.86	8,850			22.04	5,540
6	36.08	51,400							23.14	6,310	21.88	5,450
8	35.82	46,900	30.25	17,100	27.31	10,800	25.70	8,670			21.67	5,320
10	25.52	42,700									21.47	5,200
12	35.19	39,000	29.72	15,700	27.00	10,300	25.28	8,230	22.59	5,910	21.26	5,080
	July 20		July 21		July 22		July 23		July 24		July 25	
2			18.41	3,730	17.34	3,260	20.09	4,440	23.16	6,330	25.94	8,930
4			18.22	3,660	17.47	3,350	20.11	4,460	23.39	6,510	25.99	8,990
6			18.05	3,590	18.01	3,570	20.18	4,490	23.57	6,660	25.98	8,980
8			17.90	3,530	18.87	3,920	20.37	4,580	23.68	6,740	25.92	8,910
10			17.77	3,480	19.59	4,210	20.60	4,700	23.82	6,860	25.82	8,800
N	19.94	4,370	17.65	3,430	19.84	4,320	20.86	4,840	24.00	7,020	25.72	8,690
2			17.54	3,390	19.98	4,390	21.16	5,020	24.23	7,230	25.58	8,540
4			17.45	3,340	20.06	4,430	21.48	5,210	24.50	7,470	25.44	8,390
6			17.37	3,290	20.10	4,450	21.82	5,410	24.82	7,770	25.29	8,240
8			17.32	3,250	20.10	4,450	22.20	5,640	25.16	8,110	25.17	8,120
10			17.30	3,230	20.09	4,440	22.54	5,880	25.47	8,420	25.07	8,020
12	18.62	3,820	17.30	3,230	20.08	4,440	22.86	6,100	25.74	8,710	25.00	7,950

Supplemental records.- July 10, 11:30 p.m., 21.52 ft, 5,230 cfs; July 25, 5 a.m., 26.00 ft, 9,000 cfs.

Solomon River at Niles, Kans.

Location.- Lat 38°58', long. 97°29', in NW¼ sec. 31, T. 12 S., R. 1 W., at county highway bridge three-quarters of a mile west of Niles and 12 miles upstream from mouth.
Drainage area.- 6,770 square miles.
Gage-height record.- Water-stage recorder graph except for periods June 16, 17, June 30 to July 2, for which a graph was drawn based on two or three wire-weight gage readings daily.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Shifting-control method used June 28, 29.
Maxima.- May-July 1951: Discharge, 178,000 cfs 6 a.m. July 14 (gage height, 31.76 ft). 1897-1903, 1917 to April 1951: Discharge observed, 41,000 cfs June 3, 1903 (gage height, 33.8 ft, datum about 1½ ft lower than present) by rainfall-runoff studies.
Remarks.- Some diurnal fluctuation caused by power plants above station.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	1,570	1,580	17,900	11	512	11,700	17,400	21	2,900	19,300	12,300
2	2,210	1,900	14,100	12	489	13,600	63,800	22	4,680	16,300	8,280
3	1,780	4,010	14,000	13	472	14,900	68,200	23	6,100	15,500	6,470
4	1,350	4,640	14,600	14	459	15,200	157,000	24	5,880	15,500	5,970
5	1,080	4,950	11,500	15	462	14,300	90,500	25	5,800	16,100	5,470
6	834	5,400	5,260	16	541	12,500	49,400	26	5,450	16,400	5,250
7	694	7,680	3,240	17	711	8,040	36,400	27	6,040	19,700	5,990
8	603	9,550	3,090	18	1,500	5,330	28,400	28	7,220	29,000	7,100
9	562	10,200	2,960	19	2,460	4,600	22,500	29	8,510	28,000	7,520
10	545	10,400	3,260	20	2,310	4,200	16,800	30	5,520	23,900	6,560
								31	1,980		4,110
Monthly mean discharge, in second-feet									2,620	12,150	23,080
Runoff, in thousands of acre-feet									161.1	722.7	1,419
Runoff, in inches									0.45	2.00	3.93

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2							22.59	5,240	29.51	25,300		
4					16.65	2,760	24.42	6,220	29.65	26,800	30.87	53,400
6	17.45	3,060	17.42	3,050			25.88	7,100	29.73	27,800		
8					16.63	2,750	27.21	8,840	30.08	32,500	30.90	54,900
10							28.14	13,900	31.18	79,800		
N	17.50	3,080	17.19	2,960	17.20	2,960	29.14	21,700	31.45	118,000	30.90	54,900
2							29.59	26,200	31.41	111,000		
4					18.76	3,580	29.65	26,800	31.29	93,700	30.88	53,900
6	17.62	3,130	16.94	2,860			29.63	26,600	31.18	79,800		
8					19.44	3,860	29.57	26,000	31.08	68,800	31.25	88,600
10							29.52	25,400	31.00	61,300		
12	17.60	3,120	16.78	2,800	20.92	4,470	29.50	25,200	30.94	57,500	31.62	149,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	31.70	165,000										
4	31.74	173,000										
6	31.76	178,000										
8	31.73	171,000										
10	31.70	165,000										
N	31.67	159,000	31.24	87,300	30.75	47,900	30.31	36,400	29.76	28,100	29.23	22,500
2	31.66	157,000										
4	31.64	153,000										
6	31.61	147,000										
8	31.59	143,000										
10	31.55	136,000										
12	31.50	126,000	31.00	61,300	30.50	40,400	30.06	32,200	29.52	25,400	28.90	19,500
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4							25.53	6,890				
6					27.29	9,160			24.10	6,040	23.39	5,640
8							25.09	6,620				
10												
N	28.54	16,700	27.89	12,400	26.94	7,900	24.69	6,380	24.02	5,990	23.03	5,460
2												
4							24.40	6,210				
6					26.55	7,500			23.90	5,920	22.69	5,300
8							24.23	6,110				
10												
12	28.20	14,300	27.46	10,000	25.97	7,150	24.14	6,060	23.68	5,800	22.45	5,180

North Fork Solomon River at Kirwin, Kans.

Location.- Lat 39°40', long. 99°07', in SW¼ sec. 34, T. 4 S., R. 16 W., half a mile south of Kirwin, three-quarters of a mile downstream from Bow Creek, and 1½ miles upstream from Deer Creek. Datum of gage is 1,656.95 ft above mean sea level, datum of 1929 (levels by Bureau of Reclamation).

Drainage area.- 1,290 square miles.

Gage-height record.- Water-stage recorder graph except for periods May 15-18, 26-31, June 2-8, 21, June 28 to July 5, July 7-10, 20, 21, 26-31, for which a graph was drawn based on once-daily wire-weight gage readings, and July 6, when there was no gage-height record.

Discharge record.- Stage-discharge relation defined by current-meter measurements below 10,000 cfs and by slope-area and contracted-opening measurements at gage height 22.3 ft.

Maxima.- May-July 1951: Discharge, 15,600 cfs 4:30 a.m., July 11 (gage height, 20.42 ft).

1919-25, 1928-32, 1941 to April 1951: Discharge, 24,000 cfs (revised) Sept. 18, 1919 (gage height, 22.5 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	40	474	270	11	34	177	10,900	21	560	1,390	524
2	36	181	266	12	33	166	12,200	22	2,440	8,610	1,910
3	35	116	202	13	33	474	10,800	23	1,570	8,300	1,780
4	33	87	502	14	35	902	4,990	24	774	3,680	1,510
5	33	79	200	15	96	642	3,020	25	234	2,250	1,310
6	32	792	160	16	77	886	1,310	26	140	990	770
7	32	1,970	137	17	76	1,060	877	27	141	722	558
8	31	3,230	151	18	66	358	823	28	127	506	746
9	40	1,980	146	19	80	183	702	29	106	574	542
10	39	402	483	20	66	157	586	30	91	466	378
								31	207		362
Monthly mean discharge, in second-feet									237	1,393	1,907
Runoff, in acre-feet									14,550	82,920	117,300
Runoff, in inches									0.21	1.21	1.70

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					4.73	141	15.60	5,650	18.30	10,200	19.75	13,700
4					4.73	141	20.30	15,200	18.13	9,860	19.70	13,600
6	4.82	150			4.73	141	19.98	14,200	19.14	12,200	19.35	12,700
8					4.73	141	19.16	12,200	20.00	14,300	19.01	11,800
10					4.73	141	18.60	10,800	19.66	13,400	18.77	11,200
N	4.85	153	4.78	146	4.73	141	18.13	9,860	19.17	12,200	18.55	10,700
2					4.74	142	18.37	10,300	18.99	11,800	18.33	10,300
4					4.82	150	18.71	11,100	19.26	12,400	18.08	9,760
6	4.84	152			6.00	490	18.80	11,300	19.39	12,800	17.78	9,160
8					7.64	1,150	18.90	11,600	19.20	12,300	17.47	8,540
10					8.95	1,670	18.92	11,600	19.25	12,400	17.16	7,920
12	4.83	151	4.74	142	10.66	2,550	18.66	11,000	19.48	13,000	16.82	7,280
	July 14		July 15		July 16		July 17		July 18		July 19	
2	16.44	6,710	12.78	3,820	9.10	1,740	7.20	970	6.76	794		
4	15.82	5,870	12.54	3,670	8.65	1,550	7.15	950	6.74	786		
6	15.40	5,450	12.38	3,580	8.46	1,470	7.08	922	6.77	798	6.62	738
8	15.08	5,130	12.02	3,360	8.20	1,370	6.98	882	6.85	830		
10	14.82	4,940	11.82	3,240	8.09	1,330	6.93	862	6.90	850		
N	14.63	4,830	11.54	3,070	7.91	1,250	6.95	870	6.89	846	6.53	702
2	14.35	4,680	11.23	2,890	7.69	1,170	6.92	858	6.85	830		
4	14.03	4,520	10.77	2,610	7.74	1,190	6.90	850	6.86	834		
6	13.62	4,290	10.69	2,560	7.58	1,120	6.85	830	6.89	846	6.43	662
8	13.22	4,070	10.29	2,340	7.45	1,070	6.82	818	6.89	846		
10	12.78	3,820	10.00	2,190	7.34	1,030	6.80	810	6.83	822		
12	12.68	3,760	9.50	1,940	7.26	994	6.78	802	6.75	790	6.34	626
	July 20		July 21		July 22		July 23		July 24		July 25	
2					6.34	626	9.53	1,960	8.82	1,620	8.44	1,470
4					6.87	838	9.10	1,740	8.68	1,560	8.42	1,460
6	6.28	602	6.12	538	7.75	1,190	8.98	1,680	8.64	1,550	8.40	1,450
8					8.70	1,570	9.03	1,700	8.57	1,520	8.36	1,430
10					9.88	2,130	9.09	1,740	8.52	1,500	8.28	1,400
N	6.24	586	6.08	522	11.00	2,750	9.16	1,770	8.47	1,480	8.18	1,360
2					10.77	2,610	9.27	1,820	8.42	1,460	8.10	1,330
4					10.87	2,670	9.24	1,810	8.42	1,460	7.94	1,270
6	6.20	570	6.05	510	10.62	2,520	9.19	1,780	8.44	1,470	7.74	1,190
8					10.37	2,380	9.15	1,760	8.48	1,480	7.52	1,100
10					10.10	2,240	9.02	1,700	8.47	1,480	7.34	1,030
12	6.15	550	6.02	498	9.90	2,140	8.93	1,660	8.46	1,470	7.18	962

Supplemental records.- July 11, 4:30 a.m., 20.42 ft, 15,600 cfs, 1 p.m., 18.15 ft, 9,900 cfs; July 12, 3 a.m., 18.10 ft, 9,800 cfs, 7:30 a.m., 20.04 ft, 14,400 cfs; July 15, 1 a.m., 12.96 ft, 3,930 cfs; July 22, 1 p.m., 11.30 ft, 2,930 cfs.

North Fork Solomon River near Downs, Kans.

Location.- Lat 39°31', long. 98°36', at west end of line between secs. 19 and 30, T. 6 S., R. 11 W., at bridge on U. S. Highway 24, 3 miles west of Downs, 4½ miles upstream from Oak Creek, and 6½ miles upstream from mouth.
Drainage area.- 2,390 square miles.
Gage-height record.- Water-stage recorder graph except for the periods May 25-28, June 4, 5, 15, 17, 18, 6 a.m. July 19 to 10 a.m. July 22, 4 p.m. July 26 to 10 a.m. July 28, for which graph was drawn based on once-daily wire-weight gage readings. Gage heights partially estimated June 11; no gage-height record May 29-31, June 16, 19, July 1-8, 10 and insufficient gage-height record June 13, 14, 20, 28-30, July 9, 30, 31.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 19,000 cfs and extended to peak stage by logarithmic plotting. Discharge for periods of insufficient or no gage-height record computed on basis of records for station at Kirwin and Solomon River at Beloit.
Maxima.- May-July 1951: Discharge, 35,700 cfs 12 m. July 12 (gage height, 30.41 ft).
1945 to April 1951: Discharge, 22,700 cfs Aug. 13, 1950 (gage height, 28.23 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	118	3,690	800	11	62	841	13,000	21	4,390	4,620	708
2	148	4,980	580	12	62	1,720	32,300	22	6,790	9,050	1,080
3	108	2,670	420	13	62	1,500	25,900	23	3,530	17,200	4,240
4	95	706	600	14	82	1,100	13,800	24	1,140	11,200	1,770
5	77	498	450	15	88	902	7,510	25	648	5,800	1,270
6	67	583	350	16	132	700	3,700	26	500	1,950	1,030
7	62	6,060	290	17	177	828	1,310	27	391	980	857
8	60	7,880	310	18	138	880	1,510	28	330	1,200	1,760
9	64	9,590	380	19	148	550	977	29	280	1,500	3,550
10	63	4,660	1,400	20	132	350	817	30	250	1,300	1,500
								31	240		800
Monthly mean discharge, in second-feet									659	3,516	4,031
Runoff, in acre-feet									40,530	209,200	247,900
Runoff, in inches									0.32	1.64	1.94

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2							18.98	3,310	29.41	29,200	29.48	29,600
4							21.52	5,490	29.56	30,100	29.31	28,600
6							22.61	6,870	29.75	31,300	29.07	27,200
8							23.65	8,570	29.98	32,800	28.87	26,000
10							24.81	11,100	30.28	34,800	28.74	25,300
N							25.47	12,800	30.41	35,700	28.70	25,100
2							25.76	13,600	30.35	35,300	28.70	25,100
4							26.14	14,600	30.18	34,100	28.70	25,100
6							27.00	17,500	29.98	32,800	28.65	24,800
8							27.97	21,500	29.79	31,500	28.57	24,400
10							28.81	25,700	29.65	30,600	28.36	23,400
12							29.25	28,200	29.58	30,200	28.02	21,700
	July 14		July 15		July 16		July 17		July 18		July 19	
2	27.61	19,900	23.74	8,740	21.98	6,050	14.22	1,520	12.75	1,190		
4	27.15	18,000	23.55	8,390	21.74	5,760	13.93	1,450	14.20	1,520	12.00	1,040
6	26.65	16,200	23.37	8,080	21.41	5,370	13.65	1,380	15.86	1,970		
8	26.24	15,000	23.23	7,840	20.89	4,830	13.38	1,320	16.18	2,080	11.81	1,010
10	25.86	13,800	23.09	7,600	20.00	4,070	13.21	1,280	15.91	1,990		
N	25.52	12,900	22.95	7,380	19.00	3,320	13.14	1,270	15.26	1,790	11.59	968
2	25.21	12,100	22.84	7,210	18.05	2,800	12.99	1,240	14.50	1,590		
4	24.92	11,300	22.73	7,040	17.14	2,430	12.85	1,210	13.68	1,380	11.48	951
6	24.65	10,700	22.62	6,890	16.32	2,130	12.90	1,220	13.00	1,240		
8	24.42	10,200	22.49	6,710	15.68	1,920	12.95	1,230	12.56	1,150	11.26	916
10	24.18	9,630	22.37	6,550	15.09	1,740	12.86	1,210	12.28	1,100		
12	23.95	9,150	22.20	6,330	14.60	1,620	12.66	1,170	12.13	1,070	11.02	880
	July 20		July 21		July 22		July 23		July 24		July 25	
2					9.76	704	16.90	2,330	16.73	2,270	13.52	1,340
4	10.87	859	9.99	736	9.92	726	19.00	3,320	16.05	2,030	13.37	1,310
6					10.16	759	20.17	4,210	15.63	1,900	13.26	1,290
8	10.72	838	9.86	717	10.50	807	20.72	4,670	15.38	1,830	13.15	1,270
10					11.20	907	21.02	4,960	15.18	1,770	13.09	1,260
N	10.57	817	9.75	702	12.80	1,200	21.26	5,210	14.98	1,710	13.06	1,250
2					13.67	1,380	21.43	5,390	14.78	1,660	13.05	1,250
4	10.42	796	9.65	690	13.80	1,420	21.49	5,460	14.56	1,600	13.04	1,250
6					13.49	1,340	21.30	5,250	14.33	1,550	13.02	1,240
8	10.28	776	9.58	680	13.10	1,260	20.55	4,520	14.09	1,490	12.97	1,230
10					13.25	1,290	19.15	3,420	13.89	1,440	12.91	1,220
12	10.13	755	9.67	692	14.75	1,650	17.80	2,690	13.69	1,390	12.85	1,210

Supplemental records.- July 10, 11 p.m., 11.73 ft, 992 cfs; July 22, 3 p.m., 13.82 ft, 1,420 cfs; July 22, 9 p.m., 13.04 ft, 1,250 cfs.

Big Blue River near Crete, Nebr.

Location.- Lat. 40°35'40", long. 96°57'35", in S½ sec. 3, T. 7 N., R. 4 E., at bridge on State Highway 82, 1.8 miles south from Missouri Pacific Railroad station in Crete, 3.3 miles downstream from Walnut Creek, 3.6 miles upstream from Squaw Creek. Datum of gage is 1,311.5 feet above mean sea level, datum of 1929.
Drainage area.- 2,680 square miles.
Gage-height record.- Wire-weight gage read twice daily. Gage heights above 12 feet obtained from graph based on gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Stage-discharge relation below about 12 feet affected by backwater from power dam downstream; discharge computed only for stages above 12 feet.
Maxima.- May-July 1951: Discharge, 25,000 cfs 4 a.m. June 3 (gage height, 28.3 ft.).
1945 to April 1951: Discharge, 27,600 cfs July 10, 1950 (gage height, 28.74 ft.).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1				11				21		2,370	
2		13,500		12				22		2,580	
3		20,800		13				23		1,400	
4		11,800		14		1,870		24			
5		7,710		15				25		1,520	
6		4,860		16				26		1,740	
7		3,130		17				27			
8		1,990		18		3,830		28			
9				19		6,850		29			
10				20		3,390		30			
								31			
Monthly mean discharge, in second-feet											
Runoff, in acre-feet											
Runoff, in inches											

Big Blue River at Barneston, Nebr.

Location.- Lat 40°03', long. 96°35', in NE¼SW¼ sec. 13, T. 1 N., R. 7 E., in tailwater of power plant, three-quarters of a mile northwest of Barneston, 2 miles upstream from Plum Creek, and 5 miles upstream from Nebraska-Kansas State line.
Drainage area.- 4,420 square miles.
Gage-height record.- Water-stage recorder graph except period July 25-31, for which a graph was drawn based on intermittent recorder record and occasional power plant tail-gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Shifting-control method used May 4 to June 2, July 15-31.
Maxima.- May-July 1951: Discharge, 26,000 cfs 12 p.m. June 4 (gage height, 27.48 ft).
1932 to April 1951: Discharge, 57,700 cfs June 9, 1941 (gage height, 34.3 ft).
Remarks.- Low flow regulated by power plant at gage, which has pondage of about 1,500 acre-feet. High flow occasionally affected for short periods by operation of trash gates.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	15,200	738	3,210	11	638	3,820	13,700	21	1,010	10,100	1,010
2	7,910	11,600	2,680	12	521	4,990	18,200	22	2,160	12,900	1,360
3	2,180	20,100	2,020	13	448	2,800	15,100	23	994	14,100	998
4	1,100	22,700	1,670	14	519	8,310	6,330	24	696	10,100	699
5	842	24,000	1,370	15	573	19,000	3,980	25	1,130	4,400	554
6	565	19,400	10,200	16	648	12,000	2,470	26	2,040	15,900	518
7	616	19,900	17,400	17	998	3,350	1,990	27	1,080	17,600	515
8	596	12,500	5,750	18	923	2,400	8,130	28	1,070	11,200	518
9	596	5,710	1,530	19	1,500	6,100	2,440	29	970	4,740	440
10	624	3,210	1,740	20	1,130	6,850	1,360	30	954	3,390	410
								31	811		419
Monthly mean discharge, in second-feet									1,647	10,460	4,152
Runoff, in acre-feet									101,200	622,600	255,300
Runoff, in inches									0.43	2.64	1.08

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	19.36	10,700	8.77	2,110	7.84	1,620	12.17	3,870	24.44	18,700	24.15	18,100
4	18.10	9,220	8.64	2,030	7.76	1,580	18.10	8,220	24.36	18,500	24.05	17,900
6	16.60	7,840	8.51	1,960	7.64	1,520	19.05	10,300	24.32	18,400	23.90	17,600
8	15.28	6,720	8.44	1,920	7.60	1,500	20.70	12,600	24.14	18,100	23.66	17,200
10	14.10	5,780	5.75	738	7.68	1,540	21.85	14,300	24.04	17,900	23.34	16,600
N	13.08	4,960	5.74	734	7.42	1,410	22.65	15,500	24.04	17,900	22.92	15,900
2	12.19	4,330	5.74	734	7.68	1,540	23.25	16,500	24.08	18,000	22.42	15,100
4	11.25	3,680	7.10	1,250	7.80	1,600	23.71	17,300	24.14	18,100	21.76	14,100
6	10.40	3,090	7.52	1,460	7.94	1,670	23.99	17,800	24.18	18,200	20.91	12,900
8	9.74	2,690	8.17	1,780	8.28	1,840	24.18	18,200	24.20	18,200	19.90	11,400
10	9.28	2,420	7.98	1,690	9.31	2,440	24.34	18,500	24.22	18,300	18.95	10,200
12	8.98	2,240	7.91	1,660	10.95	3,460	24.42	18,600	24.20	18,200	18.10	9,220
	July 14		July 15		July 16		July 17		July 18		July 19	
2	17.22	8,400	12.76	4,710	10.84	3,170	9.73	2,410	8.25	1,520	12.65	4,620
4	16.42	7,680	12.54	4,530	10.76	3,110	9.60	2,320	10.00	2,600	11.88	4,000
6	15.72	7,080	12.35	4,380	10.63	3,020	9.45	2,210	14.60	6,180	11.12	3,400
8	15.14	6,610	12.16	4,230	10.56	2,980	9.30	2,120	19.61	11,000	10.46	2,910
10	14.65	6,220	11.96	4,070	9.50	2,250	9.16	2,030	20.65	12,500	10.00	2,600
N	14.28	5,920	11.79	3,930	5.93	545	9.07	1,970	20.93	12,900	9.64	2,330
2	14.02	5,720	11.65	3,820	8.40	1,600	8.94	1,900	20.56	12,300	9.40	2,180
4	13.80	5,540	11.48	3,680	9.60	2,320	8.80	1,820	19.60	11,000	7.83	1,300
6	13.61	5,390	11.32	3,560	10.00	2,590	8.71	1,770	18.40	9,540	5.94	548
8	13.42	5,240	11.16	3,420	10.00	2,590	8.60	1,710	16.75	7,980	5.92	542
10	13.20	5,060	11.06	3,350	9.98	2,570	8.47	1,640	15.05	6,540	7.95	1,360
12	12.98	4,890	10.96	3,260	9.82	2,470	8.33	1,560	13.62	5,400	8.38	1,600
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4												
6												
8												
10												
N												
2												
4												
6												
8												
10												
12												

Big Blue River at Randolph, Kans.

Location.- Lat 39°27', long. 96°43', in SW¼ sec. 12, T. 7 S., R. 6 E., at bridge on State Highway 13, half a mile upstream from Fancy Creek and three-quarters of a mile east of Randolph. Datum of gage is 1,034.73 ft above mean sea level, datum of 1929.
Drainage area.- 9,100 square miles.
Gage-height record.- Water-stage recorder graph except for period July 29-31, for which a graph was drawn based on once-daily wire-weight gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements.
Maxima.- May-July 1951: Discharge, 60,100 cfs 2 p.m. July 13 (gage height, 28.88 ft).
1918 to April 1951: Discharge, 80,000 cfs (revised) June 10, 1941 (gage height, 30.81 ft), by conveyance-slope studies.
Flood of 1903 reached a stage of 30.6 ft, from floodmarks.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	27,200	1,780	17,400	11	1,870	5,620	49,700	21	3,360	39,800	4,740
2	35,800	3,010	9,620	12	1,820	6,570	57,100	22	2,820	51,000	7,010
3	18,100	18,100	6,610	13	1,640	6,370	59,200	23	3,590	45,400	12,200
4	4,800	24,000	5,550	14	1,520	6,780	50,000	24	2,600	36,200	4,890
5	3,350	27,100	5,840	15	1,500	21,200	32,800	25	2,150	22,200	3,720
6	2,760	31,700	7,030	16	3,990	35,500	15,500	26	2,410	31,900	3,930
7	2,180	37,000	14,900	17	4,870	24,300	9,710	27	2,950	46,900	2,980
8	2,100	39,400	17,500	18	3,160	5,610	7,330	28	2,030	53,900	3,040
9	1,970	28,300	7,970	19	5,860	4,920	14,800	29	1,900	51,400	2,650
10	1,920	10,600	25,300	20	5,510	9,340	7,060	30	2,020	36,400	2,730
								31	2,030		2,680
Monthly mean discharge, in second-feet									5,154	25,410	15,210
Runoff, in thousands of acre-feet									316.9	1,512	935.2
Runoff, in inches									0.65	3.12	1.93

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	18.26	17,100			10.61	4,410			27.87	51,800	28.77	59,000
4	18.45	17,400	15.57	12,300	12.01	5,930	26.84	46,700	28.06	52,900	28.75	58,800
6	18.61	17,600			14.90	10,900			28.36	55,100	28.76	58,900
8	18.76	17,800	13.87	8,750	16.97	15,000	27.47	49,800	28.55	56,800	28.80	59,300
10	18.85	18,000			20.29	20,400			28.70	58,300	28.85	59,800
N	18.91	18,100	12.55	6,650	23.45	30,000	27.76	51,300	28.80	59,300	28.87	60,000
2	18.92	18,100			24.32	34,100			28.82	59,500	28.88	60,100
4	18.87	18,000	11.59	5,430	24.89	37,000	27.77	51,400	28.80	59,300	28.87	60,000
6	18.75	17,800			25.30	39,000			28.80	59,300	28.82	59,500
8	18.47	17,400	10.94	4,740	25.67	40,800	27.78	51,400	28.73	58,600	28.76	58,900
10	17.98	16,700			25.90	42,000			28.75	58,800	28.67	58,000
12	17.32	15,600	10.50	4,320	26.18	43,400	27.80	51,500	28.74	58,700	28.54	56,800
	July 14		July 15		July 16		July 17		July 18		July 19	
2									13.25	7,680	14.89	10,900
4	28.24	54,100	25.52	40,100	18.72	17,800			13.09	7,420	15.97	13,200
6							14.82	10,700	13.02	7,310	16.95	15,000
8	27.89	52,000	24.90	37,000	17.67	16,200			12.92	7,170	17.68	16,200
10									12.90	7,140	18.20	17,000
N	27.50	50,000	24.22	33,600	17.04	15,100	14.17	9,340	12.84	7,060	18.44	17,400
2									12.78	6,970	18.36	17,300
4	27.10	48,000	23.34	29,500	16.50	14,200			12.76	6,940	18.04	16,800
6							13.86	8,730	12.82	7,030	17.53	16,000
8	26.66	45,800	22.12	24,700	16.00	13,200			12.92	7,170	16.81	14,700
10									13.20	7,600	16.00	13,200
12	26.12	43,100	20.34	20,500	15.52	12,200	13.42	7,950	13.96	8,920	15.24	11,600
	July 20		July 21		July 22		July 23		July 24		July 25	
2					10.25	4,120	17.28	15,600				
4	13.96	8,920	11.36	5,160	10.17	4,060	17.27	15,500	12.00	5,920	9.98	3,900
6					10.10	4,000	17.14	15,300				
8	13.05	7,360	11.19	4,990	10.04	3,950	16.80	14,700	11.27	5,070	9.89	3,830
10					9.99	3,910	16.36	13,900				
N	12.43	6,480	11.00	4,800	10.10	4,000	15.84	12,900	10.75	4,550	9.77	3,740
2					11.19	4,990	15.28	11,700				
4	11.90	5,800	10.65	4,450	13.07	7,390	14.74	10,500	10.40	4,240	9.64	3,630
6					14.75	10,600	14.23	9,460				
8	11.55	5,380	10.49	4,310	15.88	13,000	13.73	8,490	10.15	4,040	9.50	3,520
10					16.60	14,400	13.28	7,730				
12	11.46	5,270	10.34	4,190	17.08	15,200	12.86	7,080	10.04	3,950	9.34	3,390

Big Blue River near Manhattan, Kans.

Location.- Lat 39°15'30", long. 96°35'03", in SW¼ sec. 30, T. 9 S., R. 8 E., just above Kansas Power and Light Company power-plant dam and 8 miles upstream from mouth.
Drainage area.- 9,540 square miles.
Gage-height record.- Graph based on twice-daily readings of wire-weight gage and frequent readings of power-plant staff gage.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 37,000 cfs and by slope-area measurement of peak discharge. At times during May and June, discharges shown include flow through tainter gate and through generator, computed on basis of a current-meter measurement and records of plant operation.
Maxima.- May-July 1951: Discharge, 102,000 cfs 10 p.m. July 12 (gage height, 29.92 ft).
Remarks.- Some regulation by power-plant operation.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	23,800	2,490	26,200	11	1,980	7,570	78,100	21	6,000	32,500	6,160
2	33,800	4,050	12,300	12	2,370	7,390	95,300	22	3,760	73,200	5,990
3	28,200	17,000	8,510	13	2,210	9,320	96,300	23	5,260	63,200	15,800
4	8,010	24,100	6,110	14	1,800	8,050	83,600	24	4,050	45,300	7,310
5	4,520	26,900	5,430	15	1,910	20,100	54,000	25	3,090	30,100	4,480
6	3,250	30,000	6,990	16	5,660	31,400	22,700	26	3,150	28,600	5,010
7	2,580	35,200	15,300	17	7,630	34,000	13,100	27	4,270	52,600	3,850
8	2,310	38,000	19,200	18	5,320	9,830	9,420	28	3,200	75,000	3,050
9	2,820	37,200	13,300	19	8,350	5,550	15,800	29	2,850	81,700	2,960
10	2,260	14,500	29,800	20	9,250	11,000	10,800	30	2,770	59,100	2,780
								31	2,960		2,780
Monthly mean discharge, in second-feet									6,432	30,500	22,010
Runoff, in thousands of acre-feet									395.5	1,815	1,354
Runoff, in inches									0.78	3.57	2.66

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2			20.32	20,100	18.72	11,400						
4			20.14	19,100	18.61	10,800	27.50	69,000				
6	20.04	18,500	19.83	17,400	18.72	11,400			29.17	90,400	29.60	96,600
8			19.52	15,700	19.50	15,600	28.17	77,000				
10			19.20	13,900	20.75	22,400						
N	20.21	19,500	18.86	12,100	21.85	28,800	28.50	81,000	29.59	96,400	29.54	95,600
2			18.56	10,600	23.40	36,000						
4			18.30	9,450	24.15	38,800	28.70	83,800				
6	20.32	20,100	18.07	8,430	24.60	41,200			29.86	101,000	29.51	95,200
8			17.95	7,950	25.70	50,200	28.80	85,200				
10			18.03	8,270	26.18	55,000						
12	20.36	20,300	18.80	11,800	26.62	59,400	28.86	86,000	29.89	101,000	29.47	94,600
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4	29.33	92,600			22.43	31,800						
6			26.89	62,100			19.23	14,100	18.45	10,100	18.75	11,600
8	29.00	88,000			20.95	23,500						
10												
N	28.71	83,900	26.12	54,400	20.31	20,000	19.02	12,900	18.27	9,320	19.95	18,000
2												
4	28.42	80,000			19.91	17,800						
6			25.20	45,600			18.83	12,000	18.13	8,680	20.42	20,600
8	28.01	75,100			19.68	16,500						
10												
12	27.56	69,700	23.87	37,700	19.49	15,500	18.64	11,000	18.00	8,150	19.90	17,800
	July 20		July 21		July 22		July 23		July 24		July 25	
2							19.48	15,400				
4					17.20	5,250	19.71	16,700				
6	19.10	13,400					19.85	17,500	18.15	8,780	18.97	4,560
8					17.13	5,040	19.91	17,800				
10							19.92	17,900				
N	18.36	9,720	17.46	6,110	17.06	4,830	19.85	17,500	17.63	8,810	16.92	4,410
2							19.73	16,800				
4					17.00	4,650	19.56	15,900				
6	17.92	7,830					19.38	14,900	17.27	5,460	16.92	4,410
8					17.65	6,780	19.16	13,700				
10							18.94	12,500				
12	17.71	6,990	17.26	5,430	19.10	13,400	18.74	11,500	17.07	4,860	16.85	4,200

Supplemental record.- July 12, 10 p.m., 29.92 ft, 102,000 cfs.

Little Blue River at Angus, Nebr.

Location.- Lat 40°16'25", long. 97°58'20", in NW¼ sec. 35, T. 4 N., R. 6 W., at bridge on county road a quarter of a mile downstream from Ox Bow Creek and half a mile southeast of Angus.

Gage-height record.- Wire-weight read twice daily and more frequently during rises. Gage heights computed from graphs based on gage readings June 1-8, 13-24, June 26 to July 2, July 10-18, 22.

Discharge record.- Stage-discharge relation defined by current-meter measurements below 6,000 cfs and extended to peak stage. Shifting-control method used June 26 to July 10, July 16-31.

Maxima.- May-July 1951: Discharge, 18,500 cfs 3 p.m. June 26 (gage height, 13.4 ft). September 1950 to April 1951: Discharge, 13,000 cfs Sept 21, 1950 (gage height, 12.1 ft, from floodmark).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	201	1,800	506	11	99	169	4,490	21	264	243	186
2	165	7,630	354	12	95	142	6,120	22	414	1,060	401
3	137	2,130	284	13	93	474	4,660	23	264	820	222
4	124	613	231	14	102	823	2,720	24	198	577	166
5	115	318	207	15	100	810	1,850	25	153	317	151
6	108	247	188	16	97	679	743	26	196	10,800	145
7	102	720	174	17	118	280	350	27	214	14,800	133
8	99	495	167	18	119	1,370	293	28	139	7,440	126
9	97	356	154	19	330	862	252	29	130	3,040	126
10	126	247	1,910	20	256	352	214	30	126	996	121
								31	118		115
Monthly mean discharge, in second-feet									158	2,020	895
Runoff, in acre-feet									9,720	120,200	55,060
Runoff, in inches											

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					2.00	158						
4					2.90	297	8.45	2,360	10.45	6,890		
6					4.25	627						
8					5.74	1,120	9.00	2,740	10.35	6,560	9.85	4,920
10					7.25	1,760						
N					8.70	2,490	9.70	4,440	10.20	6,060		
2					9.60	4,120						
4					9.55	3,960	10.20	6,060	10.10	5,730	9.78	4,700
6					8.90	2,630						
8					8.40	2,330	10.40	6,720	10.00	5,400		
10					8.25	2,260						
12			1.95	152	8.20	2,230	10.50	7,060	9.90	5,080	9.45	3,650
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4												
6			7.90	2,080	5.15	868	3.85	457				
8	8.98	2,720										
10												
N			7.70	1,980	4.55	670	3.45	358				
2												
4	8.70	2,490										
6			7.00	1,630	4.22	571	2.85	233				
8												
10												
12	8.20	2,230	6.05	1,220	4.00	509	2.60	191				
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4												
6												
8												
10												
N												
2												
4												
6												
8												
10												
12												

Little Blue River near Endicott, Nebr.

Location.- Lat 40°05'10", long. 97°08'10", in sec. 6, T. 1 N., R. 3 E., 300 feet downstream from county highway bridge, 1½ miles upstream from Chicago, Burlington and Quincy Railroad bridge, and 2 miles northwest of Endicott.

Drainage area.- 2,340 square miles.

Gage-height record.- Water-stage recorder graph except period July 10-12.

Discharge record.- Stage-discharge relation defined by current-meter measurements. Shifting-control method used for stages below about 9 ft; for stages above 9 ft discharge computed by using rate of change in stage as a factor. Discharge for July 10-12 computed from graph based on gage readings obtained at bridge on State Highway 15 about 4 miles upstream.

Maxima.- May-July 1951: Discharge, 36,800 cfs 8 p.m. June 27. Gage height, 16.82 ft 12 p.m. June 27.

1908-15, 1929 to April 1951: Discharge, 31,000 cfs June 9, 1941 (gage height, 16.23 ft), from rating curve extended above 20,000 cfs.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	797	303	2,410	11	270	1,160	11,000	21	946	1,370	641
2	961	3,590	1,320	12	270	1,160	20,000	22	1,060	2,880	700
3	634	7,060	1,010	13	248	703	13,000	23	862	4,220	775
4	453	10,000	804	14	254	1,100	8,080	24	586	2,660	862
5	371	2,640	675	15	262	1,660	4,670	25	470	1,340	562
6	348	1,500	641	16	295	1,370	3,040	26	547	16,300	472
7	324	1,370	782	17	351	1,140	1,540	27	464	28,900	431
8	303	2,260	512	18	358	900	1,480	28	433	22,500	405
9	290	1,960	453	19	348	1,360	926	29	418	12,000	402
10	279	1,120	920	20	297	1,720	750	30	420	5,810	400
								31	344		371
Monthly mean discharge, in second-feet									450	4,735	2,582
Runoff, in acre-feet									28,290	281,800	158,700
Runoff, in inches									0.23	2.26	1.27

Little Blue River at Waterville, Kans.

Location.- Lat 39°42', long. 96°45', in SE¼ sec. 16, T. 4 S., R. 6 E., half a mile north of Waterville, 1 mile downstream from Corn Creek, and 4 miles upstream from mouth. Datum of gage is 1,111.06 ft above mean sea level, datum of 1929.
Drainage area.- 3,440 square miles.
Gage-height record.- Graph drawn on basis of wire-weight gage readings made generally once daily, twice daily at high stages.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 25,000 cfs and extended to peak stage by logarithmic plotting. Shifting-control method used July 16-31.
Maxima.- May-July 1951: Discharge, 38,200 cfs 2 a.m., July 13 (gage height, 24.65 ft). 1922-25, 1928 to April 1951: Discharge, 50,400 cfs June 10, 1941 (gage height, 26.20 ft, from floodmarks), by velocity-area studies.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	7,790	605	8,210	11	601	2,130	25,200	21	970	20,800	1,980
2	4,910	2,930	5,150	12	560	2,130	30,700	22	1,710	16,400	4,240
3	3,430	7,800	4,240	13	545	1,720	33,800	23	1,330	11,200	4,510
4	2,370	9,000	3,710	14	513	3,230	23,700	24	1,120	10,700	2,090
5	1,410	9,760	3,520	15	520	6,350	12,700	25	1,210	5,880	1,500
6	1,060	5,680	3,200	16	766	4,500	8,080	26	851	14,300	1,400
7	916	6,550	3,030	17	816	2,630	5,950	27	707	22,900	1,330
8	761	4,870	2,860	18	834	1,950	4,430	28	601	30,200	1,280
9	702	5,390	2,550	19	1,710	1,400	3,990	29	567	26,000	1,310
10	633	3,710	11,200	20	940	3,920	3,160	30	610	19,000	1,300
								31	633		1,200
Monthly mean discharge, in second-feet									1,358	8,788	7,146
Runoff, in acre-feet									83,500	522,900	439,400
Runoff, in inches									0.46	2.85	2.39

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					8.20	2,610						
4					9.42	3,590						
6					11.10	5,100	22.17	26,700	22.22	26,900	24.56	37,800
8					13.10	7,110						
10					14.80	8,980						
N	8.52	2,870	8.08	2,510	16.18	10,600	21.88	25,500	22.94	29,800	23.80	34,000
2					17.43	12,200						
4					18.45	13,900						
6					19.38	16,600	21.60	24,400	23.91	34,600	23.02	30,100
8					20.24	19,300						
10					20.95	21,800						
12	8.27	2,670	8.07	2,510	21.42	23,700	21.75	25,000	24.61	38,000	22.59	28,400
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4												
6	22.18	26,700										
8												
10												
N	21.65	24,600	17.26	12,000	13.92	7,900	12.42	6,020	11.10	4,300	10.90	4,050
2												
4												
6	20.70	21,000										
8												
10												
12	19.48	16,900	15.50	9,800	13.00	6,700	11.70	5,050	10.92	4,070	10.68	3,780
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4					8.91	1,750						
6							12.32	5,870				
8					9.08	1,880						
10												
N	10.19	3,190	9.05	1,860	11.32	4,570	10.95	4,150	9.19	2,010	8.44	1,490
2												
4					12.72	6,370						
6							10.30	3,300				
8					12.98	6,680						
10												
12	9.60	2,460	8.90	1,740	12.94	6,640	9.84	2,770	8.70	1,580	8.27	1,440

Supplemental record.- July 13, 2 a.m., 24.65 ft, 38,200 cfs.

Soldier Creek near Topeka, Kans.

Location.- Lat 39°06', long. 95°43', in NW¼ sec. 14, T. 11 S., R. 15 E., at steel highway bridge, 1½ miles upstream from Halfday Creek, 4 miles northwest of Topeka, and 7 miles upstream from mouth. Datum of gage is 866.38 ft above mean sea level (levels by Corps of Engineers).
Drainage area.- 268 square miles.
Gage-height record.- Graph drawn on basis of wire-weight gage readings made generally once daily, with frequent readings during periods of high stages, May 1, June 21-24, 26-30, July 5, 6, 10-12.
Discharge record.- Stage-discharge relation defined by current-meter measurements.
Maxima.- May-July 1951: Discharge, 13,200 cfs 12 p.m. July 12 (gage height, 29.06 ft).
1929 to April 1951: Discharge, 9,910 cfs April 23, 1944 (gage height, 28.2 ft, from graph based on gage readings).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	5,340	84	1,760	11	412	115	8,070	21	724	2,950	384
2	5,650	75	980	12	250	101	11,700	22	302	10,500	288
3	830	136	2,300	13	169	111	11,800	23	196	8,160	266
4	353	89	1,190	14	137	89	7,100	24	152	5,420	242
5	265	61	4,320	15	122	1,010	4,990	25	134	1,740	193
6	220	61	5,210	16	119	728	3,910	26	120	6,670	173
7	185	175	1,790	17	305	226	2,410	27	104	7,490	186
8	165	508	679	18	197	313	1,010	28	91	3,680	154
9	159	690	404	19	1,010	564	630	29	90	5,010	129
10	367	674	2,110	20	1,680	149	490	30	95	2,370	119
								31	92		116
Monthly mean discharge, in second-feet									646	1,998	2,423
Runoff, in acre-feet									39,740	118,900	149,000
Runoff, in inches									2.78	8.32	10.42

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					5.50	537	18.99	4,960	26.28	9,620		
4	7.18	890	4.91	427	6.60	766	20.76	5,900	27.05	10,200	28.99	13,100
6					8.12	1,100	22.40	6,860	27.55	10,600		
8	6.54	753	4.80	407	10.00	1,540	24.38	8,270	27.87	11,000	28.80	12,700
10					11.73	2,010	25.20	8,840	28.15	11,400		
N	6.01	642	4.73	394	12.91	2,380	25.46	9,020	28.40	11,900	28.51	12,100
2					13.68	2,650	25.58	9,110	28.60	12,300		
4	5.56	549	4.69	387	14.22	2,850	25.68	9,180	28.76	12,600	28.08	11,300
6					14.47	2,950	25.76	9,230	28.88	12,900		
8	5.22	484	4.68	386	14.18	2,830	25.83	9,280	28.97	13,000	27.53	10,400
10					15.70	3,440	25.98	9,390	29.02	13,100		
12	5.04	450	4.71	391	17.25	4,110	26.07	9,460	29.06	13,200	26.86	9,630
	July 14		July 15		July 16		July 17		July 18		July 19	
2	26.50	9,200					17.82	3,310				
4	26.03	8,730	21.97	5,420	19.65	4,120	17.40	3,140	11.24	1,260	8.13	693
6	25.56	8,300					16.98	2,970				
8	25.02	7,820	21.68	5,230	19.38	4,000	16.50	2,780	10.55	1,110	7.91	658
10	24.45	7,310					15.99	2,610				
N	23.80	6,790	21.35	5,030	19.17	3,910	15.40	2,410	9.73	956	7.70	624
2	23.20	6,310					14.80	2,210				
4	22.78	5,990	20.92	4,780	18.98	3,820	14.10	2,000	9.12	852	7.53	596
6	22.52	5,800					13.40	1,800				
8	22.37	5,700	20.48	4,540	18.72	3,700	12.88	1,670	8.72	787	7.37	569
10	22.28	5,640					12.42	1,550				
12	22.21	5,590	20.00	4,300	18.19	3,470	11.99	1,440	8.42	739	7.23	545
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4	7.10	523	6.50	421	5.87	314	5.50	257	5.56	266	5.11	202
6												
8	6.99	504	6.39	402	5.78	300	5.52	260	5.49	256	5.07	197
10												
N	6.90	489	6.28	384	5.69	286	5.56	266	5.40	243	5.02	190
2												
4	6.80	472	6.17	365	5.61	274	5.60	272	5.32	232	5.00	187
6												
8	6.71	457	6.06	346	5.55	264	5.62	275	5.21	216	4.98	184
10												
12	6.61	440	5.95	328	5.51	258	5.60	272	5.17	211	4.97	183

Supplemental records.- July 10, 7 p.m., 14.12 ft, 2,810 cfs.

Delaware River at Valley Falls, Kans.

Location.- Lat 39°21', long. 95°27', in SW¼ sec. 18, T. 8 S., R. 18 E., at county highway bridge, 200 ft downstream from Walnut Creek, 300 ft upstream from Atchison, Topeka, and Santa Fe Railway bridge, and a quarter of a mile north of Valley Falls. Datum of gage is 884.55 ft above mean sea level, datum of 1929.
Drainage area.- 922 square miles.
Gage-height record.- Graph drawn on basis of two or more daily wire-weight gage readings except May 4 and July 29, when gage was not read.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 39,000 cfs and by slope-area measurement of peak discharge. Discharge for days of no gage-height record computed on basis of records for stations on nearby streams.
Maxima.- May-July 1951: Discharge, 94,600 cfs 9:30 p.m. June 21 (gage height, 32.08 ft, from floodmarks).
1922 to April 1951: Discharge, 45,900 cfs June 16, 1945 (gage height, 27.85 ft, from floodmark).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	18,600	282	1,070	11	1,010	257	21,300	21	850	42,900	605
2	1,510	349	776	12	593	305	32,500	22	700	56,300	475
3	1,010	401	2,100	13	432	329	18,200	23	522	15,200	456
4	670	246	1,370	14	365	226	2,020	24	419	3,300	391
5	654	215	5,180	15	337	1,230	1,200	25	378	1,220	357
6	637	222	16,200	16	1,720	1,270	934	26	370	14,800	329
7	505	1,040	12,700	17	1,090	406	711	27	325	13,500	304
8	460	1,620	1,320	18	549	246	6,140	28	271	16,400	284
9	490	748	828	19	7,580	293	2,660	29	278	13,400	270
10	910	396	1,570	20	1,980	500	784	30	278	1,740	259
								31	293		245
Monthly mean discharge, in second-feet									1,477	6,311	4,305
Runoff, in acre-feet									90,820	375,600	264,900
Runoff, in inches									1.85	7.64	5.39

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	5.66	1,890			4.35	862	15.08	9,180	24.89	31,400	24.55	29,800
4	5.41	1,680	4.37	878	4.42	915	18.24	12,700	24.91	31,600	24.22	28,100
6	5.19	1,500			4.49	968	20.62	16,500	24.93	31,600	23.77	25,800
8	5.03	1,370	4.30	825	4.59	1,040	21.49	18,300	24.95	31,800	23.18	23,400
10	4.90	1,280			4.73	1,150	22.15	20,000	25.00	32,000	22.30	20,500
N	4.83	1,220	4.26	797	4.90	1,280	22.84	22,200	25.18	32,900	21.20	17,600
2	4.75	1,160			5.10	1,430	23.37	24,200	25.39	34,000	20.00	15,400
4	4.68	1,110	4.24	783	5.32	1,610	23.85	26,200	25.45	34,200	18.68	13,300
6	4.63	1,070			5.55	1,800	24.25	28,200	25.36	33,800	17.16	11,400
8	4.56	1,020	4.26	797	6.00	2,180	24.55	29,800	25.21	33,000	15.24	9,340
10	4.50	975			6.67	2,700	24.71	30,600	25.03	32,200	11.95	6,510
12	4.46	945	4.31	832	10.02	4,980	24.82	31,100	24.82	31,100	7.98	3,570
	July 14		July 15		July 16		July 17		July 18		July 19	
2	6.96	2,900							4.09	684	10.60	5,430
4	6.40	2,500							4.22	769	9.62	4,680
6	6.02	2,200	4.90	1,280	4.51	982	4.21	762	4.45	938	8.68	4,020
8	5.80	2,010							6.25	2,380	7.85	3,480
10	5.69	1,920							15.20	9,300	6.96	2,900
N	5.60	1,840	4.75	1,160	4.45	938	4.11	696	17.25	11,500	6.16	2,310
2	5.54	1,790							16.57	10,700	5.36	1,640
4	5.47	1,730							15.77	9,870	4.84	1,230
6	5.40	1,670	4.66	1,100	4.38	885	4.04	654	14.84	8,960	4.54	1,000
8	5.30	1,590							13.78	8,010	4.36	870
10	5.22	1,530							12.75	7,150	4.31	832
12	5.16	1,480	4.58	1,040	4.30	825	4.02	642	11.70	6,310	4.30	825
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4									3.56	414		
6	4.30	825			3.73	490	3.67	462				
8									3.50	390		
10												
N	4.28	811	3.95	602	3.68	466	3.67	462	3.46	374	3.41	354
2												
4									3.47	378		
6	4.18	742			3.65	452	3.65	452				
8									3.48	382		
10												
12	4.10	690	3.80	525	3.66	457	3.62	439	3.47	378	3.38	343

Wakarusa River near Lawrence, Kans.

Location.- Lat 38°55', long. 95°16', in NW¼ sec. 24, T. 13 S., R. 19 E., at bridge on U. S. Highway 59, 4 miles southwest of Lawrence, and 11 miles upstream from mouth. Datum of gage is 799.24 ft above mean sea level, datum of 1929.
Drainage area.- 458 square miles.
Gage-height record.- Graph drawn on basis of two or more daily wire-weight gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 15,000 cfs and extended to peak stage by logarithmic plotting.
Maxima.- May-July 1951: Discharge, 24,200 cfs 12 p.m. July 12 (gage height, 31.59 ft, from floodmark).
1929 to April 1951: Discharge, 18,500 cfs April 23, 1944 (gage height, 30.00 ft, from graph based on gage readings).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	2,850	78	1,630	11	718	329	21,300	21	196	121	485
2	3,660	62	790	12	396	311	22,600	22	347	672	269
3	746	40	1,300	13	266	253	22,100	23	516	1,510	262
4	463	30	1,350	14	202	174	9,790	24	275	3,760	333
5	331	28	1,480	15	163	256	1,910	25	168	1,220	268
6	256	226	2,350	16	158	526	996	26	132	8,120	194
7	217	3,560	4,160	17	241	217	693	27	108	13,300	156
8	190	3,130	1,240	18	214	141	501	28	91	6,490	162
9	178	2,720	678	19	182	429	424	29	82	3,730	116
10	907	670	15,700	20	157	172	409	30	79	3,820	93
								31	81		85
Monthly mean discharge, in second-feet									470	1,870	3,672
Runoff, in acre-feet									28,900	111,300	225,800
Runoff, in inches									1.18	4.55	9.24

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	16.20	2,370	9.88	706	16.48	2,470						
4	14.69	1,860	9.78	686	24.00	6,150			31.07	21,800		
6	13.31	1,460	9.71	672	29.07	14,200	30.88	21,000			31.46	23,600
8	12.20	1,200	9.64	659	29.80	16,800			31.10	22,000		
10	11.49	1,040	9.58	647	30.18	18,200						
N	11.11	959	9.55	642	30.38	19,000	30.97	21,400	31.17	22,300	31.21	22,400
2	10.82	897	9.53	638	30.48	19,400						
4	10.60	851	9.51	634	30.59	19,900			31.29	22,800		
6	10.40	810	9.50	632	30.69	20,300	31.02	21,600			30.89	21,100
8	10.26	782	9.50	632	30.77	20,600			31.50	23,800		
10	10.11	752	9.55	642	30.81	20,700						
12	9.99	728	12.00	1,160	30.85	20,900	31.04	21,700	31.59	24,200	30.27	18,600
	July 14		July 15		July 16		July 17		July 18		July 19	
2	30.01	17,500										
4	29.69	16,400	16.65	2,530			10.43	816	9.02	534		
6	29.27	14,900			11.57	1,060						
8	28.80	13,400	15.19	2,020			10.17	764	9.03	536		
10	28.00	11,200										
N	26.28	7,920	15.12	2,000	11.23	986	9.86	702	8.95	520	8.50	430
2	24.75	6,640										
4	23.25	5,700	13.24	1,440			9.43	616	8.77	484		
6	21.88	4,930			10.94	922						
8	20.64	4,270	12.53	1,280			9.15	560	8.59	448		
10	19.49	3,700										
12	18.43	3,220	12.08	1,170	10.64	859	9.05	540	8.51	432	8.38	406
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4	8.32	394	8.78	486								
6					7.72	274	7.54	238	8.06	342		
8	8.27	384	8.87	504								
10												
N	8.31	392	8.89	508	7.53	236	7.63	256	8.08	346	7.69	268
2												
4	8.41	412	8.85	500								
6					7.57	244	7.75	280	8.01	332		
8	8.54	438	8.71	472								
10												
12	8.68	466	8.40	410	7.53	236	7.91	312	7.91	312	7.47	224

Stranger Creek near Tonganoxie, Kans.

Location.- Lat 39°06', long. 95°01', in NE¼ sec. 13, T. 11 S., R. 21 E., at highway bridge 1 mile upstream from Tonganoxie Creek, 4 miles east of Tonganoxie, and 9 miles upstream from mouth. Datum of gage is 796.95 ft above mean sea level (levels by Corps of Engineers).

Drainage area.- 406 square miles.

Gage-height record.- Water-stage recorder graph except for periods May 23, 24, 26, 27, 29-31, June 2, 3, 7, 9, 10, 12, for which a graph was drawn based on once-daily wire-weight gage readings, May 25, 28, June 1, 4-6, 8, 11, when there was no gage-height record.

Discharge record.- Stage-discharge relation defined by current-meter measurements below 16,000 cfs and by slope-area measurement of peak discharge. Discharge for periods of no gage-height record computed on basis of recorded range in stage and records for stations on nearby streams.

Maxima.- May-July 1951: Discharge, 33,100 cfs 12 p.m. July 12 (gage height, 28.94 ft). 1929 to April 1951: Discharge, 15,500 cfs Dec. 5, 1944 (gage height, 27.40 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	2,380	95	2,640	11	773	220	3,370	21	135	811	246
2	3,220	73	468	12	406	155	14,200	22	141	2,620	196
3	3,100	67	656	13	254	88	19,400	23	119	7,300	190
4	512	65	892	14	198	78	10,200	24	104	9,960	190
5	323	70	2,760	15	168	108	2,580	25	105	4,110	165
6	261	150	3,430	16	172	438	567	26	108	3,150	148
7	222	104	3,950	17	218	329	346	27	106	3,820	134
8	201	450	6,170	18	186	131	278	28	84	8,290	124
9	224	365	2,600	19	164	119	870	29	74	3,810	116
10	1,060	307	1,120	20	144	470	679	30	81	8,160	111
								31	96		114
Monthly mean discharge, in second-feet									495	1,864	2,545
Runoff, in acre-feet									30,420	110,900	156,500
Runoff, in inches									1.41	5.12	7.23

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	25.70	6,960	24.50	3,700	17.20	1,300	16.84	1,230	24.90	3,940		
4	25.72	7,060	23.93	3,390	16.89	1,240	20.32	2,150	25.03	4,070	28.54	27,900
6	25.74	7,150	23.33	3,130	16.58	1,180	22.91	2,970	25.25	4,820		
8	25.75	7,200	22.87	2,950	16.21	1,100	24.01	3,420	25.59	6,430	27.99	21,800
10	25.73	7,100	22.45	2,810	15.82	1,020	24.60	3,760	26.02	8,500		
N	25.68	6,860	21.89	2,620	15.63	986	24.94	3,960	26.51	11,100	27.45	17,000
2	25.61	6,530	21.23	2,420	15.65	990	25.07	4,170	27.15	15,000		
4	25.50	6,000	20.55	2,220	15.87	1,030	25.08	4,190	27.62	18,500	27.02	14,100
6	25.37	5,380	19.79	1,990	16.13	1,090	25.04	4,100	28.32	25,400		
8	25.20	4,600	19.03	1,760	16.30	1,120	25.00	4,000	28.14	23,400	26.80	12,800
10	25.00	4,000	18.25	1,560	16.37	1,130	24.94	3,960	28.61	28,800		
12	24.78	3,870	17.58	1,400	16.38	1,140	24.86	3,920	28.94	33,100	26.78	12,700
	July 14		July 15		July 16		July 17		July 18		July 19	
2			25.12	4,310							10.49	260
4	26.80	12,800	24.84	3,900	13.75	658	11.66	379			10.49	260
6			24.47	3,680					10.78	287	10.84	293
8	26.70	12,200	24.01	3,420	13.41	607	11.50	361			12.46	476
10			23.26	3,100							14.22	730
N	26.44	10,700	22.15	2,700	13.19	577	11.31	340	10.67	276	15.63	986
2			20.39	2,170							16.46	1,150
4	26.13	9,080	18.46	1,620	12.84	528	11.16	325			17.09	1,280
6			16.78	1,220					10.56	266	17.47	1,370
8	25.76	7,250	15.55	970	12.30	455	11.03	312			17.65	1,410
10			14.76	822							17.64	1,410
12	25.35	5,280	14.26	737	12.00	418	10.94	303	10.50	261	17.42	1,360
	July 20		July 21		July 22		July 23		July 24		July 25	
2	16.96	1,250										
4	16.32	1,120					9.50	178				
6	15.59	978	10.51	262					9.66	191		
8	14.73	816					9.57	184				
10	13.91	682										
N	13.14	570	10.28	241	9.72	196	9.68	192	9.71	195	9.33	164
2	12.47	477										
4	11.96	413					9.78	200				
6	11.56	368	10.11	227					9.61	187		
8	11.26	335					9.75	198				
10	11.01	310										
12	10.86	295	9.96	215	9.51	179	9.70	194	9.48	176	9.20	155

Supplemental records.- July 12, 7 p.m., 28.55 ft, 28,000 cfs.

Marais de Cygnes River at Melvern, Kans.

Location.- Lat 38°31', long. 95°38', in SW¼ sec. 3, T. 18 S., R. 16 E., half a mile north of Melvern and 1½ miles upstream from Long Creek.
Drainage area.- 363 square miles.
Gage-height record.- From graph based on once-daily wire-weight gage readings, except May 9, 10, 16, June 26, 30, July 17, when there was insufficient gage-height record to construct the graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 19,000 cfs and by slope-area measurement of peak discharge. Discharge for days of insufficient gage-height computed on basis of records for stations on nearby streams.
Maxima.- May-July 1951: Discharge, 68,000 cfs 6 a.m. July 11 (gage height, 31.5 ft, from floodmarks).
1939 to April 1951: Discharge, 29,000 cfs April 23, 1944 (gage height, 26.7 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	3,690	55	742	11	97	389	59,000	21	220	60	239
2	1,400	46	348	12	95	202	40,200	22	273	160	180
3	935	37	1,230	13	92	204	24,700	23	930	2,790	3,070
4	399	31	1,170	14	92	220	5,480	24	318	1,540	659
5	119	31	700	15	99	246	681	25	192	522	306
6	109	34	2,940	16	500	234	738	26	180	1,500	238
7	104	1,420	7,310	17	90	180	1,500	27	128	372	426
8	93	1,790	3,790	18	83	119	388	28	92	444	224
9	2,500	1,420	639	19	84	86	291	29	69	458	180
10	480	1,190	9,840	20	180	69	267	30	60	3,500	146
								31	59		125
Monthly mean discharge, in second-feet									444	645	5,411
Runoff, in acre-feet									27,300	38,380	332,700
Runoff, in inches									1.41	1.98	17.19

Marais des Cygnes River near Ottawa, Kans.

Location.- Lat 38°37', long. 95°15', in NW¼ sec. 6, T. 17 S., R. 20 E., three-quarters of a mile downstream from Skunk Creek and 1½ miles southeast of Ottawa. Datum of gage is 858.08 ft above mean sea level (levels by Corps of Engineers).
Drainage area.- 1,260 square miles.
Gage-height record.- Water-stage recorder graph except for periods May 1-6, for which graph was drawn based on once-daily readings of U. S. Geological Survey wire-weight gage, and 9 p.m. July 12 to 5 p.m. July 16, for which graph was drawn based on once-daily readings of U. S. Weather Bureau gage 1½ miles upstream, which were converted by a gage-relation curve.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 44,000 cfs and by slope-area measurement of peak discharge.
Maxima.- May-July 1951: Discharge, 142,000 cfs 12 p.m. July 11 to 2 a.m. July 12 (gage height, 42.50 ft), by slope-area measurement.
1902-5, 1918 to April 1951: Discharge, 75,000 cfs Nov. 17, 1928 (gage height, 38.65 ft).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	4,800	224	9,500	11	5,950	1,910	62,300	21	788	256	665
2	9,110	198	7,120	12	1,280	796	139,000	22	748	467	536
3	8,880	163	1,580	13	786	759	117,000	23	1,620	982	2,540
4	3,500	143	1,120	14	585	527	51,300	24	1,580	4,280	4,210
5	856	128	1,300	15	464	449	19,100	25	794	6,600	2,100
6	646	140	1,670	16	434	1,070	11,500	26	516	7,080	713
7	519	3,090	5,040	17	753	987	4,650	27	383	10,500	876
8	440	7,010	8,720	18	845	464	3,120	28	326	7,660	945
9	673	11,200	7,760	19	740	323	1,110	29	286	8,460	478
10	7,970	8,710	10,100	20	635	440	822	30	241	9,680	385
								31	230		305
Monthly mean discharge, in second-feet									1,851	3,157	15,410
Runoff, in acre-feet									113,800	187,800	947,200
Runoff, in inches									1.69	2.80	14.10

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					15.83	5,260	29.33	13,400	42.50	142,000		
4	20.78	8,020	23.02	9,360	18.33	6,660	29.77	13,700	42.44	141,000	42.02	134,000
6					20.73	7,990	30.31	14,100	42.46	141,000		
8	21.53	8,470	22.48	9,040	22.95	9,320	31.43	15,500	42.35	140,000	41.67	129,000
10					24.63	10,300	32.58	20,600	42.25	138,000		
N	22.18	8,860	21.30	8,330	25.77	11,000	34.98	42,600	42.20	137,000	41.20	122,000
2					26.60	11,500	37.63	71,600	42.20	137,000		
4	22.67	9,150	19.28	7,140	27.43	12,100	39.53	97,400	42.24	138,000	40.55	112,000
6					28.08	12,600	40.73	115,000	42.27	138,000		
8	23.02	9,360	16.65	5,820	28.48	12,800	41.63	128,000	42.25	138,000	39.45	96,300
10					28.81	13,100	42.25	138,000	42.21	137,000		
12	23.15	9,440	14.67	4,250	29.06	13,200	42.50	142,000	42.19	137,000	38.28	79,900
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4					29.44	13,500	15.85	5,280	14.26	3,910	7.27	1,290
6	36.78	61,600	32.83	22,600								
8					28.62	12,900	14.95	4,500	13.85	3,610	6.65	1,140
10												
N	35.65	49,300	31.97	16,700	27.55	12,200	14.67	4,250	13.23	3,240	6.28	1,050
2												
4					25.80	11,000	14.65	4,240	12.41	2,860	6.03	988
6	34.65	39,300	31.11	14,900								
8					22.28	8,920	14.65	4,240	10.73	2,260	5.87	945
10												
12	33.70	30,300	30.20	14,100	18.15	6,580	14.59	4,180	8.27	1,540	5.75	912
	July 20		July 21		July 22		July 23		July 24		July 25	
2							4.63	603				
4							7.23	1,290			13.11	3,170
6	5.59	869					10.23	2,100	14.23	3,880		
8							12.10	2,740			11.53	2,540
10							13.08	3,150				
N	5.41	821	4.85	666	4.41	539	13.26	3,260	15.03	4,580	9.49	1,880
2							13.16	3,200				
4							13.03	3,120			7.73	1,410
6	5.25	778					12.94	3,080	15.24	4,770		
8							12.87	3,050			6.57	1,120
10							12.92	3,070				
12	5.08	732	4.61	597	4.18	472	13.18	3,210	14.37	4,000	5.83	934

Supplemental records.- July 23, 1 a.m., 4.18 ft, 472 cfs.

Marais des Cygnes River at Trading Post, Kans.

Location.- Lat 38°15', long. 94°41', in SE¼ sec. 5, T. 21 S., R. 25 E., at bridge on U. S. Highway 69 at Trading Post, 1 mile upstream from Big Sugar Creek. Datum of gage is 761.16 ft above mean sea level, datum of 1929.
Drainage area.- 2,910 square miles.
Gage-height record.- Water-stage recorder graph except for period 6 a.m. July 13 to 12 p.m. July 14, for which a graph was drawn based on floodmark and shape of graph on adjacent days, and July 15 to 22, for which a graph was drawn based on twice-daily wire-weight gage readings.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 110,000 cfs and extended to peak stage on basis of area-velocity studies.
Maxima.- May-July 1951: Discharge, 148,000 cfs 2 to 4 a.m. July 14 (gage height, 38.12 ft, from floodmark in gage house).
1921-23, 1928 to April 1951: Discharge, 120,000 cfs Nov. 18, 1928 (gage height, 34.45 ft), from rating curve extended above 74,000 cfs.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	1,850	912	51,700	11	6,940	14,200	27,400	21	2,250	6,900	14,100
2	8,360	728	39,600	12	10,100	13,900	59,000	22	2,740	2,900	4,630
3	11,900	616	31,800	13	7,500	6,950	126,000	23	2,800	4,340	2,240
4	13,200	538	32,100	14	2,400	2,300	141,000	24	3,120	13,000	7,580
5	12,900	472	27,600	15	1,500	1,580	107,000	25	3,120	15,900	9,510
6	6,240	454	22,100	16	1,220	3,950	73,000	26	2,210	17,100	8,090
7	1,760	2,160	20,800	17	2,330	8,620	52,600	27	1,460	21,000	2,940
8	1,240	6,440	19,100	18	2,630	4,830	39,300	28	1,060	23,400	1,630
9	1,060	11,200	16,800	19	2,290	1,980	30,100	29	888	28,900	1,820
10	1,950	13,500	17,600	20	2,290	3,100	23,800	30	819	44,200	1,690
								31	763		896
Monthly mean discharge, in second-feet									3,900	9,202	32,690
Runoff, in thousands of acre-feet									239.8	547.6	2,010
Runoff, in inches									1.54	3.53	12.95

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2												
4	26.14	19,900					26.57	21,800	28.84	39,400	34.96	107,000
6			25.04	17,300	24.65	16,500						
8	25.99	19,500					26.98	23,900	29.40	45,000	35.97	119,000
10												
N	25.83	19,100	24.79	16,800	25.14	17,500	27.50	27,000	30.26	54,100	36.78	129,000
2												
4	25.65	18,700					27.93	30,400	31.54	69,500	37.39	137,000
6			24.52	16,200	25.51	18,400						
8	25.47	18,300					28.20	33,000	32.49	80,400	37.83	144,000
10												
12	25.30	17,900	24.30	15,800	26.18	20,100	28.52	36,200	33.81	94,600	38.07	147,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4	38.12	148,000										
6			35.73	116,000	32.48	80,300	30.48	56,800	29.13	42,300	28.12	32,200
8	38.01	146,000										
10												
N	37.76	143,000	34.87	106,000	31.78	72,400	30.14	52,700	28.81	39,100	27.84	29,700
2												
4	37.43	138,000										
6			34.03	96,800	31.18	65,200	29.74	48,400	28.51	36,100	27.64	28,100
8	37.02	132,000										
10												
12	36.56	126,000	33.23	88,500	30.75	60,000	29.43	45,300	28.29	33,900	27.48	26,900
	July 20		July 21		July 22		July 23		July 24		July 25	
2					17.90	8,370	4.32	1,870	13.42	5,090	19.11	9,340
4	27.37	26,200	25.24	17,800	16.80	7,500	4.14	1,770	14.43	5,800	19.20	9,420
6					15.63	6,640	4.07	1,720	15.36	6,450	19.26	9,470
8	27.23	25,400	24.36	15,900	14.33	5,730	4.02	1,680	16.21	7,060	19.32	9,520
10					12.83	4,690	4.02	1,680	16.89	7,570	19.36	9,560
N	27.03	24,200	23.28	14,000	11.24	3,700	4.11	1,750	17.44	8,000	19.40	9,590
2					9.63	3,180	4.40	1,900	17.98	8,430	19.41	9,600
4	26.75	22,800	22.00	12,100	8.33	2,920	5.25	2,200	18.30	8,690	19.41	9,600
6					7.14	2,660	6.93	2,610	18.53	8,870	19.40	9,590
8	26.38	20,900	20.50	10,600	6.15	2,420	8.92	3,040	18.71	9,020	19.36	9,560
10					5.30	2,210	10.82	3,480	18.87	9,150	19.30	9,500
12	25.89	19,200	18.89	9,160	4.68	2,010	12.25	4,310	19.00	9,250	19.21	9,430

Supplemental records.- July 10, 1 a.m., 24.27 ft, 15,700 cfs; July 14, 2 a.m. 38.12 ft, 148,000 cfs.

Osage River at Osceola, Mo.

Location.- Lat 38°03'44", long. 93°41'37", in NE¼NE¼ sec. 17, T. 38 N., R. 25 W., half a mile downstream from Gallinipper Creek, 1 mile downstream from hydroelectric plant of West Missouri Power Co., and 1 mile northeast of Osceola. Datum of gage is 678.91 ft above mean sea level, datum of 1929.
Drainage area.- 8,220 square miles.
Gage-height record.- Water-stage recorder graph.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Gage heights used to half tenths below 6.0 ft and tenths above.
Maxima.- May-July 1951: Discharge, 98,300 cfs 2 to 7 p.m. July 6 (gage height, 35.87 ft in gage well, 36.04 ft from outside gage).
1921-28, 1930 to April 1951: Discharge, 146,000 cfs May 21, 1943 (gage height, 41.48 ft in gage well, 41.7 ft from outside gage).
Maximum stage known prior to 1943, about 40.3 ft in June 1844, from profile based on floodmarks in the vicinity and furnished by Union Electric Company of Missouri (discharge, 135,000 cfs, from rating curve defined by discharge measurements since 1931).
Remarks.- Low and medium flow regulated by power plant 1 mile upstream.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	4,190	3,680	53,800	11	5,040	16,300	67,700	21	5,210	9,370	84,500
2	5,210	2,620	60,500	12	9,550	18,400	65,700	22	8,830	18,200	77,400
3	10,300	2,230	65,800	13	12,100	19,900	61,000	23	14,300	25,800	69,600
4	13,700	1,930	89,400	14	12,700	17,400	56,600	24	14,100	32,700	62,200
5	14,700	1,650	74,200	15	9,190	14,100	57,600	25	13,300	27,000	55,200
6	15,300	1,350	96,100	16	4,700	9,550	65,900	26	13,100	28,800	49,500
7	14,700	2,050	90,900	17	3,280	11,600	79,200	27	12,000	30,600	42,800
8	9,190	6,740	74,000	18	3,760	13,900	88,600	28	8,110	30,600	35,500
9	4,360	14,100	64,400	19	5,380	12,300	91,600	29	4,280	33,400	28,300
10	3,760	15,700	67,600	20	5,210	8,470	90,600	30	2,830	44,800	20,100
								31	3,120		7,930
Monthly mean discharge, in second-feet									8,565	15,840	64,330
Runoff, in thousands of acre-feet									526.6	942.6	3,955
Runoff, in inches									1.20	2.15	9.02

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	33.44	80,500	31.22	67,300	30.02	61,400	31.59	69,500	31.00	66,300	30.56	64,300
4	33.10	78,500	31.06	66,800	30.42	63,300	31.51	68,900	30.98	66,300	30.47	63,800
6	33.03	77,900	30.92	65,800	30.64	64,300	31.44	68,400	30.95	66,300	30.36	63,300
8	32.90	77,300	30.75	65,300	31.00	66,300	31.38	68,400	30.93	65,800	30.23	62,400
10	32.65	75,400	30.61	64,300	31.19	67,300	31.31	67,900	30.91	65,800	30.08	61,900
N	32.47	74,800	30.47	63,800	31.43	68,400	31.28	67,900	30.88	65,800	29.97	61,400
2	32.27	73,600	30.33	62,800	31.61	69,500	31.23	67,300	30.89	65,800	29.80	60,500
4	32.01	71,800	30.22	62,400	31.71	70,100	31.19	67,300	30.87	65,800	29.68	60,000
6	31.92	71,200	30.10	61,900	31.76	70,600	31.12	66,800	30.83	65,300	29.57	59,600
8	31.72	70,100	30.01	61,400	31.74	70,100	31.10	66,800	30.78	65,300	29.39	58,700
10	31.53	68,900	30.85	65,300	31.70	70,100	31.06	66,800	30.71	64,800	29.29	58,200
12	31.37	68,400	30.78	65,300	31.63	69,500	31.03	66,300	30.67	64,800	29.20	57,800
	July 14		July 15		July 16		July 17		July 18		July 19	
2	29.16	57,800	28.82	56,000	29.84	60,500	32.22	73,000	34.15	85,900	34.89	90,900
4	29.09	57,300	28.87	56,500	30.03	61,400	32.39	74,200	34.23	85,900	34.92	90,900
6	29.00	56,900	28.89	56,500	30.23	62,400	32.59	75,400	34.30	86,600	34.96	91,600
8	29.00	56,900	28.91	56,500	30.40	63,300	32.79	76,600	34.39	87,300	34.97	91,600
10	28.95	56,900	28.97	56,900	30.58	64,300	32.97	77,900	34.47	88,000	34.97	91,600
N	28.91	56,500	29.05	56,900	30.77	65,300	33.16	79,200	34.56	88,700	34.98	91,600
2	28.88	56,500	29.13	57,300	30.96	66,300	33.29	79,800	34.65	88,700	34.99	91,600
4	28.87	56,500	29.20	57,800	31.17	67,300	33.45	80,500	34.71	89,400	35.01	91,600
6	28.86	56,500	29.30	58,200	31.37	68,400	33.59	81,800	34.77	90,200	35.04	91,300
8	28.83	56,000	29.42	58,700	31.60	69,500	33.75	83,200	34.85	90,200	35.04	91,600
10	28.84	56,000	29.57	59,600	31.78	70,600	33.86	83,800	34.88	90,900	35.07	92,300
12	28.85	56,000	29.70	60,000	31.99	71,800	34.02	84,500	34.91	90,900	35.07	92,300
	July 20		July 21		July 22		July 23		July 24		July 25	
2	35.07	92,300	34.46	88,000	33.45	80,500	32.24	73,000	30.82	65,300	29.28	58,200
4	35.07	92,300	34.38	87,300	33.35	80,500	32.12	72,400	30.68	64,800	29.16	57,800
6	35.05	91,600	34.33	86,600	33.25	79,200	31.99	71,800	30.57	64,300	29.02	56,900
8	35.02	91,600	34.21	85,900	33.15	79,200	31.88	71,200	30.47	63,800	28.97	56,500
10	34.98	91,600	34.12	85,200	33.06	78,500	31.75	70,300	30.37	63,300	28.75	56,000
N	34.95	91,600	34.03	84,500	32.96	77,900	31.65	69,500	30.22	62,400	28.59	55,200
2	34.88	90,900	33.95	84,500	32.86	77,300	31.55	69,500	30.08	61,900	28.48	54,800
4	34.78	90,200	33.82	83,200	32.75	76,600	31.42	68,400	29.97	61,400	28.36	54,500
6	34.74	89,400	33.77	83,200	32.65	75,400	31.30	67,900	29.82	60,500	28.19	53,800
8	34.67	89,400	33.67	82,500	32.55	75,400	31.17	67,300	29.68	60,000	28.07	53,500
10	34.59	88,700	33.57	81,800	32.45	74,200	31.07	66,800	29.56	59,600	27.89	52,900
12	34.53	88,000	33.49	81,200	32.35	74,200	30.96	66,300	29.45	58,700	27.75	52,600

Lake of the Ozarks near Bagnell, Mo.

Location.- Lat 38°12', long. 92°37', in SE¼ sec. 19, T. 40 N., R. 15 W., at Bagnell Dam on Osage River, 2 miles southwest of Bagnell. Datum of gage is at mean sea level, adjustment of 1912, or 1.18 ft below mean sea level, datum of 1929, determined by Union Electric Company of Missouri. Elevations given herein are referred to adjustment of 1912.
Drainage area.- 14,000 square miles.
Gage-height record.- Water-stage recorder graph.
Maxima.- May-July 1951: Contents, 1,482,000 acre-feet 12 m. to 10 p.m. July 7 (elevation, 664.41 ft).
1931 to April 1951: Contents, 1,527,000 acre-feet May 22, 1943 (elevation, 635.45 ft).
Remarks.- Reservoir is formed by concrete gravity dam. Spillway is equipped with 12 taintor gates 34 ft wide by 22 ft high. Storage began in 1931. Usable capacity, 1,235,000 acre-feet between elevations 630.00 ft (maximum draw-down) and 660.00 ft (top of gates) above mean sea level. Dead storage, 774,000 acre-feet. Figures given herein are of usable contents. Water is used for generating electricity. Records collected and prepared in cooperation with the Union Electric Co. of Missouri.

Elevation, in feet, and contents, in acre-feet, at 12 p.m. of indicated day

Day	May		June		July	
	Elevation	Acre-feet	Elevation	Acre-feet	Elevation	Acre-feet
1	651.53	804,300	655.48	998,800	662.75	1,393,000
2	651.55	805,300	655.48	998,800	663.08	1,410,000
3	651.63	809,100	655.65	1,008,000	663.08	1,410,000
4	651.86	820,100	655.45	997,300	663.14	1,414,000
5	652.58	854,300	655.21	984,900	663.64	1,440,000
6	653.30	889,400	654.95	971,500	664.37	1,480,000
7	653.70	909,200	654.77	962,300	664.40	1,481,000
8	653.90	919,200	654.58	952,900	664.20	1,471,000
9	653.86	917,200	654.95	971,500	663.79	1,449,000
10	653.68	908,300	655.13	980,800	663.74	1,446,000
11	653.44	896,400	655.31	990,100	663.74	1,446,000
12	653.55	901,800	655.74	1,012,000	663.56	1,436,000
13	654.00	924,100	656.15	1,034,000	663.52	1,439,000
14	654.04	926,100	656.34	1,044,000	663.12	1,413,000
15	654.07	927,600	656.67	1,062,000	662.59	1,385,000
16	653.89	918,700	657.35	1,098,000	662.11	1,359,000
17	653.57	902,800	657.90	1,128,000	661.81	1,343,000
18	653.24	886,400	658.17	1,143,000	661.76	1,340,000
19	653.38	893,400	658.31	1,151,000	661.84	1,344,000
20	654.30	939,000	658.31	1,151,000	661.95	1,350,000
21	654.64	955,900	658.09	1,138,000	661.93	1,349,000
22	655.26	987,500	658.09	1,138,000	661.76	1,340,000
23	655.37	993,200	658.72	1,173,000	661.48	1,325,000
24	655.43	996,200	659.82	1,235,000	661.15	1,306,000
25	655.44	996,800	660.17	1,255,000	660.87	1,292,000
26	655.75	1,013,000	660.29	1,261,000	660.63	1,280,000
27	656.24	1,038,000	660.29	1,261,000	660.39	1,267,000
28	656.22	1,037,000	660.73	1,285,000	660.15	1,254,000
29	656.07	1,030,000	661.48	1,325,000	660.09	1,251,000
30	656.12	1,032,000	662.52	1,381,000	660.08	1,250,000
31	655.81	1,016,000			659.79	1,233,000

Osage River near Bagnell, Mo.

Location.- Lat 38°12'26", long. 92°35'23", in N½SE¼ sec. 21, T. 40 N., R. 15 W., 1½ miles upstream from Bagnell and 3 miles downstream from hydroelectric plant of Union Electric Company of Missouri.
Datum of gage is 548.57 ft above mean sea level, datum of 1929.
Drainage area.- 14,000 square miles.
Gage-height record.- Water-stage recorder graph except for May 1, June 26 to July 1, when there was no recorder record.
Discharge record.- Stage-discharge relation defined by current-meter measurements. Gage heights used to half-tenths between 3.9 and 6.4 ft, hundredths below and tenths above these limits. Discharge determined by integration on days of power plant regulation. Discharge during periods of no gage-height record obtained from power plant operating data.
Maxima.- May-July 1951: Discharge, 126,000 cfs 5 to 8 a.m. July 8 (gage height, 38.26 ft).
1925 to April 1951: Discharge, 220,000 cfs May 19, 1943 (gage height, 48.8 ft).
Maximum stage known prior to 1943, 43.1 ft in June 1844 (discharge, 164,000 cfs).
Remarks.- Flow regulated by Lake of the Ozarks (see preceding page).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	9,400	12,800	93,800	11	13,600	20,800	119,000	21	8,760	21,200	102,000
2	9,360	4,620	96,900	12	8,940	21,100	117,000	22	16,200	21,400	102,000
3	9,620	1,570	100,000	13	3,270	21,100	119,000	23	20,500	23,900	97,900
4	9,910	9,040	101,000	14	13,100	20,800	117,000	24	20,800	34,600	92,900
5	834	9,130	104,000	15	13,500	19,200	115,000	25	19,600	50,900	85,600
6	500	9,220	116,000	16	13,200	9,460	113,000	26	8,060	57,600	77,600
7	8,640	12,100	124,000	17	13,600	1,870	109,000	27	2,840	59,600	68,700
8	9,140	20,000	124,000	18	12,800	12,400	105,000	28	13,100	61,400	57,300
9	9,750	21,100	122,000	19	4,400	15,700	104,000	29	13,100	71,400	40,500
10	12,300	20,300	119,000	20	1,380	21,100	102,000	30	5,090	84,900	29,300
								31	13,700		25,000
Monthly mean discharge, in second-feet									10,290	25,680	96,760
Runoff, in thousands of acre-feet									632.7	1,528	5,949
Runoff, in inches									0.85	2.05	7.98

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	38.24	125,000	37.87	123,000	37.30	120,000	37.12	119,000	36.92	117,000	37.00	118,000
4	38.24	125,000	37.84	123,000	37.28	120,000	37.12	119,000	36.94	117,000	37.10	119,000
6	38.26	126,000	37.82	123,000	37.27	120,000	37.12	119,000	36.97	118,000	37.18	119,000
8	38.26	126,000	37.80	123,000	37.25	119,000	37.12	119,000	36.97	118,000	37.20	119,000
10	38.12	125,000	37.70	122,000	37.22	119,000	37.10	119,000	36.96	118,000	37.19	119,000
N	38.10	125,000	37.60	122,000	37.20	119,000	37.10	119,000	36.96	118,000	37.18	119,000
2	38.06	125,000	37.53	121,000	37.20	119,000	36.93	117,000	36.95	118,000	37.12	119,000
4	38.02	124,000	37.46	121,000	37.18	119,000	37.01	118,000	36.93	117,000	37.10	119,000
6	37.98	124,000	37.42	120,000	37.16	119,000	37.12	119,000	36.93	117,000	37.10	119,000
8	37.94	123,000	37.40	120,000	37.16	119,000	37.12	119,000	36.93	117,000	37.10	119,000
10	37.92	123,000	37.35	120,000	37.15	119,000	36.88	117,000	36.92	117,000	37.09	119,000
12	37.90	123,000	37.32	120,000	37.13	119,000	36.88	117,000	36.91	117,000	37.08	119,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	37.04	118,000	36.64	116,000	36.21	114,000	35.87	112,000	34.60	106,000	34.38	104,000
4	37.00	118,000	36.60	116,000	36.18	114,000	35.82	112,000	34.60	106,000	34.37	104,000
6	36.98	118,000	36.57	116,000	36.13	113,000	35.80	112,000	34.57	106,000	34.34	104,000
8	36.93	117,000	36.52	115,000	36.10	113,000	35.78	112,000	34.53	105,000	34.33	104,000
10	36.91	117,000	36.49	115,000	36.08	113,000	35.67	111,000	34.51	105,000	34.33	104,000
N	36.90	117,000	36.47	115,000	36.04	112,000	35.33	109,000	34.50	105,000	34.28	104,000
2	36.88	117,000	36.43	115,000	36.00	112,000	35.18	108,000	34.48	105,000	34.20	104,000
4	36.83	117,000	36.40	115,000	35.97	112,000	35.03	108,000	34.46	105,000	34.15	104,000
6	36.80	117,000	36.37	115,000	35.94	112,000	34.94	107,000	34.43	104,000	34.11	103,000
8	36.77	117,000	36.33	114,000	35.91	112,000	34.70	106,000	34.40	104,000	34.08	103,000
10	36.72	116,000	36.30	114,000	35.88	112,000	34.73	106,000	34.38	104,000	34.07	103,000
12	36.70	116,000	36.27	114,000	35.88	112,000	34.70	106,000	34.37	104,000	34.05	102,000
	July 20		July 21		July 22		July 23		July 24		July 25	
2	34.03	102,000	33.98	102,000	33.95	102,000	33.40	99,600	32.45	95,200	31.08	89,400
4	34.00	102,000	33.98	102,000	33.94	102,000	33.35	99,600	32.39	95,200	31.02	89,000
6	34.00	102,000	33.98	102,000	33.94	102,000	33.29	99,200	32.32	94,700	30.97	89,000
8	34.00	102,000	33.98	102,000	33.93	102,000	33.24	98,700	32.28	94,700	30.90	88,600
10	34.00	102,000	33.98	102,000	33.91	102,000	33.15	98,700	32.13	93,800	30.64	87,200
N	34.00	102,000	33.98	102,000	33.90	102,000	33.04	97,800	32.02	93,400	30.20	85,500
2	34.00	102,000	33.98	102,000	33.90	102,000	32.94	97,400	31.85	92,500	29.98	84,600
4	34.00	102,000	33.98	102,000	33.89	102,000	32.88	97,400	31.72	92,100	29.83	83,700
6	33.94	102,000	33.98	102,000	33.80	102,000	32.83	96,900	31.60	91,600	29.70	83,300
8	33.94	102,000	33.98	102,000	33.72	101,000	32.80	96,900	31.52	91,200	29.58	82,800
10	33.97	102,000	33.97	102,000	33.60	101,000	32.66	96,500	31.37	90,800	29.50	82,400
12	33.98	102,000	33.96	102,000	33.50	100,000	32.52	95,600	31.23	89,900	29.34	81,500

Osage River near St. Thomas, Mo.

Location.- Lat 38°20'25", long. 92°13'25", in SE¼SW¼ sec. 35, T. 42 N., R. 12 W., 0.5 mile downstream from Sugar Creek and 2½ miles south of St. Thomas. Datum of gage is 528.06 ft above mean sea level, datum of 1929.

Drainage area.- 14,500 square miles.

Gage-height record.- Water-stage recorder graph except for periods May 3, 4, 13, 15-21, July 10-17, 20-23, for which graph was drawn based on daily gage readings and recorded range line.

Discharge record.- Stage-discharge relation defined by current-meter measurements. Gage heights used to half-tenths below 5.6 ft and to tenths above.

Maxima.- May-July 1951: Discharge 130,000 cfs about 7 to 11 p.m. July 13 (gage height, 35.20 ft).

1931 to April 1951: Discharge, 216,000 cfs May 20, 1943 (gage height, 43.8 ft). Maximum stage known prior to 1943, about 39.4 ft in June 1844.

Remarks.- Flow regulated by Lake of the Ozarks (see p.).

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	9,410	12,900	94,300	11	14,000	21,600	124,000	21	5,640	21,000	109,000
2	9,940	10,800	97,400	12	11,600	21,900	124,000	22	17,200	21,300	108,000
3	9,940	3,780	102,000	13	6,000	21,300	128,000	23	24,100	23,800	106,000
4	10,200	3,700	105,000	14	7,100	21,300	128,000	24	21,600	33,400	103,000
5	8,630	9,410	107,000	15	13,500	20,100	124,000	25	20,400	49,800	96,900
6	2,620	10,200	114,000	16	13,200	14,300	121,000	26	14,000	60,600	89,800
7	2,740	9,940	122,000	17	13,200	6,850	118,000	27	6,600	62,300	81,000
8	9,150	19,800	128,000	18	12,900	4,240	114,000	28	5,640	63,200	69,000
9	9,150	24,800	128,000	19	10,500	13,800	112,000	29	13,500	68,100	52,600
10	11,000	21,600	126,000	20	2,920	20,100	110,000	30	9,410	82,900	33,400
								31	6,360		27,400
Monthly mean discharge, in second-feet									10,710	25,960	103,300
Runoff, in thousands of acre-feet									658.8	1,545	6,353
Runoff, in inches									0.85	2.00	8.22

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge	Gage height	Dis-charge
	July 8		July 9		July 10		July 11		July 12		July 13	
2	34.67	126,000	35.01	128,000	34.88	128,000	34.51	125,000	34.40	124,000	34.58	126,000
4	34.71	126,000	35.01	128,000	34.86	128,000	34.51	125,000	34.40	124,000	34.61	126,000
6	34.79	127,000	35.00	128,000	34.82	127,000	34.50	125,000	34.40	124,000	34.66	126,000
8	34.83	127,000	34.99	128,000	34.78	127,000	34.48	125,000	34.41	124,000	34.72	126,000
10	34.87	128,000	34.98	128,000	34.72	126,000	34.46	125,000	34.41	124,000	34.80	127,000
N	34.89	128,000	34.97	128,000	34.69	126,000	34.44	124,000	34.43	124,000	34.83	127,000
2	34.91	128,000	34.96	128,000	34.64	126,000	34.42	124,000	34.45	124,000	34.93	128,000
4	34.93	128,000	34.96	128,000	34.63	126,000	34.42	124,000	34.45	124,000	35.01	128,000
6	34.96	128,000	34.95	128,000	34.60	126,000	34.41	124,000	34.47	125,000	35.10	129,000
8	34.99	128,000	34.95	128,000	34.58	126,000	34.41	124,000	34.50	125,000	35.20	130,000
10	35.00	128,000	34.93	128,000	34.55	126,000	34.40	124,000	34.51	125,000	35.20	130,000
12	35.01	128,000	34.91	128,000	34.53	125,000	34.40	124,000	34.54	125,000	35.14	129,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	35.14	129,000	34.62	126,000	34.09	122,000	33.67	120,000	33.12	116,000	32.59	113,000
4	35.10	129,000	34.58	126,000	34.05	122,000	33.61	119,000	33.06	116,000	32.57	113,000
6	35.05	128,000	34.53	125,000	34.00	122,000	33.59	119,000	33.00	116,000	32.53	113,000
8	35.01	128,000	34.48	125,000	33.97	122,000	33.56	119,000	32.92	115,000	32.51	113,000
10	34.96	128,000	34.45	124,000	33.93	121,000	33.50	119,000	32.88	115,000	32.49	113,000
N	34.95	128,000	34.40	124,000	33.90	121,000	33.47	119,000	32.82	114,000	32.48	113,000
2	34.92	128,000	34.36	124,000	33.88	121,000	33.42	118,000	32.79	114,000	32.45	112,000
4	34.88	128,000	34.31	124,000	33.83	121,000	33.41	118,000	32.76	114,000	32.42	112,000
6	34.83	127,000	34.25	123,000	33.81	121,000	33.37	118,000	32.71	114,000	32.40	112,000
8	34.79	127,000	34.20	123,000	33.79	121,000	33.29	117,000	32.68	114,000	32.38	112,000
10	34.72	126,000	34.15	123,000	33.75	121,000	33.23	117,000	32.65	113,000	32.35	112,000
12	34.69	126,000	34.13	122,000	33.70	120,000	33.19	117,000	32.62	113,000	32.32	111,000
	July 20		July 21		July 22		July 23		July 24		July 25	
2	32.31	111,000	31.96	110,000	31.72	108,000	31.65	107,000	31.16	105,000	30.08	99,500
4	32.28	111,000	31.93	109,000	31.70	108,000	31.62	107,000	31.07	105,000	30.03	99,000
6	32.23	111,000	31.91	109,000	31.70	108,000	31.60	107,000	31.00	104,000	39.93	98,500
8	32.20	111,000	31.89	109,000	31.70	108,000	31.60	107,000	30.91	104,000	29.85	98,000
10	32.19	111,000	31.85	109,000	31.71	108,000	31.59	107,000	30.84	103,000	29.76	98,000
N	32.16	111,000	31.83	109,000	31.71	108,000	31.53	107,000	30.73	103,000	29.66	97,400
2	32.13	110,000	31.80	109,000	31.73	108,000	31.50	107,000	30.62	102,000	29.56	96,900
4	32.11	110,000	31.79	109,000	31.73	108,000	31.43	106,000	30.54	102,000	29.47	96,400
6	32.09	110,000	31.77	109,000	31.73	108,000	31.39	106,000	30.45	101,000	29.38	95,900
8	32.06	110,000	31.74	108,000	31.73	108,000	31.32	106,000	30.37	101,000	29.26	95,400
10	32.01	110,000	31.73	108,000	31.70	108,000	31.28	106,000	30.30	101,000	29.13	94,300
12	31.99	110,000	31.73	108,000	31.68	108,000	31.22	105,000	30.20	100,000	28.97	93,800

Salt Creek near Lyndon, Kans.

Location.- Lat 38°37', long. 95°38', in SW¼ sec. 34, T. 16 S., R. 16 E., on downstream side of county highway bridge, 2½ miles east of Lyndon.
Drainage area.- 111 square miles.
Gage-height record.- Graph based on usually once-daily readings of wire-weight gage, except May 3, 18, 20, 24, June 7, 10, July 14, 21, 27, 30, when there was no gage-height record, and June 8, when there was insufficient gage-height record.
Discharge record.- Stage-discharge relation defined by current-meter measurements below 60,000 cfs and by slope-area measurement of peak discharge. Discharge for days of no gage-height record computed on basis of unpublished records for Hundred and Ten Mile Creek near Quenemo and records for other stations on nearby streams.
Maxima.- May-July 1951: Discharge, 36,400 cfs 10 a.m. July 11 (gage height, 17.00 ft, from floodmarks).
1939 to April 1951: Discharge, 17,900 cfs (revised) Apr. 22, 1944 and Apr. 16, 1945 (gage height, 16.0 ft, from floodmark).
Flood of 1935 reached a stage of 20.3 ft, from floodmarks.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	2,700	12	158	11	88	62	16,600	21	36	10	70
2	434	8.5	95	12	73	53	7,760	22	249	22	129
3	120	7.0	58	13	50	66	1,540	23	291	205	603
4	73	7.0	45	14	30	148	750	24	65	924	226
5	49	16	48	15	30	123	218	25	40	117	90
6	41	1,370	1,270	16	127	30	182	26	29	683	62
7	30	1,700	993	17	88	20	428	27	23	120	270
8	30	900	158	18	45	15	185	28	18	652	135
9	854	414	71	19	36	13	127	29	12	1,060	69
10	137	120	4,600	20	40	11	98	30	9.0	1,360	45
								31	11		39
Monthly mean discharge, in second-feet									189	342	1,197
Runoff, in acre-feet									11,620	20,330	73,630
Runoff, in inches									1.96	3.43	12.42

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2					2.89	44	15.15	10,000	15.76	15,000		
4					2.90	45	15.78	15,200	15.46	12,100	9.37	2,700
6					3.00	58	15.28	10,800	15.03	9,520		
8					5.20	550	16.71	30,000	14.57	8,560	8.20	1,920
10					11.69	4,800	17.00	36,400	14.10	7,850		
N	3.57	151	3.06	67	13.60	7,100	16.72	30,200	13.63	7,140	7.08	1,250
2					13.91	7,560	16.12	19,600	13.13	6,470		
4					13.98	7,670	15.50	12,400	12.64	5,840	6.18	790
6					14.00	7,700	14.94	9,220	12.13	5,280		
8					14.01	7,720	14.54	8,510	11.62	4,720	5.60	540
10					14.06	7,790	14.35	8,220	11.08	4,190		
12	3.30	105	2.90	45	14.38	8,270	14.95	9,250	10.51	3,680	5.23	392
	July 14		July 15		July 16		July 17		July 18		July 19	
2												
4												
6					4.62	186	6.25	825				
8												
10												
N			4.73	219	4.53	162	5.20	380	4.61	183	4.38	126
2												
4												
6					4.49	152	4.90	270				
8												
10												
12			4.69	207	4.82	246	4.75	225	4.48	150	4.28	106
	July 20		July 21		July 22		July 23		July 24		July 25	
2												
4							5.75	600				
6					3.98	53						
8							6.02	710				
10												
N	4.25	100			4.13	77	5.98	692	4.58	175	4.21	92
2												
4							5.84	636				
6					4.53	162						
8							5.63	552				
10												
12	4.18	86			5.25	400	5.38	452	4.25	100	4.11	74

Neosho River near Parsons, Kans.

Location.- Lat 37°20', long. 95°06', in NE¼ sec. 21, T. 31 S., R. 21 E., at bridge on U. S. Highway 160, half a mile upstream from Hickory Creek, three-quarters of a mile upstream from St. Louis-San Francisco Railway bridge, 2½ miles upstream from dam of Kansas Ordnance Plant, and 8½ miles east of Parsons. Datum of gage is 810.25 ft above mean sea level (levels by Corps of Engineers).
Drainage area.- 4,817 square miles, including that of Hickory Creek.
Gage-height record.- Water-stage recorder graph, except for period July 14-21, for which a graph was drawn based on high-water mark in gage well and a stage record at the Kansas Gas and Electric Company plant about 3 miles downstream.
Discharge record.- Stage-discharge relation defined by current-meter measurements.
Maxima.- May-July 1951: Discharge, 439,000 cfs 1 to 2 p.m. July 14 (gage height, 40.20 ft, from high-water mark in gage well).
1921 to April 1951: Discharge, 87,800 cfs July 27, 1948 (gage height, 30.74 ft).
Remarks.- Small diversion from pool in which gage is located by the Kansas Ordnance Plant.

Mean discharge, in second-feet, 1951

Day	May	June	July	Day	May	June	July	Day	May	June	July
1	1,210	2,060	27,800	11	9,030	13,900	40,900	21	9,220	7,500	40,400
2	8,480	1,890	28,800	12	7,280	16,200	39,500	22	17,800	7,230	30,800
3	14,900	1,780	29,300	13	5,650	18,800	70,200	23	22,400	12,200	15,100
4	16,100	1,660	30,800	14	5,640	20,900	400,000	24	17,300	17,100	8,440
5	16,500	1,530	32,600	15	4,600	12,800	279,000	25	11,400	23,300	14,500
6	18,000	1,420	33,300	16	2,960	3,830	132,000	26	8,640	24,800	17,500
7	20,100	1,590	32,900	17	2,650	6,540	85,300	27	7,980	24,900	14,100
8	21,700	4,600	33,900	18	5,340	8,730	69,800	28	6,980	22,600	7,410
9	9,830	7,410	35,400	19	4,570	9,300	60,600	29	5,330	15,400	5,690
10	4,630	11,200	40,100	20	7,020	5,970	51,000	30	3,830	24,500	5,440
								31	2,430		4,350
Monthly mean discharge, in second-feet									9,687	11,050	55,380
Runoff, in thousands of acre-feet									595.6	657.8	3,405
Runoff, in inches									2.32	2.56	13.26

Gage height, in feet, and discharge, in second-feet, at indicated time, 1951

Hour	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge	Gage height	Discharge
	July 8		July 9		July 10		July 11		July 12		July 13	
2											26.76	38,900
4					26.54	36,200					26.78	39,100
6											26.79	39,300
8					26.89	40,600					26.81	39,500
10											26.82	39,700
N	26.29	33,900	26.47	35,500	27.01	42,100	26.92	41,000	26.80	39,400	26.82	39,700
2											26.83	39,800
4					26.98	41,700					26.92	41,000
6											28.28	58,400
8					26.96	41,500					32.23	119,000
10											35.15	197,000
12	26.40	34,800	26.51	35,900	26.96	41,500	26.86	40,200	26.76	38,900	36.90	266,000
	July 14		July 15		July 16		July 17		July 18		July 19	
2	38.02	317,000										
4	38.80	356,000										
6	39.40	391,000	38.40	336,000	33.58	148,000	30.75	91,000				
8	39.82	416,000										
10	40.05	430,000										
N	40.18	438,000	37.12	275,000	32.66	127,000	30.32	83,600	29.35	69,600	28.63	60,600
2	40.20	439,000										
4	40.16	437,000										
6	40.02	428,000	35.80	222,000	31.93	113,000	30.03	79,000				
8	39.82	416,000										
10	39.60	403,000										
12	39.36	389,000	34.58	177,000	31.30	100,000	29.78	75,300	28.97	64,600	28.29	56,500
	July 20		July 21		July 22		July 23		July 24		July 25	
2									12.33	6,500		
4					26.30	34,000	22.15	22,400	12.35	6,520		
6									12.47	6,700	16.89	13,500
8					26.08	32,500	19.74	18,000	12.69	7,040		
10									12.92	7,480		
N	27.84	51,200	26.89	40,600	25.77	30,800	17.32	14,100	13.35	8,020	17.68	14,700
2									13.72	8,580		
4					25.36	29,100	15.36	11,200	14.10	9,160		
6									14.59	9,940	18.32	15,600
8					24.80	27,600	13.60	8,400	15.01	10,600		
10									15.41	11,300		
12	27.26	44,900	26.48	35,600	23.85	25,700	12.48	6,720	15.91	12,100	18.86	16,500

Supplemental record.- July 14, 1 p.m., 40.20 ft, 439,000 cfs.

SUMMARY OF FLOOD STAGES AND DISCHARGES

The results of the determinations of maximum flood flows at existing gaging stations and at miscellaneous points on streams in the area covered by this report are summarized and presented in table 2. Miscellaneous points can be identified by the absence of a period of record and of nearly all data other than discharge during the present flood.

Figure 8, a plot of maximum discharge in cubic feet per second per square mile, shows the variation of unit discharges with size of drainage area during the flood period.

The methods used in determining the maximum discharge are indicated in the discharge column by symbols which are explained in the headnotes. Figures of discharge that are not qualified by a symbol were obtained from a stage-discharge relation.

Table 2.--Summary of flood discharges in Kansas, Missouri, and Nebraska for the floods of May-July 1951
(Maximum discharges for the floods of May-July 1951 were obtained from gaging-station records, except as otherwise indicated by the following symbols: A, by current-meter measurement; B, by indirect methods)

No. on fig. 2	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (ft)	Discharge		Time	Gage height (ft)	Discharge	
						cfs	cfs per square mile			cfs	cfs per square mile
	MISSOURI RIVER MAIN STEM										
1	Missouri River at St. Joseph, Mo.	424,300	1928-	Apr. 29, 1881	27.2	a 370,000	0.87	May 3, 6 a.m.	19.9	198,000	0.47
2	Missouri River at Kansas City, Mo.	489,200	1905-6, 1928-	June 16, 1844	38.0	a 625,000	1.28	July 14, 1 p.m.	b 36.2	573,000	1.17
3	Missouri River at Waverly, Mo.	491,200	1929-	Apr. 24, 1944	c 25.14	347,000	.71	July 16, 8-11 a.m.	d 28.2	532,000	1.08
4	Missouri River at Boonville, Mo.	505,700	1925-	June 21, 1844	32.7	a 710,000	1.40	July 17, 2 p.m.	e 32.82	550,000	1.09
5	Missouri River at Hermann, Mo.	528,200	1928-	June 1844	35.5	a 892,000	1.69	July 19, 8 a.m. to 12 m.	33.33	618,000	1.17
	KANSAS RIVER BASIN										
6	Republican River near Bloomington, Nebr.	20,800	1929-	June 1, 1935	f, g20.4	260,000	12.5	July 14, 4 p.m.	7.04	11,000	.53
7	Republican River near Guide Rock, Nebr.	-	1950-	Sept. 20, 1950	8.46	10,200	-	May 22, 2 p.m.	9.82	14,300	-
8	Republican River near Hardy, Nebr.	22,400	1932-	June 2, 1935	19.4	225,000	10.0	June 2, 11:45 a.m.	12.59	18,600	.83
9	Republican River at Scandia, Kans.	22,930	1919-25, 1928-44, 1950-	June 2, 1935	f 17.8	215,000	9.38	July 11, 8 a.m.	11.60	38,200	1.67
10	Republican River at Concordia, Kans.	23,540	1946-	June 25, 1947	14.90	75,000	3.19	July 13, 2 p.m.	11.23	33,600	1.43
11	Republican River at Clay Center, Kans.	24,570	1917-	June 3, 1935	f 25.74	(h)	-	July 12, 6 p.m.	22.20	51,500	2.10
12	Republican River at Milford, Kans.	24,900	(i)	-	-	-	-	July 12, 12 m.	19.70	62,900	2.53
13	Kansas River at Ogden, Kans.	45,240	1917-	June 3, 1935	j 28.03	170,000	3.76	July 12, 10 p.m.	30.53	314,000	6.94
14	Kansas River at Wamego, Kans.	55,240	1919-	June 4, 1935	k 23.79	177,000	3.20	July 13, 5:30 a.m.	27.56	340,000	6.15
15	Kansas River at Topeka, Kans.	56,710	1917-	June 5, 1935	m, n26.65	154,000	2.72	July 13, 6:30 a.m.	36.34	478,000	8.43
16	Kansas River at Lecompton, Kans.	58,420	1899-1905, 1936-	May 31, 1903	(p)	-	-	July 13, 4 p.m.	30.23	483,000	8.27
17	Kansas River at Bonner Springs, Kans.	59,890	1917-	June 18, 1943	25.23	147,000	2.45	July 13, 12 p.m.	38.58	510,000	8.52
18	Kansas River at Kansas City, Kans.	-	-	-	-	-	-	July 14, 8 a.m.-3 p.m.	q 35.80	A 503,000	-
19	White Rock Creek at Lovewell, Kans.	358	1946-	July 10, 1950	n 21.62	23,300	65.1	June 7, 7:30 p.m.	21.40	26,600	74.3

20	Smoky Hill River near Russell, Kans.	6,965	1939-	June 18, 1942	r 18.70	22,300	3.20	May 23, 6:30 p.m.	23.26	39,500	5.67
21	Smoky Hill River at Ellsworth, Kans.	7,580	1895-1905, 1918-25, 1928-	June 1, 1938	27.2	61,000	8.05	May 23, 9:15 p.m.	24.12	30,000	3.96
22	Kanopolis Reservoir near Kanopolis, Kans.	7,857	1948-	Sept. 1, 2, 1950	1,491.03	s 248,400	-	July 14	1,506.90	s 434,000	-
23	Smoky Hill River near Langley, Kans.	t 7,857	1941-	Oct. 20, 1941	23.47	17,200	2.19	July 15, 8 a.m.	15.29	5,570	.71
24	Smoky Hill River at Lindsborg, Kans.	8,110	1930-	May 1903	33.9	32,000	3.95	July 12, 4 p.m.	29.32	18,700	2.30
25	Smoky Hill River near Mentor, Kans.	8,230	1923-32, w 1947-	Aug. 17, 1927	n 25.8	n 7,450	.90	July 13, 10 a.m.	24.93	24,000	2.92
26	Smoky Hill River at Enterprise, Kans.	19,200	1934-	May 1903	a 32	90,000	4.69	July 14, 2p.m.	33.96	240,000	12.5
27	Smoky Hill River at Junction City, Kans.	19,900	-	-	-	-	-	July 13, 1 a.m.	v 33.40	279,000	14.0
28	Big Creek near Hays, Kans.	-	1946-	Oct. 6, 1946	19.65	w 4,000	-	May 22, 4 a.m.	21.46	21,000	-
29	Saline River near Russell, Kans.	1,502	1946-	July 26, 1950	18.40	14,300	9.52	June 28, 9 p.m.	19.12	17,000	11.3
30	Saline River at Tescott, Kans.	2,820	1919-	June 3, 1935	29.57	6,850	2.43	July 13, 4 a.m.	30.06	61,400	21.8
31	South Fork Solomon River at Webster, Kans.	-	1945-	June 22, 1948	11.12	15,000	-	-	f 14.9	55,200	-
32	South Fork Solomon River at Alton, Kans.	1,720	1919-25, 1928-32, 1942-	June 16, 1943	x 19.94	11,500	6.69	July 12, between 7 and 9 p.m.	f 27.10	91,900	53.4
33	South Fork Solomon River at Osborne, Kans.	2,024	1946-	Aug. 29, 1950	20.13	10,000	4.94	July 13, 2 a.m.	27.65	76,800	37.9
34	Solomon River near Cawker City, Kans.	4,960	-	-	-	-	-	-	-	95,400	19.2
35	Solomon River at Glen Elder, Kans.	5,040	-	-	-	-	-	-	-	104,000	20.6
36	Solomon River at Beloit, Kans.	5,430	1895-97, 1929-	June 3, 1935	f 34.5	37,800	6.96	July 13, 4 a.m.	39.30	125,000	23.0
37	Solomon River at Niles, Kans.	6,770	1897-1903, 1917-	June 3, 1903	y 33.8	41,000	6.06	July 14, 6 a.m.	31.76	178,000	26.3
38	North Fork Solomon River at Kirwin, Kans.	1,290	1919-25, 1928-32, 1941-	Sept. 18, 1919	22.5	z 24,000	18.6	July 11, 4:30 a.m.	20.42	15,600	12.1
39	North Fork Solomon River near Downs, Kans.	2,390	1945-	Aug. 13, 1950	28.23	22,700	9.50	July 12, 12 m.	30.41	35,700	14.9
40	Chapman Creek near Chapman, Kans.	300	-	-	-	-	-	-	-	46,700	156
41	Big Blue River near Crete, Nebr.	2,680	1945-	July 10, 1950	28.74	27,600	10.3	June 3, 4 a.m.	28.3	25,000	9.33
42	Big Blue River at Barneston, Nebr.	4,420	1932-	June 9, 1941	34.3	57,700	13.1	June 4, 12 p.m.	27.48	26,000	5.88
43	Big Blue River at Randolph, Kans.	9,100	1918-	June 10, 1941	z 30.81	80,000	8.79	July 13, 2 p.m.	28.88	60,100	6.60

See footnotes at end of table, page 67

Table 2.--Summary of flood discharges in Kansas, Missouri, and Nebraska for the floods of May-July 1951--Continued

No. on fig. 2	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (ft)	Discharge		Time	Gage height (ft)	Discharge	
						cfs	cfs per square mile			cfs	cfs per square mile
44	Big Blue River near Manhattan, Kans.	9,540	1950-	-	-	-	-	July 12, 10 p.m.	29.92	102,000	10.7
45	Little Blue River at Angus, Nebr.	-	1950-	Sept. 21, 1950	f 12.1	13,000	-	June 26, 3 p.m.	13.4	18,500	-
46	Little Blue River near Endicott, Nebr.	2,340	1908-15, 1929-	June 9, 1941	16.23	31,000	13.2	June 27, 8 p.m.	aa 16.82	36,800	15.7
47	Little Blue River at Waterville, Kans.	3,440	1922-25, 1928-	June 10, 1941	f 26.20	50,400	14.7	July 13, 2 a.m.	24.65	38,200	11.1
48	Tributary to Kansas River near Wamego, Kans.	2.3	-	-	-	-	-	-	-	B 563	245
49	Mill Creek at C.R.I.&P.R.R. bridge near Alta Vista, Kans.	16.7	-	-	-	-	-	-	-	B 19,800	1,060
50	Mill Creek at State Highway 10 bridge near Alma, Kans.	316	-	-	-	-	-	-	-	B 78,800	249
51	Soldier Creek near Topeka, Kans.	268	1929-	Apr. 23, 1944	28.2	9,910	37.0	July 12, 12 p.m.	29.06	13,200	49.3
52	Delaware River at Valley Falls, Kans.	922	1922-	June 16, 1945	f 27.85	45,900	49.8	June 21, 9:30 p.m.	f 32.08	94,600	103
53	Wakarusa River near Lawrence, Kans.	458	1929-	April 23,1944	30.00	18,500	40.4	July 12, 12 p.m.	f 31.59	24,200	52.8
54	Stranger Creek near Tonganoxie, Kans.	406	1929-	Dec. 5, 1944	27.40	15,500	38.2	July 12, 12 p.m.	28.94	33,100	81.5
	OSAGE (MARAIS DES CYGNES) RIVER BASIN										
55	Marais des Cygnes River at Melvern, Kans.	363	1939-	Apr. 23, 1944	26.7	29,000	79.9	July 11, 6 a.m.	31.50	68,000	187
56	Marais des Cygnes River near Ottawa, Kans.	1,260	1902-5, 1918-	Nov. 17, 1928	38.65	75,000	59.5	July 11, 12 p.m. to July 12, 2 a.m.	42.50	142,000	113
57	Marais des Cygnes River at Trading Post, Kans.	2,910	1921-23, 1928-	Nov. 18, 1928	34.45	120,000	41.2	July 14, 2-4 a.m.	38.12	148,000	50.9
58	Osage River at Osceola, Mo.	8,220	1921-28, 1930-	May 21, 1943	ab 41.48	146,000	17.8	July 6, 2-7 p.m.	ac 35.87	98,300	12.0
59	Lake of the Ozarks near Bagnell, Mo.	14,000	1931-	May 22, 1943	665.45	s 1,527,000	-	July 7, 12 m.-10p.m.	664.41	s 1,482,000	-
60	Osage River near Bagnell, Mo.	14,000	1925-	May 19, 1943	48.8	220,000	15.7	July 8, 5-8 a.m.	38.26	126,000	9.00
61	Osage River near St. Thomas, Mo.	14,500	1931-	May 20, 1943	43.8	216,000	14.9	July 13, 7-11 p.m.	35.20	130,000	8.97
62	Salt Creek near Lyndon, Kans.	111	1939-	Apr. 22, 1944 Apr. 16, 1945	f 16.0	z 17,900	161	July 11, 10 a.m.	f 17.00	36,400	328
63	Big Bull Creek near Hillsdale, Kans.	147	1948-	May 21, 1949	22.50	7,450	50.7	July 11, 12:30 p.m.	25.82	47,000	320

64	Little Osage River at Fulton, Kans.	295	1948-	July 19, 1950	29.0	-	-	-	-	16,600	56.9
65	Marmaton River near Fort Scott, Kans.	411	1921-25, 1929-	May 18, 1943	ad 36.90	34,200	83.2	June 30, 1:30 p.m.	35.96	28,000	68.1
	ARKANSAS RIVER BASIN										
66	Neosho River at Council Grove, Kans.	250	1939-	Oct. 20, 1941	ae 37.13	44,600	178	July 11, 8:30 a.m.	af 35.5	126,000	504
67	Neosho River at Burlington, Kans.	3,025	-	-	-	-	-	-	-	B 292,000	96.5
68	Neosho River near Parsons, Kans.	4,817	1921-	July 27, 1948	30.74	87,800	18.2	July 14, 1-2 p.m.	ag 40.20	439,000	91.1
69	Rock Creek at Burlington, Kans.	8.8	-	-	-	-	-	-	-	B 9,560	1,090

a About. Furnished by Corps of Engineers.
b Occurred 5-7 a.m.
c Occurred June 24, 1947.
d Occurred 6 a.m. to 1 p.m. July 14.
e Occurred at 11 p.m.
f From floodmarks.
g Site then in use.
h Discharge uncertain.
i From November 1950
j Flood of May 1903 reached a stage of about 28.5 ft.
k Flood of May 1903 reached a stage of 26.3 ft, from floodmarks, determined by U. S. Weather Bureau.
m Flood of May 1903 reached a stage of 32.7 ft, from floodmarks, at U. S. Weather Bureau gage and datum 0.5 mile downstream; higher flood in spring of 1844, according to Corps of Engineers.
n Site and datum then in use.
p Gage height and discharge uncertain; flood in spring of 1844 believed higher, according to Corps of Engineers.
q Stage at Missouri River at Kansas City gage.
r Flood of May 30, 1938 reached a stage of 30.3 ft (discharge not determined) from local information.
s Contents in acre-feet.
t Affected by storage in Kanopolis Reservoir since February 1948.
u Gage located 10 miles above present site.
v Gage reading observed on highway department staff gage at bridge on State Highway 57 at 3 a.m.
w Observed.
x Flood of Sept. 19, 1919 reached a gage height of 21.5 ft and flood of Aug. 1, 1928 reached a stage of 24.5 ft.
y Datum about 1½ ft lower than present.
z revised.
aa Occurred 12 p.m. June 27.
ab Gage height, 41.7 ft, from outside gage.
ac Gage height, 36.04 ft, from outside gage.
ad Flood of 1915 reached a stage of 42.34 ft.
ae Flood of 1903 reached a stage of 37.3 ft, from floodmark.
af Gage height of top of surge in well, 36.29 ft, from floodmarks; gage height in wire- weight gage box at upstream side of bridge, 37.97 ft. from floodmark.
ag From high-water mark in gage structure.

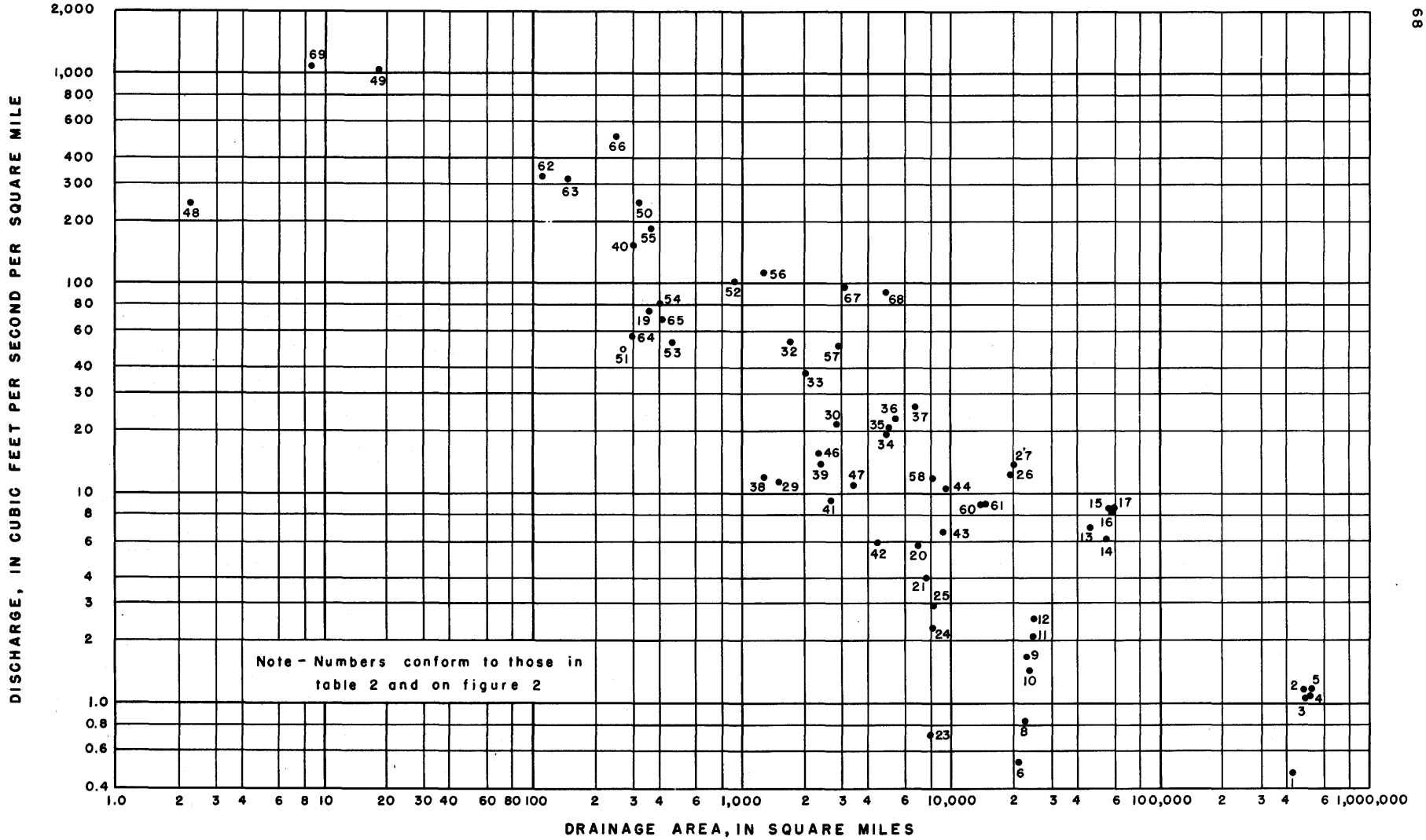

Figure 8.--Maximum discharges, in cubic feet per second per square mile, for various areas in Kansas-Missouri, May-July 1951.

FLOOD DAMAGE

The July 1951 flood caused the greatest damage ever experienced in Kansas. Damage occurred to homes, business, and industrial buildings, to highways and railways, to government property, and to farm lands. The flood waters carried a high concentration of suspended sediment that settled out in slack-water areas, thus adding to the immediate heavy damage. However, over a period of time this may benefit the soil. The cost of disrupted transportation alone ran into hundreds of thousands of dollars.

For several days during the flood it was impossible to cross the Kansas River anywhere by train or automobile between Junction City and Kansas City, Kans. All roads and railroads running up the Kansas Valley were closed equally long or longer. At the following locations, highway bridges over the Kansas River between Junction City and Kansas City were entirely destroyed or damaged so that they are not yet in use:

Fort Riley - damaged.
Ogden - rendered useless by channel change.
County bridge 3 miles above Manhattan - several spans carried away.
St. George - almost entirely destroyed.
Brickyard bridge west of Topeka - almost entirely destroyed.
Sardou Bridge, Topeka - destroyed.
Lecompton - two spans carried away.
De Soto - badly damaged.

In all, 17 major bridges were reported to have been destroyed throughout the flooded area.

The Rock Island and Santa Fe Railway bridges at Topeka were badly damaged by the July flood. The Rock Island bridge was restored with temporary repairs, only to be destroyed by the rise in early September. The foregoing list of bridges damaged or destroyed is a sample of the flood damage throughout the state of Kansas. The Kansas Highway Commission has asked for emergency relief assistance from the Federal government for 40 State projects totaling $4,845,100 and for 37 county Federal-aid projects totaling $1,691,000. According to the Topeka State Journal, Sept. 6, the requested amounts include some projects for which damage occurred earlier than the July flood.

Many homes were entirely lost or destroyed beyond repair by the July floods. In many of the flooded residential areas, homes had been evacuated during June when the first floods came. The residents had just completed the cleanup of their houses and grounds when the July flood struck with its much more discouraging damage. More than two months after the July flood many of the damaged homes were uninhabited. Figures released by the Corps of Engineers show that 518,500 people left their homes during the July flood. The need for housing is being met temporarily at many communities with trailer-houses. Store, office, and light industrial buildings stood idle for weeks or were repaired at great cost. The complete stocks of most stores in the flooded communities were ruined, windows were smashed, and floors had to be rebuilt because of failure or swollen floor-boards.

Municipal installations, mainly sewer and waterworks, received heavy damage in many communities. About 30 cities in Kansas had orders to use boiled water for a period of approximately one week after contamination of their supplies. Good supervision of the problem forestalled any epidemics. Sewers were damaged by the flood through complete plugging with silt or by erosion of cover material. The high water table that accompanied the flood caused inconvenience at the Topeka Waterworks when large pumps began settling in the saturated alluvium.

The loss to agricultural land was not restricted to the loss of crops by flooding but, in addition, included scour and sand deposition. The Kansas River cut several new channels between Junction City and Kansas City that in some cases destroyed entire farms. Sand deposited 2 to 3 feet deep on many acres in the area will hamper the production on scores of farms until a means of disposing or treatment of it can be found.

As printed in the Topeka Daily Capital, July 20, preliminary estimates by the Corps of Engineers list the flood losses as:

	Kansas	Missouri
Acres flooded	1,074,000	926,000
Persons displaced	368,500	150,000
Railroad rolling stock affected (units)	22,100	65,000
Livestock, lost or stranded	7,000	9,000
Flood loss total	$736,000,000	$139,000,000