UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

FLOODS OF JUNE - JULY, 1982, IN IOWA

By Albert J. Heinitz

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CONVERSION FACTORS

For the use of readers who prefer to use metric units, conversion factors for terms used in this report are listed below:

Multiply	By	To obtain
Length		
inch (in.)	25.40	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
Area		
square miles (mi^2)	2.590	square kilometers (km^2)
Flow		
cubic feet per second (cfs)	0.02832	cubic meters per second (m^3/s)

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ABSTRACT

Record flood-peak discharges occurred in June and July, 1982, in southwestern, south-central, and east-central Iowa. The record flood peaks resulted from rainfalls of 6 to 8 inches on soil saturated from persistent moderate to heavy rainfalls that began in May and continued through mid July.

May was the wettest across Iowa since 1959, averaging just over 7 inches statewide to rank as Iowa's 6th wettest May in 100 years of State records. Statewide rainfall for July averaged in excess of 6 inches to rank among the 3rd wettest July in Iowa since 1958.

One of the greatest floods ever recorded in the State occurred on Cedar Creek in south-central Iowa on July 3, 1982. The flood peak discharge at the gaging station near Bussey (05489000) was 4.4 times that of a regional 100-year flood. The gage height exceeded the record flood stage of July 4, 1981, by 5.78 feet. Flood peak discharges on other streams ranged up to 2.7 times that of a regional 100-year flood.

INTRODUCTION

Major flooding, resulting in many new flood peaks of record, occurred on streams in the southeastern half of Iowa from rainstorms on June 15, June 30 to July 3 and July 14 to 16, 1982. These storms followed an accumulation of excessive rainfall which began in May and extended through mid July.

Purpose and Scope

The purpose of this report is to document the record flood peak stages and discharges that occurred in June and July, 1982, in Iowa. Flood peak discharges were determined at the gaging stations and at 7 miscellaneous sites listed in table 1. This report presents storm and flood descriptions, locations of flood discharge sites, peak stages and discharges, a flood-crest profile and flood-frequency relations.

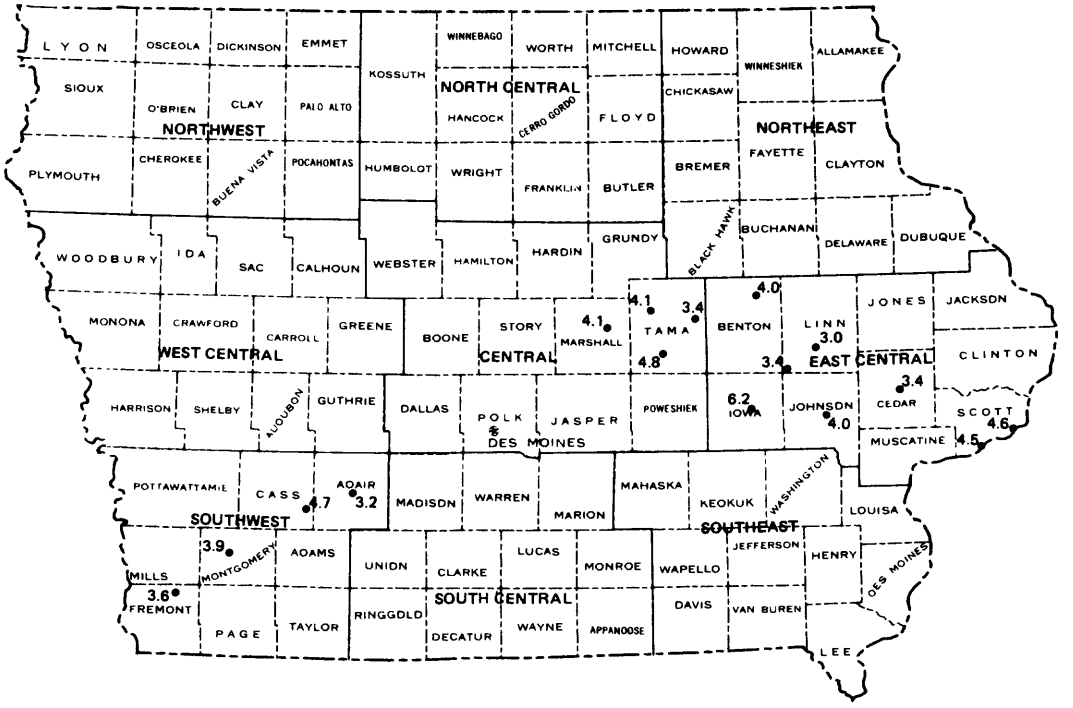
Acknowledgements

This report was prepared as part of a cooperative program with the Highway Research Board, Highway Division, Iowa Department of Transportation. Various Federal, State, and local agencies cooperated in the collection of the streamflow records used in this report, acknowledgement of which is contained in the annual streamflow reports of the U.S. Geological Survey. Rainfall records are those published by the National Oceanic and Atmospheric Administration, Climatological Data for Iowa, March-July, 1982.

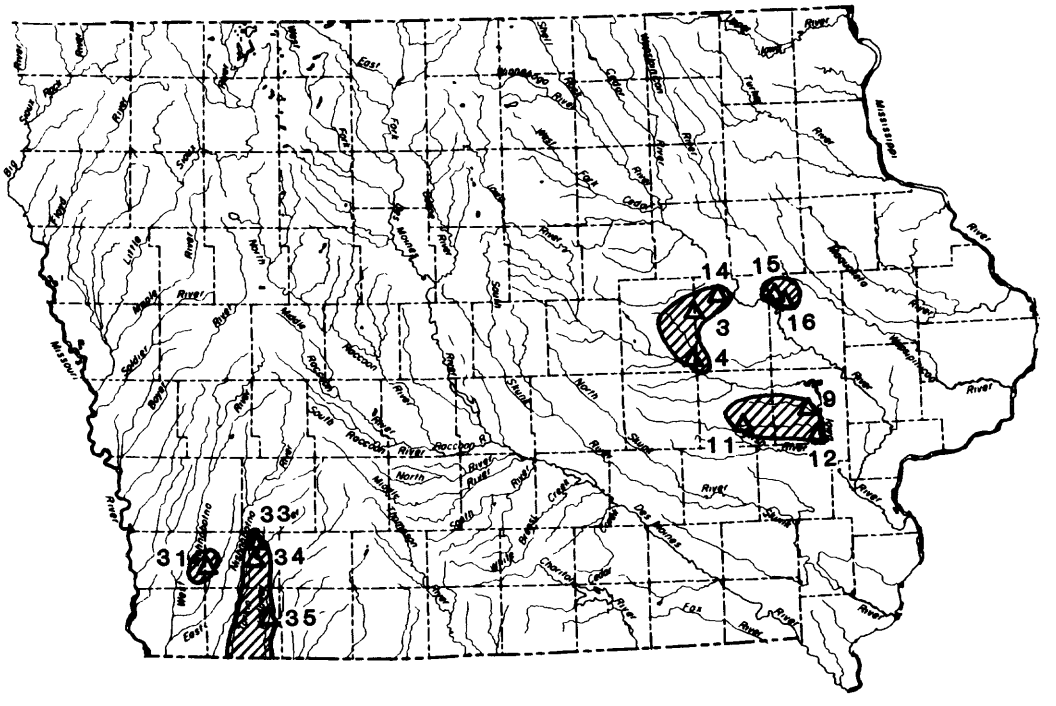
PRECIPITATION

The primary cause of the floods in June and July 1982 was the persistent moderate to heavy rainfalls that began in May throughout the State of Iowa and continued through most of July. May was the wettest across Iowa since 1959, averaging just over 7 inches Statewide to rank as Iowa's 6th wettest May in 100 years of State records. The July statewide rainfall averaged in excess of 6 inches to rank among the 3rd wettest July in Iowa since 1958. South-central Iowa had the wettest July since 1958. Record amounts of rainfall for July occurred at several recording sites in south-central Iowa. Among these sites were Moulton in Appanoose County with 22.45 inches, Albia in Monroe County with 18.33 inches and Rathbun Lake in Appanoose County with 18.19 inches.

Rainstorms producing rainfalls of 6 to 8 inches on saturated soils produced the large floods on June 15, July 3 and 16, 1982 in Iowa. Rainfall amounts greater than 3 inches recorded at National Oceanic and Atmospheric Administration precipitation stations are shown in figures 1-3 for the above storms. Cumulative precipitation for three rainfall recording stations across the area where considerable flooding occurred are shown in figure 4. These stations are Randolph in Fremont County in southwestern Iowa, Albia in Appanoose County in south-central Iowa and Toledo in Tama County in the eastern part of central Iowa. Albia recorded nearly 31 inches of rain for the period from May 5 to July 26.

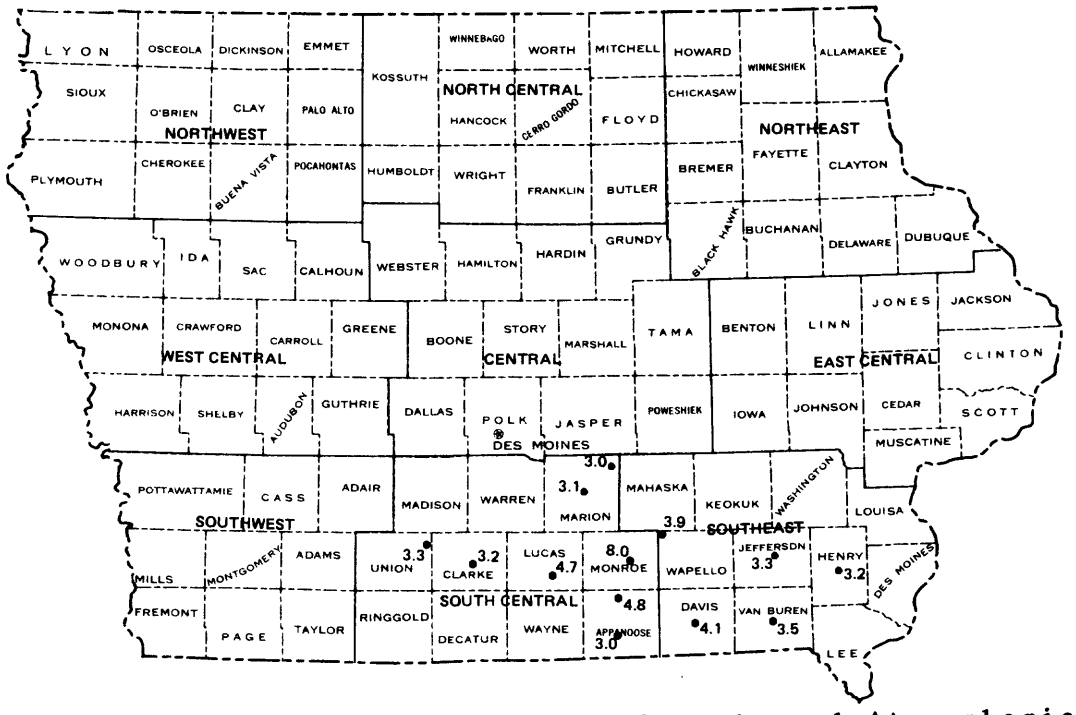


Rainfall, in inches, at National Oceanic and Atmospheric Administration precipitation stations with amounts greater than 3 inches shown for June 15, 1982.

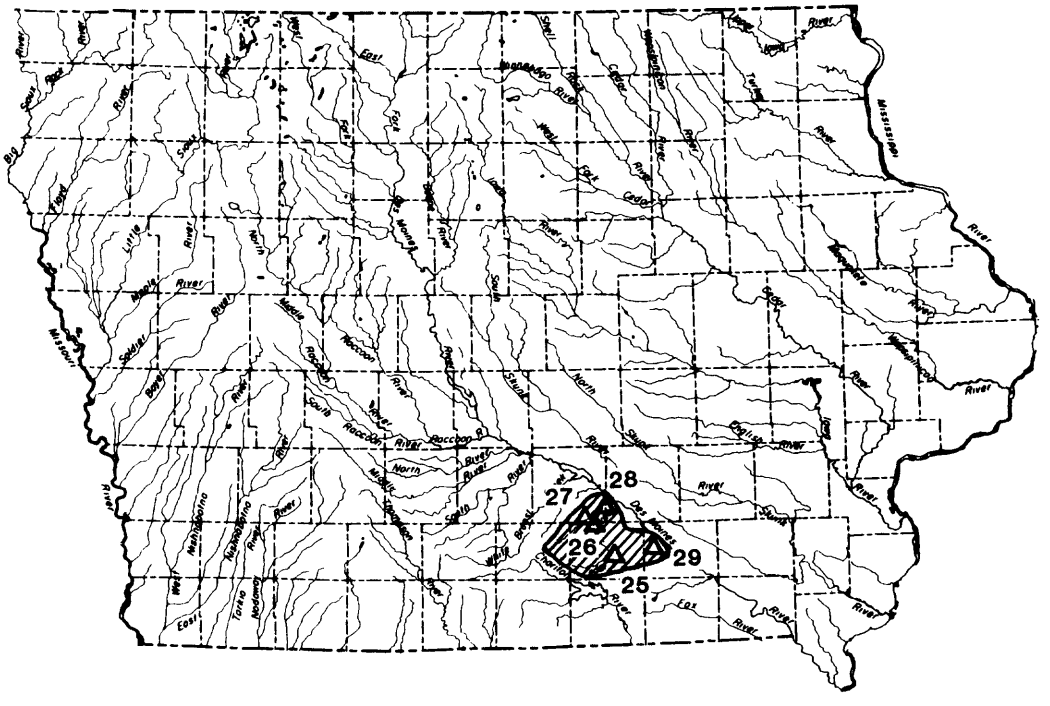


Sites on drainage basins where discharges were determined for major floods on June 15, 1982. Site numbers refer to those in table 1.

Figure 1. Location of precipitation and discharge sites for floods of June 15, 1982.

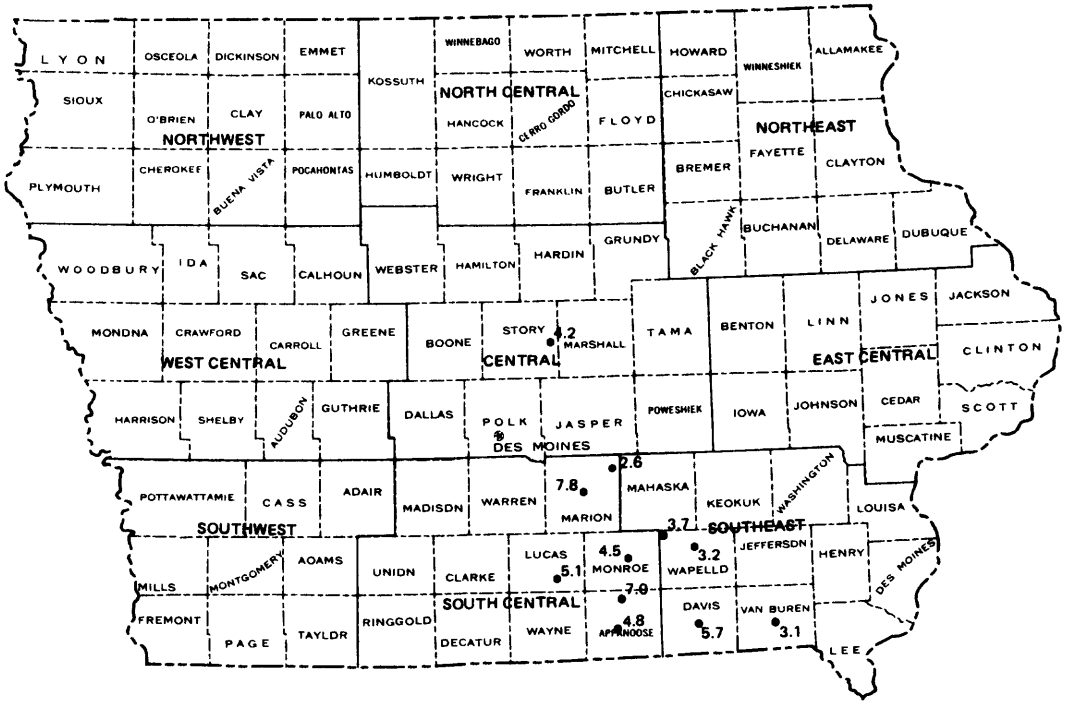


Rainfall, in inches, at National Oceanic and Atmospheric Administration precipitation stations with amounts greater than 3 inches shown for June 30-July 3, 1982.

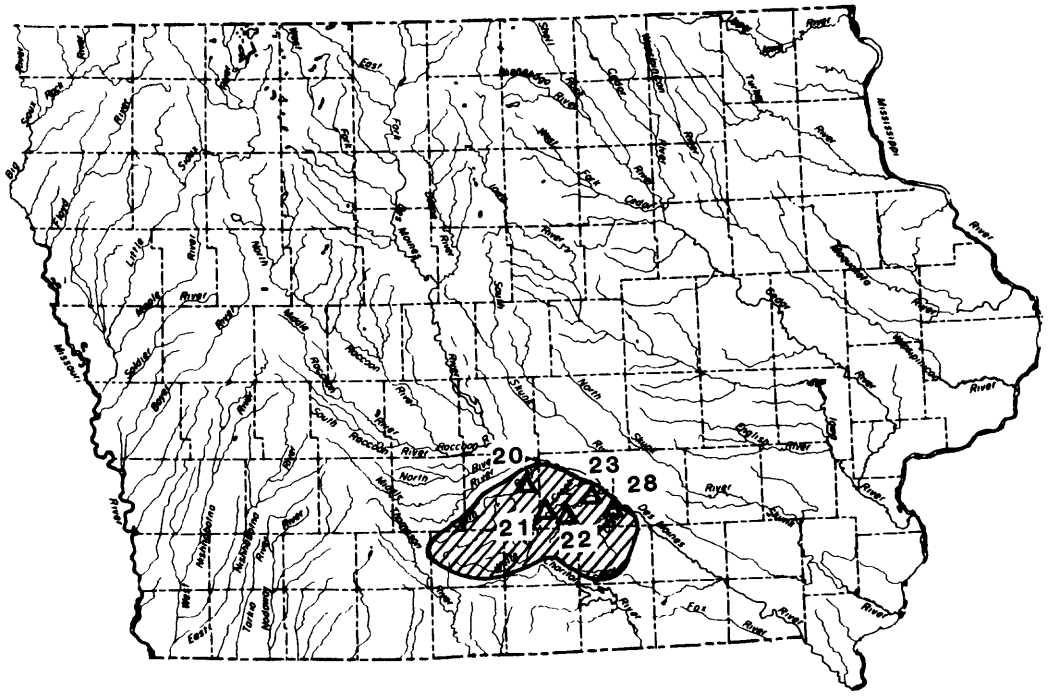


Sites on drainage basins where discharges were determined for major floods on July 3, 1982. Site numbers refer to those in table 1.

Figure 2. Location of precipitation and discharge sites for floods of July 3, 1982.



Rainfall, in inches, at National Oceanic and Atmospheric Administration precipitation stations with amounts greater than 3 inches shown for July 14-16, 1982.



Sites on drainage basins where diascharges were determined for major floods on July 16, 1982. Site numbers refer to those in table 1.

Figure 3. Location of precipitation and discharge sites for floods of July 16, 1982.

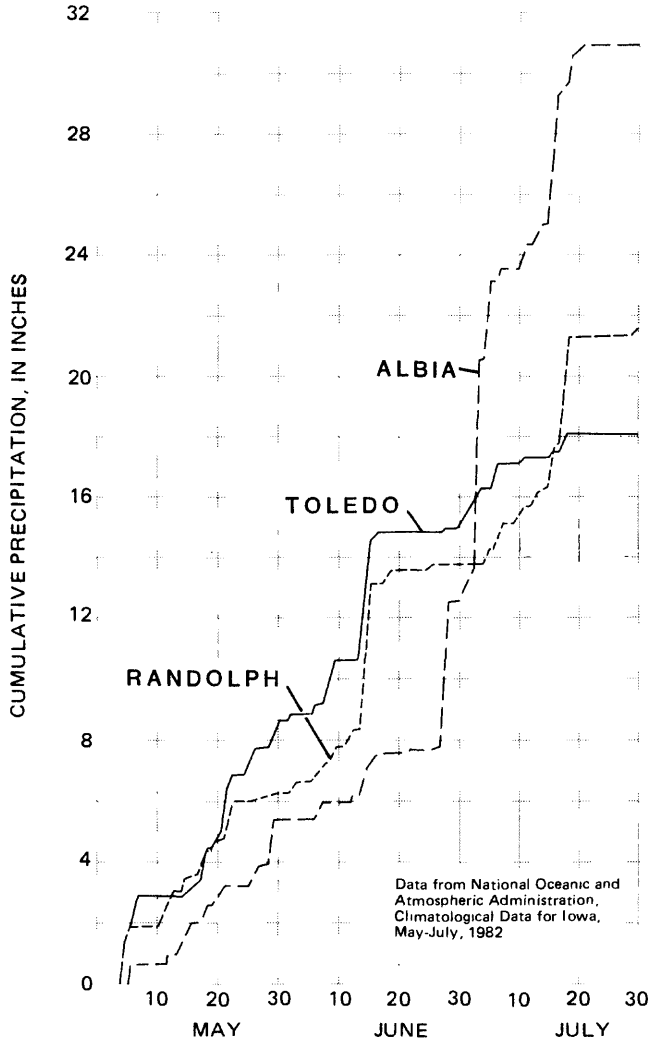


Figure 4. Cumulative precipitation, May-July, 1982, at recording stations at Albia, Randolph and Toledo, Iowa.

FLOODS OF JUNE AND JULY 1982

The major floods of June and July 1982 were concentrated in three general areas in the State. The June 15-17 storm system extended along a band from southwest to east-central Iowa. Major floods occurred primarily in a localized area in southwest Iowa and in a large general area in east-central Iowa (fig. 1). The July 3rd floods were concentrated primarily in the Cedar Creek basin in south-central Iowa (fig. 2). The July 16-20 floods again hit much of the same area flooded by the July 3rd storm and extended northwest to include the English Creek, White Breast Creek and South River basins (fig. 3). Moderate flooding was also experienced in east-central Iowa from the July 16-20 storms. Gaging stations and miscellaneous sites where flood peak data were obtained are listed in table 1 and shown in figures 1-3.

Southwest Iowa Streams

Indian Creek

A devastating flood on Indian Creek in Mills and Montgomery Counties in southwestern Iowa occurred in the early morning hours of June 16, 1982. Unofficial rainfall amounts of up to 8 inches were reported in the headwaters of the basin. Red Oak (fig. 1) recorded 3.92 inches on June 15.

A crest-stage gaging station (site 31) is located on Indian Creek at the U.S. Highway 34 bridge. The peak flood discharge at this site was determined to be 15,800 cubic feet per second, about twice the discharge of a regional 100-year flood. Floodwaters overtopped the road and bridge at this site with no significant damage to the structure.

Floods which occurred on other streams on June 15 in southwest Iowa include the West Nishnabotna River at Randolph (site 32) with a 20-year flood, East Tarkio River near Stanton (site 33) with a 50-year flood, Tarkio River at Stanton (site 34) with a flood 1.1 times that of a regional 100-year flood and the Nodaway River at Clarinda (site 35) with a 70-year flood.

South-central Iowa Streams

Many streams in Marion, Lucas and Monroe counties had significant flood peak discharges in the July 1982 rain storms. Included among these streams were Coal Creek, White Breast Creek, English Creek, Cedar Creek, North Cedar Creek, South Avery Creek and South River. In Marion County, flood waters from English Creek, Cedar Creek and North Cedar Creek were over the road at nearly every stream crossing in the county.

Cedar Creek

One of the greatest floods ever recorded in Iowa occurred on July 3, 1982 on Cedar Creek in Marion County in south-central Iowa. The flood peak discharge of 96,000 cubic feet per second at the gaging station near Bussey (site 28) was 4.4 times that of a regional 100-year flood. The gage height of the July 3 flood exceeded the previous maximum gage height (28.83 feet) of July 4, 1981, by 5.78 feet. Flood waters were about one half foot over the handrails of the bridge and over 7 foot deep on the road for more than 2,000 feet.

The July 3 flood on Cedar Creek near Bussey (site 28) was followed on July 16, 1982 by a second flood which was of a magnitude to rank it as the second greatest flood to occur at this site. The gage height on July 16 was 4.37 feet higher than the July 4, 1981 peak. The flood discharge of 63,800 cubic feet per second was 2.9 times that of a regional 100-year flood.

Table 1. Summary of flood peak discharges at selected sites for the floods of June and July, 1982, in Iowa

Site no.	Station number	Stream	Location	Period of flood record	Drainage area (sq mi)	Previous maximum flood			Flood-June 15-17, 1982				Flood of July 3, 1982				Flood-July 16-20, 1982			
						Date	Gage height (feet)	Discharge (cfs)	Date	Gage height (feet)	Discharge (cfs)	RI (+)	Date	Gage height (feet)	Discharge (cfs)	RI (+)	Date	Gage height (feet)	Discharge (cfs)	RI (+)
1	05451700	Timber Cr nr Marshalltown	SW 1/4 Sec. 8 T.83N., R.17W.	1949-	118	8-16-77	17.69	12000	15	17.30	9940	40								
2	05451900	Richland Cr nr Haven	NE 1/4 Sec. 21 T.82N., R.14W.	1949-	56.1	5-28-74	24.00	7000	15	21.17	2560	3								
3	05451955	Stein Cr nr Clutier	SE 1/4 Sec. 13 T.84N., R.13W.	1971-	23.4	3-19-79	74.73	2500	15	77.92	11400	1.7*								
4	05452000	Salt Cr nr Elberon	NW 1/4 Sec. 36 T.83N., R.13W.	1945-	201	6-13-47	17.6	35000	15	20.00	33200	1.9*					18	17.58	7540	7
5	05452200	Walnut Cr nr Hartwick	SW 1/4 Sec. 8 T.81N., R.13W.	1949-	70.9	8-16-77	16.30	6800	15	14.58	2980	4					18	14.71	3110	4
6	05453000	Big Bear Cr at Ladora	SW 1/4 Sec. 7 T.80N., R.11W.	1945-	189	3-30-60	24.60	10500	15	23.91	5450	4					19	23.23	4770	3
7	05453100	Iowa R at Marengo	NE 1/4 Sec. 24 T.81N., R.11W.	1956-	2794	3-31-60	19.21	30800	16	18.12	21100	5					20	16.60	13100	2
8	05454000	Rapid Cr nr Iowa City	NE 1/4 Sec. 36 T.80N., R.6W.	1937-	25.3	5-23-65	14.10	6100	15	11.92	2180	6					18	12.84	2920	10
9	05454300	Clear Cr nr Coralville	SE 1/4 Sec. 1 T.79N., R.7W.	1952-	98.1	5-17-74	13.93	6630	15	14.61	9900	60					19	13.23	4710	7
10	05454500	Iowa R at Iowa City	SE 1/4 Sec. 9 T.79N., R.6W.	1903-	3271	6-18-18	19.6	42500	15	21.44	10400	5								
11	(m)	Old Mans Cr at Williamsburg	SW 1/4 Sec. 10 T.79N., R.10W.		41.7				15		16100	1.9*								
12	05455100	Old Mans Cr nr Iowa City	NW 1/4 Sec. 36 T.79N., R.7W.	1950-	201	5-29-62	14.52	12000	15	15.25	13500	90								
13	05455500	English R at Kalona	SE 1/4 Sec. 13 T.77N., R.8W.	1939-	573	9-21-65	21.45	20000	17	17.18	8170	4					20	18.45	11600	8
14	05464310	Pratt Cr nr Garrison	SE 1/4 Sec. 12 T.85N., R.12W.	1966-	23.4	7-18-69	92.03	2500	15	96.17	10800	1.6*								
15	(m)	Blue Cr nr Center Point	NW 1/4 Sec. 8 T.85N., R.8W.		31.2				15		10700	1.4*								
16	(m)	East Blue Cr nr Center Point	SW 1/4 Sec. 6 T.85N., R.8W.		27.4				15		7300	100								
17	05464500	Cedar R at Cedar Rapids	NW 1/4 Sec. 28 T.83N., R.7W.	1902-	6510	3-31-61	19.66	73000	16	10.67	30100	3					19	7.96	18400	1
18	05464640	Prairie Cr at Fairfax	SW 1/4 Sec. 9 T.82N., R.8W.	1966-	178	3-19-79	14.63	8140	16	12.10	4600	3					19	9.04	2330	1

Table 1. Summary of flood peak discharges at selected sites for the floods of June and July, 1982, in Iowa--Continued.

Site no.	Station number	Stream	Location	Period of flood record	Drainage area (sq mi)	Previous maximum flood			Flood-June 15-17, 1982				Flood of July 3, 1982				Flood-July 16-20, 1982			
						Date	Gage height (feet)	Discharge (cfs)	Date	Gage height (feet)	Discharge (cfs)	RI (+)	Date	Gage height (feet)	Discharge (cfs)	RI (+)	Date	Gage height (feet)	Discharge (cfs)	RI (+)
19	05485640	Fourmile Cr at Des Moines	NE 1/4 Sec. 32 T.79N., R.23W.	1971-	92.7	6-09-74	14.84	5340									16	14.46	4800	6
20	05487470	South R nr Ackworth	SE 1/4 Sec. 34 T.76N., R.23W.	1940-	460	6-05-47	24.6	34000					3	22.55	9700	4	16	32.00	26000	100
21	05487980	White Breast Cr nr Dallas	NW 1/4 Sec. 3 T.74N., R.21W.	1962-	342	7-05-81	26.61	12300					3	26.73	12300	15	16	33.45	37300	1.8*
22	(m)	English Cr nr Melcher	SW 1/4 Sec. 16 T.74N., R.20W.		46.3												16		16100	1.8*
23	(m)	English Cr nr Knoxville	NE 1/4 Sec. 16 T.75N., R.19W.		91.0												16		28000	2.3*
24	05488500	Des Moines R nr Tracy	SE 1/4 Sec. 19 T.75N., R.17W.	1920-	12479	6-14-47	26.5	155000					3	19.06	30500		16	19.62	35000	
25	05488620	Coal Cr nr Albia	SW 1/4 Sec. 20 T.72N., R.17W.	1966-	13.5	8-09-77	86.14	7000					3	88.51	12700	2.4*				
26	(m)	Cedar Cr nr Marysville	NE 1/4 Sec. 28 T.74N., R.18W.		241								3		64700	3.6*				
27	(m)	North Cedar Cr nr Marysville	NE 1/4 Sec. 20 T.74N., R.18W.		123								3		35900	2.7*				
28	05489000	Cedar Cr nr Bussey	SW 1/4 Sec. 11 T.74N., R.18W.	1946-	374	6----46 7-04-81	28.05 28.83	31500 26600					3	34.61	96000	4.4*	16	33.20	63800	2.9*
29	05489350	South Avery Cr nr Blakesburg	SE 1/4 Sec. 19 T.72N., R.15W.	1965-	33.1	6-09-67	88.95	15000					3	90.20	21000	2.7*				
30	05489500	Des Moines R at Ottumwa	NE 1/4 Sec. 25 T.72N., R.14W.	1917-	13374	6-07-47	20.2	135000									17	14.46	45300	3
31	06807470	Indian Cr nr Emerson	NW 1/4 Sec. 19 T.72N., R.39W.	1966-	37.3	6-21-67	91.16	5000	15	92.63	15800	1.9*								
32	06808500	West Nishnabotna R at Randolph	NE 1/4 Sec. 17 T.70N., R.41W.	1948-	1326	6-21-67	22.60	35500	15	23.51	27600	20								
33	6811800	East Tarkio Cr nr Stanton	W 1/2 Sec.34 T.73N., R.37W.	1952-	4.66	6-09-67	13.74	4790	15	12.82	2600	50								
34	06811840	Tarkio R at Stanton	SW 1/4 Sec. 4 T.71N., R.37W.	1957-	49.3	6-09-67	28.56	22500	15	21.23	10100	1.1*								
35	06817000	Nodaway R at Clarinda	NE 1/4 Sec. 32 T.69N., R.36W.	1918-25 1936	762	6-13-47	25.3	31100	15	19.70	29700	70								

m Miscellaneous measurement site.
+ Recurrence interval, in years.
* Ratio of flood discharge to that of regional 100-year flood.

Peak discharges for the July 3 flood were determined for the Cedar Creek (site 26) and North Cedar Creek (site 27) crossings at State Highway 5. Flood waters overtopped the roads and bridges at these sites. Considerable damage was done to the road at the Cedar Creek crossing. The July 16 flood was about 2 feet lower at the Cedar Creek site and was 0.1 foot higher at the North Cedar Creek site than the July 3 flood.

East-central Iowa Streams

General flooding occurred over a large area in east-central Iowa on June 15-17, 1982. New flood peaks of record occurred at several sites. Moderate flooding occurred again on many of the streams on July 18-20.

Old Mans Creek

State Highway 149 and the bridge over Old Mans Creek (site 11) at Williamsburg were inundated by the June 15, 1982 flood. Rainfall of 6.15 inches was reported in Williamsburg on June 15 and unofficial amounts of up to 8 inches were reported in the area. The flood peak discharge at the highway 149 bridge was twice that of a regional 100-year flood.

A new flood peak discharge of record occurred at the crest-stage gage on Old Mans Creek southwest of Iowa City (site 12). The flood peak discharge was equivalent to a 100-year flood. The flood plain on Old Mans Creek becomes quite wide and flat as it progresses downstream toward this gage. A large area of inundation and flood water storage occurred in the lower reaches of the basin resulting in the attenuation of the flood peak at this site.

Clear Creek

A new flood peak discharge of record occurred at the gaging station near Coralville (site 9) on June 15, 1982. Water from Clear Creek flowed over the I-80 highway west of Coralville. The Clear Creek basin adjoins the Old Mans Creek basin on the north where heavy flooding occurred.

Pratt Creek

U.S. Highway 218, north of Garrison in Benton County, was inundated by about 1 1/2 feet of water on June 15, 1982, for a stretch of about 400 feet by waters from Pratt Creek. A new flood peak discharge of record occurred at the crest-stage gage (site 14) located at this site, which was 1.6 times the regional 100-year flood.

Salt Creek

A new record flood stage was set by the June 15, 1982 flood at the gaging station on Salt Creek near Elberon (site 4). The peak discharge of 33,200 cubic feet per second however, was second to the 1947 flood discharge of 35,000 cubic feet per second. The June 15 flood discharge was nearly 2 times that of a regional 100-year flood.

FLOOD MAGNITUDE AND FREQUENCY

A flood event of a magnitude which is expected to be equalled or exceeded once on the average during any 100-year period (recurrence interval) has been commonly used as a standard against which flood peaks are measured. This event, commonly termed the 100-year flood, has a 1 percent chance of being equalled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year such as occurred on the Cedar Creek near Bussey (site 28) in July 1982.

A method for determining the 100-year flood discharges at sites including those not gaged, using regional equations, is described by Lara (1973). Regional relationships are developed using the annual flood peak discharges for all gaging stations in a hydrologically homogeneous area thereby reducing the errors associated with nonrepresentative, short-term stations. For this reason, regional analysis may also produce improved estimates of the flood characteristics at the gaged site.

Figure 5 shows the relation of selected 1982 flood peak discharges to the regional 100-year flood discharges and to the curve enveloping the maximum peak discharges experienced in the state of Iowa (Lara, 1973). The 96,000 cubic feet per second flood peak on the Cedar Creek near Bussey (site 28) approaches the enveloping curve of maximum discharges. Many of the 1982 flood peaks are approximately 2 times that of the regional 100-year flood. Frequencies of the flood peaks listed in table 1 are given for recurrence intervals of 100 or less. For greater flood peaks, recurrence intervals are given as a ratio to the 100-year flood because of the uncertainties of the frequency relations for greater recurrence intervals.

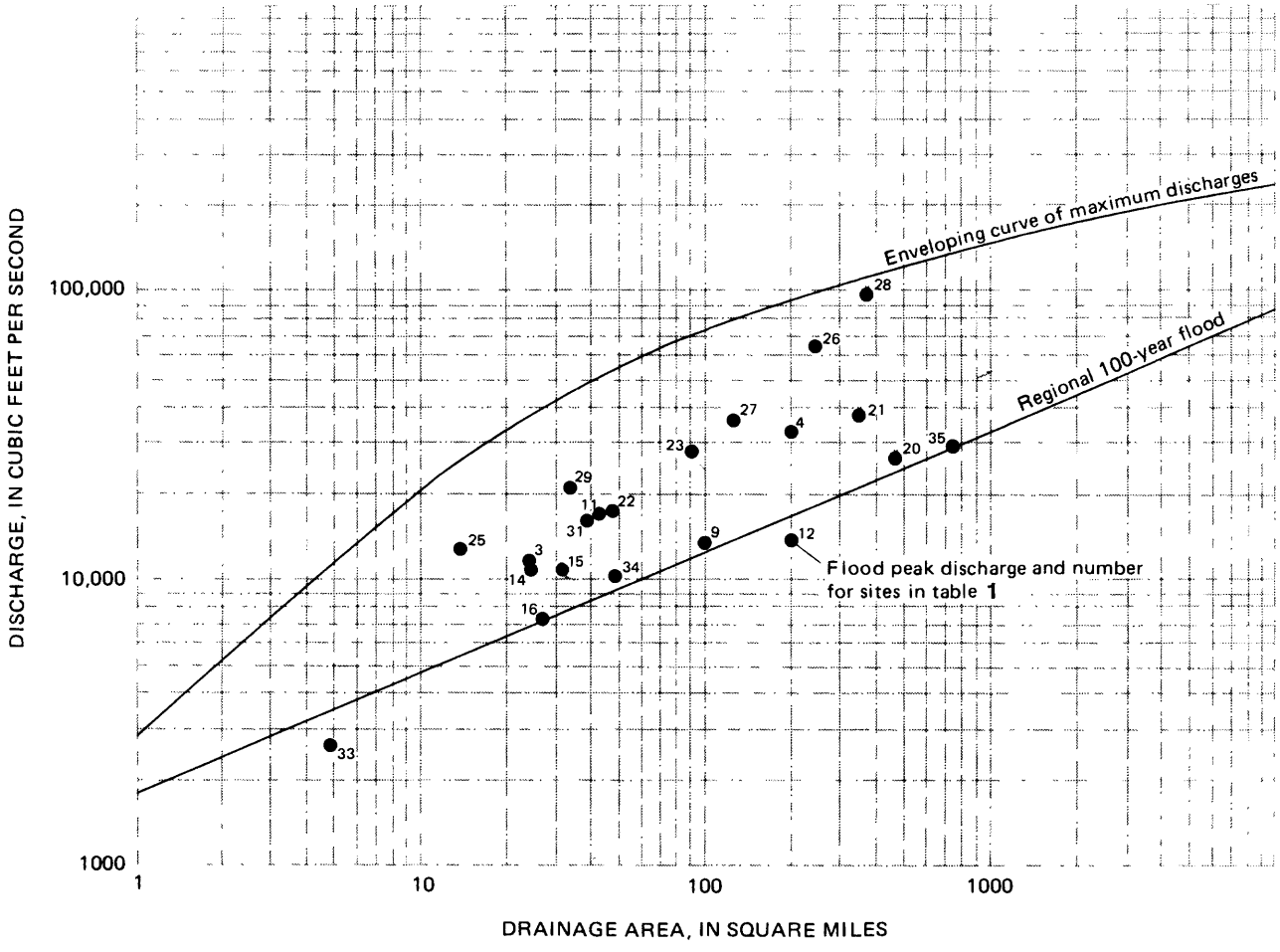


Figure 5. Relation of flood peak discharges to drainage area for selected sites for floods of June and July, 1982, in Iowa.

FLOOD-CREST PROFILES

A profile of the June 15, 1982, flood on Indian Creek from the U.S. Highway 34 bridge downstream to near the mouth is shown in figure 6. Elevations for the profile were obtained by levels at the upstream and downstream sides of the bridges. Profiles between the bridges are straight line interpolations and are subject to some error. As shown on the profiles, floodwaters within the town of Emerson were virtually pooled for about one-half mile along the upstream side of the railroad grade. A low-water profile taken on September 14, 1982, closely approximates the channel bottom configuration and can be used to estimate the depths of the water for the June 15, 1982, flood.

Much of the south-central Iowa area that was flooded in the July 3 and 16, 1982 periods had also been extensively flooded from the July 4, 1981 storms. Flood profiles for the 1981 floods were obtained on the South River, White Breast Creek, Chariton River, Cedar Creek and on some of the tributaries to these streams. Additional profile elevations were obtained for the July 1982 floods on Cedar and White Breast Creeks. A report documenting the floods in south-central Iowa will include the above profiles. Preliminary profile data can be obtained from the U.S. Geological Survey, Box 1230, 400 S. Clinton Street, Iowa City, Ia. 52244.

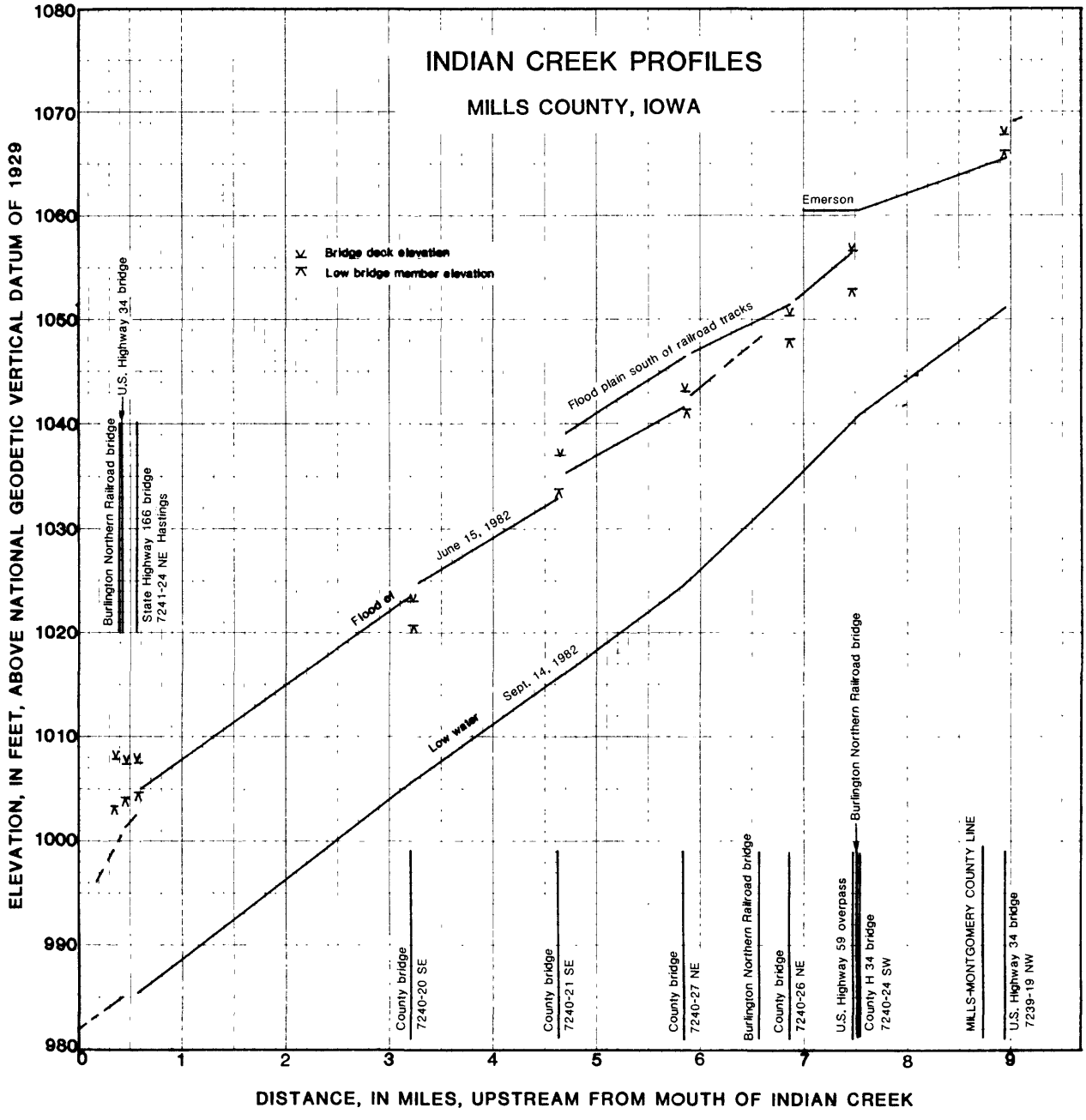


Figure 6. Profile of June 15, 1982, flood on Indian Creek.

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