

FLOODS IN NORTHERN ILLINOIS, JULY 1996



Introduction

Record flooding in northern Illinois from July 18 through 20, 1996 caused millions of dollars worth of damage and two deaths (Chicago Tribune, July 21 and July 26). Rainfall amounts ranging from less than 2 inches to more than 16 inches were reported in northern Illinois during the 24-hour period ending at 7:00 a.m. on

July 18. The runoff from this rainfall produced record flood-peak discharges at 19 U.S. Geological Survey (USGS) streamflow-gaging stations.

The Storm

The rainfall producing the flooding came from a very slow moving low-pressure system that stalled over northern

Illinois (fig. 1). This stalled front enabled multiple thunderstorms to develop over a 24-hour period along the same east-west track from midmorning July 17 until the next morning, July 18, 1996. Rainfall amounts were greatest in Kane and Du Page Counties; 16.91 inches of rain were officially recorded at the National Weather Service rain gage in Aurora. This amount is a new State of Illinois record

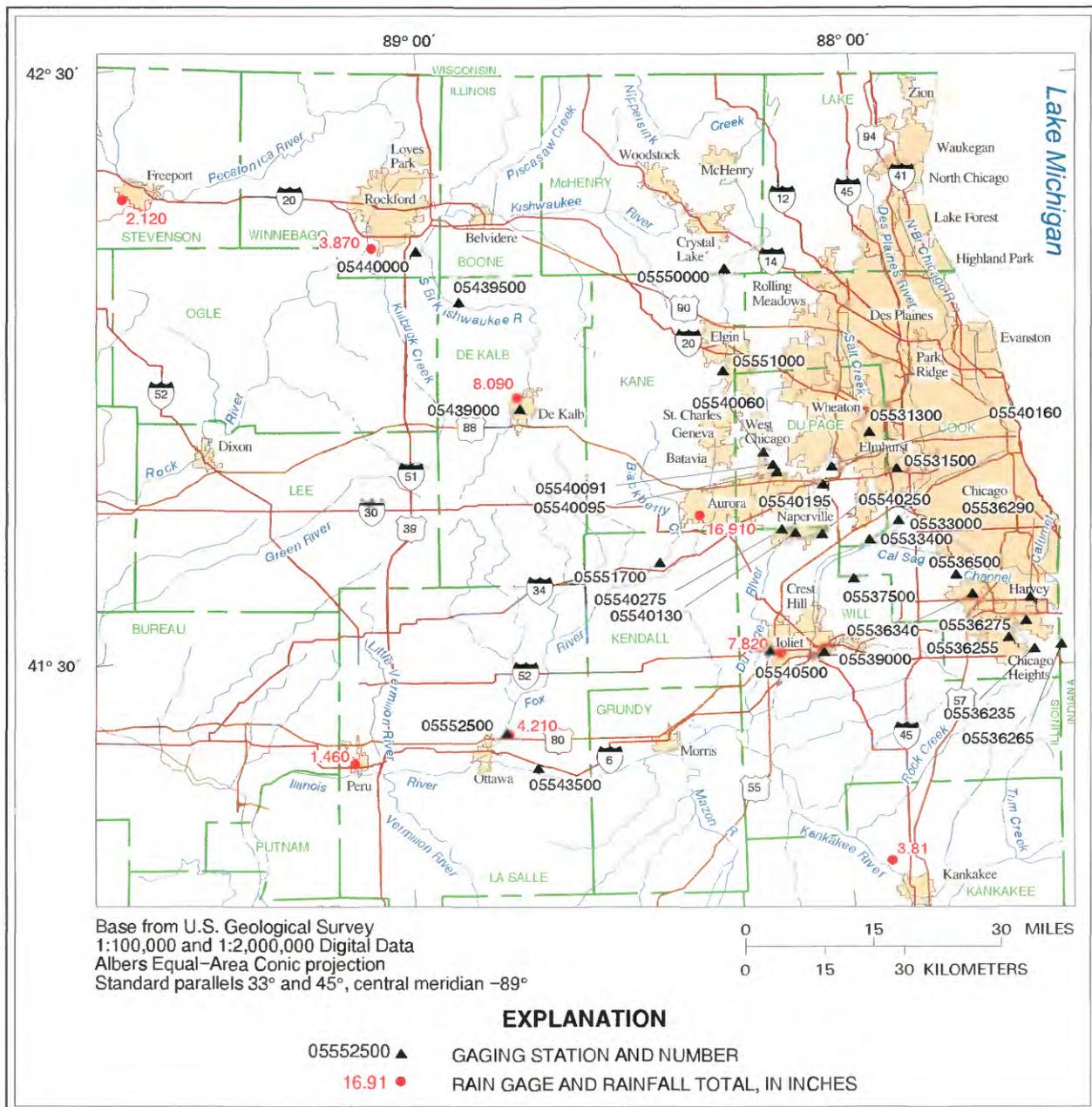


Figure 1. Location of selected streamflow-gaging stations utilized during the July 1996 floods in northern Illinois.

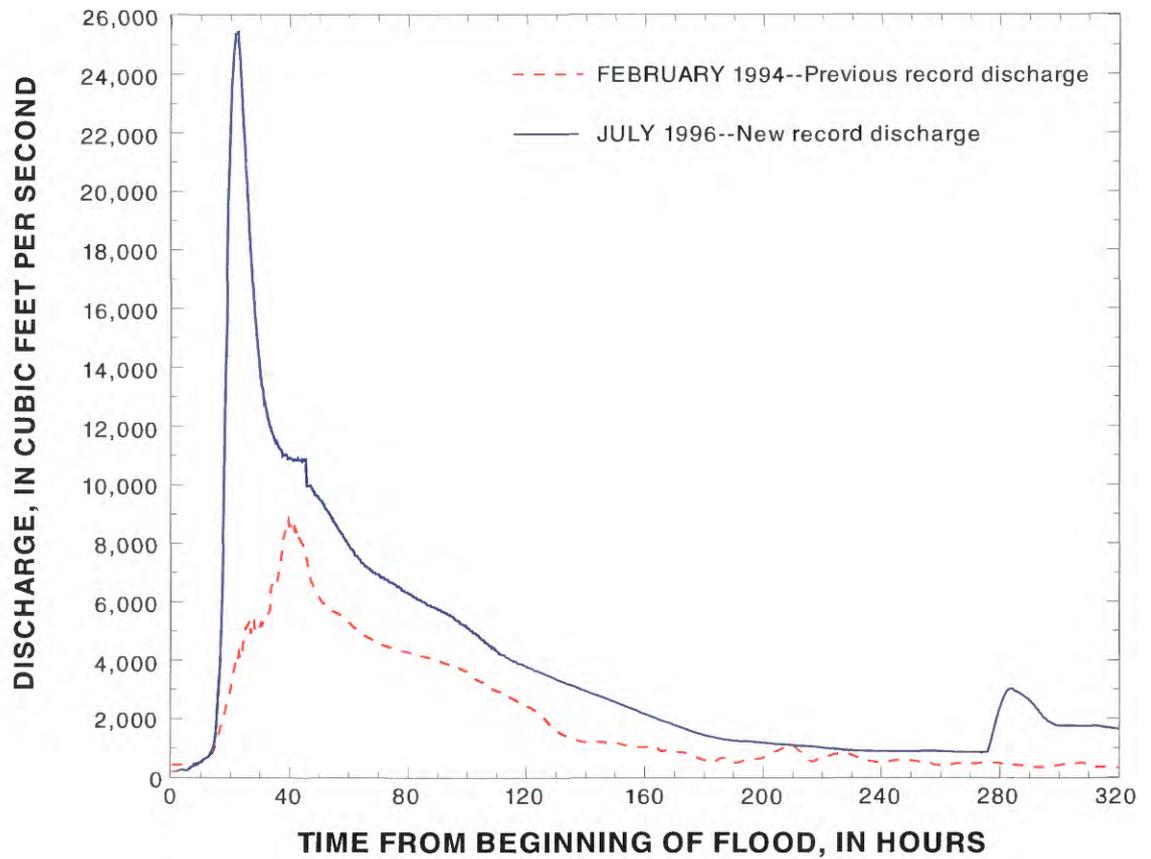


Figure 2. Discharge for the July 1996 flood and the previous flood of record (February 1994) for the South Branch Kishwaukee River near Fairdale, Ill. (05439500)

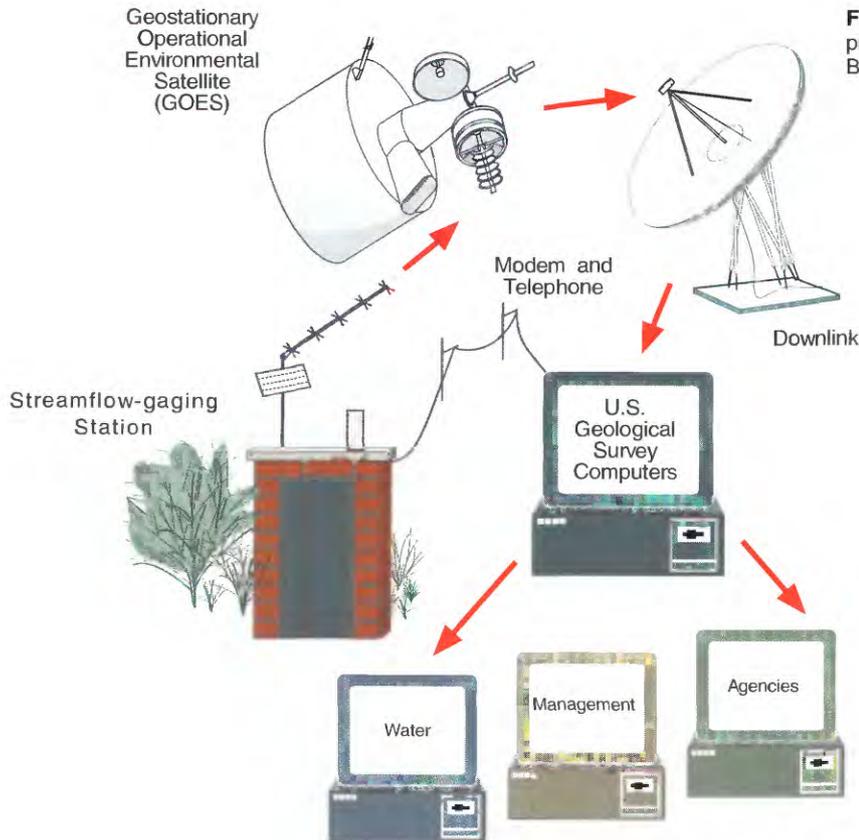


Figure 3. Schematic diagram showing how streamflow data are transmitted, processed, and distributed.

Curtis, G.W., 1987, Technique for estimating flood-peak discharges and frequencies on rural streams in Illinois: U.S. Geological Survey Water-Resources Investigations Report 87-4207, 79 p.

Table 1. Drainage area, period of record, stage, and discharge for the July 1996 flood and the previous flood of record at selected streamflow-gaging stations in northern Illinois

[mi², square mile; ft, foot; ft³/s, cubic foot per second; >, greater than; --, no data]

Station number (see fig.1)	Station name	Drainage area (mi ²)	Period of record	Previous Maximum Flood			Maximum For July 1996 Flood			
				Date	Stage height (feet above datum)	Discharge (ft ³ /s)	Date	Stage height (ft)	Discharge (ft ³ /s)	Recurrence interval (years) ¹
05439000	South Branch Kishwaukee River at Dekalb, Ill.	77.7	1979-current	07-02-83	15.80	3,500	07-18-96	12.97	2,280	¹ > 25
05439500	South Branch Kishwaukee River Near Fairdale, Ill.	387	1939-current	03-19-79	10.45	7,600	07-18-96	13.37	25,400	¹ >100
				02-20-94	10.31	8,790				
05440000	Kishwaukee River near Perryville, Ill.	1,099	1939-current	02-21-94	20.17	17,100	07-18-96	23.54	24,200	¹ > 50
05531300	Salt Creek at Elmhurst, Ill.	91.2	1989-current	08-21-90	13.37	1,530	07-18-96	10.91	934	² >2
05531500	Salt Creek at Western Springs, Ill.	115	1945-current	08-17-87	10.54	3,540	07-18-96	8.03	1,600	² > 2
05533000	Flag Creek near Willow Springs, Ill.	16.5	1951-current	09-14-61	13.71	2,680	07-18-96	10.37	2,300	² > 25
05533400	Sawmill Creek near Lemont, Ill.	13.0	1985-current	05-09-90	15.46	1,730	07-18-96	17.53	3,070	² >100
				06-07-93	15.60	1,600				
05536215	Thorn Creek at Glenwood, Ill.	24.7	1949-current	08-17-68	11.26	2,600	07-18-96	--	2,700	>25
05536235	Deer Creek near Chicago Heights, Ill.	23.1	1948-current	11-28-90	11.79	809	07-18-96	11.41	824	² > 5
				07-13-57	11.75	1,380				
05536255	Butterfield Creek at Flossmoor, Ill.	23.5	1948-current	05-22-82	11.97	2,160	07-18-96	12.59	2,220	² > 25
05536265	Lansing Ditch near Lansing, Ill.	8.84	1948-current	10-11-54	10.18	302	07-18-96	9.52	207	² > 2
				05-10-48	9.24	461				
05536275	Thorn Creek at Thornton, Ill.	104	1948-current	06-14-81	17.06	4,140	07-18-96	16.24	4,470	² > 25
				07-13-57	16.00	4,700				
05536290	Little Calumet River at South Holland, Ill.	208	1947-current	11-28-90	20.50	4,150	07-19-96	20.01	3,870	² > 5
				07-14-57	20.11	4,440				
05536340	Midlothian Creek at Oak Forest, Ill.	12.6	1950-current	07-13-57	9.00	550	07-18-96	6.15	473	² > 10
				04-22-73	7.67	627				
05536500	Tinley Creek near Palos Park, Ill.	11.2	1951-current	10-10-54	10.30	1,930	07-18-96	10.25	2,010	² > 50
05537500	Long Run near Lemont, Ill.	20.9	1951-current	10-10-54	9.91	3,160	07-18-96	11.10	5,310	¹ >100
05539000	Hickory Creek at Joliet, Ill.	107	1944-current	06-13-81	14.90	17,300	07-18-96	10.00	8,710	² >25
05540060	Kress Creek at West Chicago, Ill.	18.1	1985-current	08-14-87	7.37	573	07-18-96	9.24	1,980	² >100
05540091	Spring Brook at Forest Preserve near Warrenville, Ill.	6.83	1991-current	06-24-94	11.24	297	07-18-96	12.60	393	³ --
05540095	West Branch Du Page River near Warrenville, Ill.	90.4	1968-current	08-15-87	5.85	3,050	07-18-96	6.41	3,470	² >100
05540130	West Branch Du Page River near Naperville, Ill.	123	1988-current	02-19-94	9.92	2,240	07-18-96	14.31	6,620	² >100
				05-25-91	9.58	3,420				
05540160	East Branch Du Page River near Downers Grove, Ill.	26.6	1989-current	05-10-90	15.55	881	07-18-96	16.13	936	² >5
05540195	St. Joseph Creek at Route 34 at Lisle, Ill.	11.1	1988-current	05-09-90	11.30	938	07-18-96	12.89	1,280	² >100
05540250	East Branch Du Page River at Bolingbrook, Ill.	75.8	1988-current	05-10-90	22.67	1,990	07-18-96	23.75	3,980	² >100
05540275	Spring Brook at 87th Street near Naperville, Ill.	9.90	1987-current	05-09-90	7.68	694	07-18-96	10.77	1,750	² >25
05540500	Du Page River at Shorewood, Ill.	324	1940-current	10-11-54	11.06	12,000	07-18-96	14.03	17,300	² >100
05543500	Illinois River at Marseilles, Ill.	8,259	1919-current	12-04-82	16.78	94,100	07-19-96	14.53	79,300	² >25
05550000	Fox River at Algonquin, Ill.	1,403	1915-current	04-01-16	4.50	5,850	07-20-96	2.15	1,760	² <2
				04-02-79	4.00	6,610				
				04-06-60	4.01	6,610				
05551000	Fox River at South Elgin, Ill.	1,556	1989-current	07-18-93	14.45	6,990	07-20-96	13.15	2,130	³ --
05551200	Ferson Creek near St. Charles, Ill.	51.7	1960-current	02-20-71	--	1,970	07-18-96	7.79	1,990	>10
				02-18-65	9.66	--				
05551700	Blackberry Creek Near Yorkville, Ill.	70.2	1960-current	07-03-83	9.91	2,060	07-18-96	13.16	5,510	¹ >100
05552500	Fox River at Dayton, Ill.	2,642	1914-current	01-25-60	36.47	⁴ --	07-19-96	24.47	55,400	² >100
				10-11-54	24.63	47,100				

¹Recurrence interval based on weighted average of Log Pearson Type III flood-frequency statistics of station peaks and flood frequency regression-equation curves from Curtis (1987).

²Recurrence interval from Log Pearson Type III flood-frequency statistics of station peaks.

³Frequency estimate unavailable.

⁴Ice jam.

for 24-hour rainfall, surpassing the former record of 16.64 inches in East St. Louis in 1957.

The Flood

The storm of July 17–18, 1996, characterized by intense rainfall in a highly

urbanized area of the State, produced a large amount of runoff that resulted in major flooding during July 18–20. Governor James Edgar mobilized three units of the Illinois National Guard to help local authorities evacuate several thousand people (Chicago Tribune, July 19). Thirteen northern Illinois counties were

declared State disaster areas (Chicago Tribune, July 19) and 11 counties were declared Federal disaster areas (Chicago Tribune, July 26).

Record peak discharges were recorded at 19 USGS streamflow-gaging stations and near-record peak discharges

were recorded at several more stations. Peak discharge and river stage (water level) for selected USGS streamflow-gaging stations in the flood area (fig. 1) are listed in table 1. Eleven stations had peak discharges that were greater than the 100-year flood discharge, which is defined as the discharge with a 1-percent

chance of occurrence in any one year. The discharge hydrographs for the July 1996 flood and the previous flood of record (February 1994) for the South Branch Kishwaukee River near Fairdale, Ill. (05439500) are shown in figure 2. Discharge for the February 1994 flood was 2.4 times the 100-year flood

discharge. The rapid rate of rise in discharge at this station is typical for streams in the flood area and demonstrates the dynamic nature of the flooding following the July 17–18 storm.

USGS Response

Forty-six field measurements of discharge were made by USGS personnel during the flood. These measurements were important to verify the relation between river stage (water level) and discharge. This relation is used to accurately determine continuous discharge and the flood-peak discharge data.

Continuous-streamflow data for many USGS streamflow-gaging stations in Illinois are collected in cooperation with numerous Federal, State, and local agencies and available in near real time. River stages are recorded electronically by a recorder inside of a gage house near the river and transmitted either by satellite or telephone telemetry to the USGS computer system in Urbana, Ill. (fig. 3). These near real-time continuous-streamflow data are used by the Illinois Department of Natural Resources, Office of Water Resources; the National Weather Service; the U.S. Army Corps of Engineers; and other agencies for flood warning, flood fighting, and flood-mitigation efforts. This information also is now available to the general public by computer on the USGS Illinois District "Home Page" on the World Wide Web at:

<http://www.dilurb.er.usgs.gov/>

—by Robert R. Holmes, Jr. and Amit Kapadia

References

- Chicago Tribune, 1996, Rain Check: Its a Record, July 19, Chicago Tribune, 150th year no. 201, section 1, p. 1.
- 1996, After the deluge, work and worries, July 21, Chicago Tribune, 150th year no. 203, section 1, p. 1.
- 1996, Federal Disaster aid to help flood victims in 11 counties, July 26, Chicago Tribune, 150th year no. 208, section 2, p. 1.