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Floods from Record Rains in Illinois, Iowa, Minnesota, and Wisconsin, August 17–30, 2007

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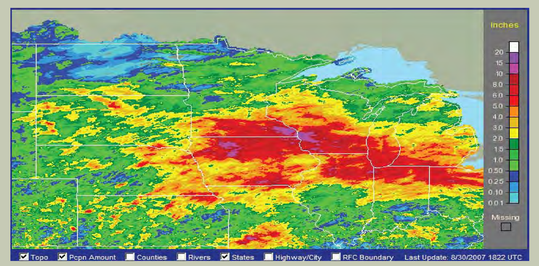
INTENSE PRECIPITATION



More than 16 inches of rain fell—up to 15 inches in 24 hours—as a series of thunderstorms moved along a stalled frontal boundary from Iowa to Minnesota, Wisconsin, Illinois, and farther east, August 17–23 (National Weather Service, 2007a).

Abstract

Record rainfall occurred August 17–23, 2007, causing severe floods in parts of the Upper Mississippi River Valley and killing 14 people. Widespread, slow-moving thunderstorms developed and redeveloped along a stationary front, stretching from northern Iowa through northern Illinois, while the low-level jet stream transported warm, moist air from the remnants of Tropical Storm Erin into southern Minnesota and southern Wisconsin (National Weather Service, 2007a). The rain broke drought conditions in parts of Minnesota and Wisconsin, but fell on saturated ground in Iowa and Illinois.

The greatest rainfall occurred in southeast Minnesota and southwest Wisconsin. Many locations exceeded the 100-year recurrence interval for 24-hour rainfall (6–7 inches) and 100-year 5-day rainfall (9–10 inches) (Huff and Angel, 1992). Record amounts of rainfall for August were recorded, including 15.18 inches in Madison, Wisconsin (National Weather Service, 2007b). The 24-hour rainfall record was broken for Minnesota in Houston County when 15.10 inches of rain fell August 18–19.

Flooding was severe in parts of the four states. In Iowa, flooding occurred in the north central and south central portions of the state beginning August 17. The most severe flooding occurred in the Des Moines and Chariton River Basins, with recurrence intervals ranging from approximately 15 to 60 years. Streams in northeastern Iowa generally had peak streamflows with recurrence intervals of less than 10 years.

In northern Illinois and the Chicago area, flooding occurred on the Kishwaukee River, Fox River tributaries, the Skokie River, and the Little Calumet River tributaries. Additional precipitation on August 23 caused flooding at the 100-year recurrence interval on the South Branch Kishwaukee River, Tyler Creek, and Deer Creek near Chicago Heights. Streamflows in larger rivers, including the DuPage and Fox, reached or exceeded recurrence intervals of 25–50 years.

In southeast Minnesota, the most severe flooding occurred in and adjacent to the Whitewater and Root River basins. Two streamgages in the Root River basin recorded peak flows of record. One gage on the Root River recorded greater than a 100-year recurrence interval while the other on a tributary is likely to exceed the 500-year recurrence interval. In the Zumbro River basin, flooding was less severe with peaks of 10-year recurrence intervals.

In southern Wisconsin, flooding was most severe in the Lower Wisconsin River, Grant/Sugar/Pecatonica River basins, southern Lake Michigan tributaries, Illinois/Fox River, and the Rock River. Recurrence intervals ranged from 2–100 years.

Federal disaster areas were declared for 14 counties in Iowa, 6 in Illinois, 8 in Minnesota, and 14 in Wisconsin (http://www.fema.gov/news/disasters.fema). Flood and storm damages were estimated at greater than $240.6 million for the four states. Damages were estimated at $10.7 million in Iowa (Iowa Homeland Security and Emergency Management, 2007), $22.6 million in Illinois (Illinois Government News Network, 2007), $157.3 million in Minnesota, (Minnesota Office of the Governor, 2007), and $48 million in Wisconsin (Wisconsin State Journal, 2007).

USGS MONITORING

Boat measurement on the Illinois River, Illinois

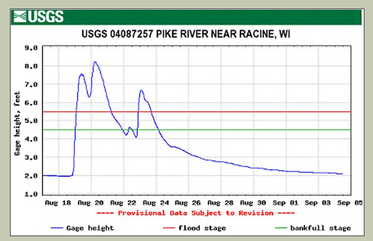
A crest-stage gage damaged by flood debris on Cedar Creek, Minnesota

Gaging station on Aux sable Creek, Illinois

A cableway and acoustic Doppler current profiler measurement on the Zumbro River, Minnesota

Gage inspection on the Chariton River, Iowa

Measuring overflow on the Chariton River, Iowa



USGS hydrologic technicians and hydrologists made more than 100 streamflow measurements related to the floods—data used during flooding by emergency officials.

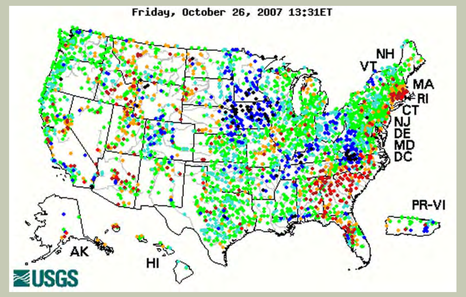
FLOOD STATISTICS

Provisional summary of peak stages and discharges at selected streamflow-gaging stations in the upper Midwest

State	Station number	Station name	Drainage area (mi^2)	Flood of August 2007: Peak stage (ft)	Peak discharge (ft^3/s)	Date (2007)	Approximate recurrence interval (years)	Previous maximum discharge: Peak stage (ft)	Peak discharge (ft^3/s)	Date	Years of record
Illinois	05439000	S. Br. Kishwaukee River at Dekalb, IL	77.7	15.34	3,100	Aug. 24	100	15.90	3,500	July 1983	28
Illinois	05440700	Rock River at Byron, IL	7990	15.50	32,100	Aug. 25	nd	16.12	35,400	June 2000	7
Illinois	05529000	Des Plaines river near Des Plaines, IL	360	8.62	3,800	Aug. 24	10	10.88	4,900	Oct. 1986	67
Illinois	05530990	Salt Creek at Rolling Meadows, IL	30.5	10.57	1,350	Aug. 23	10 - 25	14.03	1,650	Aug 1987	34
Illinois	05536000	North Branch Chicago River at Niles, IL	100	9.61	1,800	Aug. 24	10	11.35	2,590	Aug. 1987	57
Illinois	05536235	Deer Creek near Chicago Heights, IL	23.1	12.37	1,320	Aug. 24	100	12.15	1,380	July 1957[2]	59
Illinois	05539900	W. Br. Du Page R. near West Chicago, IL	128.5	10.32	3,100[4]	Aug. 24	50	10.91	984	Dec. 1982[2]	46
Illinois	05543500	Illinois River at Marseilles, IL	8,260	24.37	80,000	Aug. 25	10 - 25	26.85	95,000	Feb. 1997	88
Illinois	05550000	Fox River at Algonquin, IL	1,400	3.51	6,700	Aug. 25	25 - 50	4.50	6,720	May 2004[2]	92
Illinois	05550300	Tyler Creek at Elgin, IL	38.9	8.91	1,050	Aug. 24	100	8.26	1,650	Aug. 2002	9
Illinois	05550500	Poplar Creek at Elgin	35.2	5.19	830	Aug. 20	10 - 25	6.78	1,180	Feb. 1997	56
Illinois	05551200	Ferson Creek near St. Charles, IL	51.7	8.10	2,800[2]	Aug. 24	50	9.66	2,580	Feb. 1997[2]	46
Illinois	05551540	Fox River at Montgomery, IL	1,730	14.77	15,300[2]	Aug. 24	nd	13.92	8,800	May 2004	4
Iowa	05387440	Upper Iowa River at Bluffton, IA	367	12.50	8,200[1]	Aug. 22	2 - 5[10]	nd	20,200	Mar 1961	5
Iowa	05387500	Upper Iowa River at Decorah, IA.	511	9.53	8,610	Aug. 22	2 - 5	nd	28,500	May 1941	37
Iowa	05388250	Upper Iowa River near Dorchester, IA	770	16.18	11,000	Aug. 22	5 - 10	21.80	30,400	May 1941	32
Iowa	05389000	Yellow River near Ion, IA.	221	14.64	9,330	Aug. 20	2 - 5	15.20	18,500	May 1941	19
Iowa	05389400	Bloody Run Creek near Marquette, IA	34.1	8.53	1,610	Aug. 19	5 - 10	12.38	4,620	May 2004	15
Iowa	05421000	Wapsipinicon River at Independence, IA	1,050	12.63	10,600	Aug. 26	2 - 5	22.35	31,100	May 1999	73
Iowa	05458900	West Fork Cedar River at Finchford, IA	846	12.81	5,930	Aug. 24	2 - 5	18.45	31,900	Jun 1951[2]	61
Iowa	05464000	Cedar River at Waterloo, IA	5,150	12.61	24,200	Aug. 24	2 - 5	21.86	76,700	Mar 1961	66
Iowa	05476750	Des Moines River at Humboldt, IA	2,260	9.24	7,270	Aug. 23	2 - 5	15.40	19,000	Jul 1993[2]	42
Iowa	05480500	Des Moines River at Fort Dodge, IA	4,190	14.51	29,400	Aug. 22	25	19.62	35,600	Apr 1965[2]	74
Iowa	05481300	Des Moines River near Stratford, IA	5,450	22.89	35,800	Aug. 23	10 - 25	25.68	57,400	Jun 1954[2]	39
Iowa	05489000	Cedar Creek near Bussey, IA	374	21.44	10,900	Aug. 25	2 - 5	34.61	96,000	Jul 1962	59
Iowa	05489500	Des Moines River at Ottumwa, IA	13,400	11.13	35,100	Aug. 24	10	22.15	112,000	Jul 1993	37
Iowa	05490500	Des Moines River at Keosauqua, IA	14,000	26.97	70,700	Aug. 24	50 - 100	32.66	111,000	Jul 1993	37
Iowa	05494300	Fox River at Bloomfield, IA	87.7	25.05	nd	Aug. 24	nd	24.02	8,600	May 1960	25
Iowa	05903700	S Fk Chariton Riv nr Promise City, IA	168	27.50	22,400	Aug. 24	25 - 50	34.84	70,600	Sep 1992	39
Iowa	06903900	Chariton River near Rathbun, IA	549	21.24[3]	0	Aug. 24	nd	14.94	2,780	Dec 1993	37
Iowa	06904010	Chariton River near Moulton, IA	740	37.80	20,400[1]	Aug. 25	nd	36.83	11,200	Jul 1962	27
Minnesota	05353800	Straight River nr Faribault, Minn.	435	8.85	3,440	Aug. 20	2 - 5	12.74	6,080	June 2004[2]	41
Minnesota	05373995	S.Fk. Zumbro River at Rochester, Minn.	303	16.64	11,500	Aug. 19	10 - 25	23.36	30,500	July 1978	56
Minnesota	05373080	Milliken Cr near Concord, Minn.	22.1	11.75	1,460	Aug. 19	5 - 25	15.80	3,470	June 2001	28
Minnesota	05374000	Zumbro R at Zumbro Falls, Minn.	1,150	21.76	18,100	Aug. 20	5 - 10	30.80	35,900	July 1951	80
Minnesota	05380100	Cedar Cr nr Ridgeway, Minn.	7.23	18.40	nd	Aug. 19	nd	13.86	nd	Sept. 2004	6
Minnesota	05383950	Root River at Pilot Mound, Minn.	565	19.23	12,600	Aug. 19	nd	23.85	21,900	Sept. 2004	4
Minnesota	05384350	Root River near Rushford, Minn.	992	28.98[3]	nd	Aug. 19	nd	26.35	32,400	June 2000	22
Minnesota	05384500	Rush Creek at Rushford, Minn.	132	17.45	39,500[1]	Aug. 19	>200	13.54	11,600	Mar. 1950	65
Minnesota	05384800	Campbell Cr nr Money Creek, Minn.	6.82	10.40	nd	Aug. 19	nd	4.80	nd	Sept. 2004	6
Minnesota	05385000	Root River near Houston, Minn.	1,250	18.15	46,000[1]	Aug. 19	100 - 200	18.32[3]	37,000	April 1952[2]	83
Minnesota	05385500	S.F. Root River nr Houston, Minn.	275	11.47	3,580	Aug. 19	2 - 5	14.90	13,800	June 2000	54
Minnesota	05387030	Crooked Creek at Freeburg, Minn.	44.8	15.90	1,510	Aug. 19	10 - 25	19.02	2,200	Mar. 1992	28
Wisconsin	04087233	Root River Canal near Franklin, Wis.	57.0	11.66	1,280	Aug. 21	10 - 25	11.28[9]	1,440	Mar 1974[2]	42
Wisconsin	04087257	Pike River near Racine, Wis.	38.5	8.24	1720[1]	Aug. 20	100	9.14[9]	1,650	May 2004[2]	35
Wisconsin	05406000	Baraboo River near Baraboo, Wis.	609	19.50	3,940	Aug. 21	2 - 5	22.78[9]	7,900	Mar 1917[2,5]	73
Wisconsin	05408000	Kickapoo River at LaFarge, Wis.	266	12.84	2,650	Aug. 19	2 - 5	14.92	14,300	July 1978	68
Wisconsin	05410490	Kickapoo River at Steuben, Wis.	687	16.89	8,700	Aug. 20	10 - 25	14.81[9]	16,500	July 1978	73
Wisconsin	05427718	Yahara River at Windsor, Wis.	73.6	6.94	1,270	Aug. 19	25 - 50	6.58	2,050	July 1993	22
Wisconsin	05430500	Rock River at Afton, Wis.	3,340	10.01	8,380	Aug. 30	5	13.05[9]	13,000	Mar 1929[2]	93
Wisconsin	05436500	Sugar River near Brodhead, Wis.	523	9.04	5,340	Aug. 23	2 - 5	11.40	14,800	Sep 1915	93
Wisconsin	05545750	Fox River near New Munster, Wis.	811	14.98	4,880	Aug. 24	5 - 10	14.10[9]	7,520	Mar 1960[2]	67

Footnotes:
[1] Peak discharge for 2007 exceeds the previous maximum known discharge
[2] Date of maximum discharge. Maximum stage was on different date.
[3] Backwater.
[4] Gage at different site and same datum.
[5] Gage at different site and datum.
[6] Gage at different datum.
[9] Before regulation .
[8] After regulation .
[5] Estimated.
[10] Less than 10 years of record, regional regression equations used to estimate recurrence interval.
nd, Not determined

Flood statistics computed and verified by the USGS are used by Federal, State, and local agencies to help plan and design structures that will minimize risks from future flooding.



Stream information is available in near-real-time online at: http://waterdata.usgs.gov/nwis

FLOOD AFFECTS

Highway erosion along Whitewater River, Minnesota (courtesy of National Weather Service)

Steuben, Wisconsin flooded from the Kickapoo River

Washed out roads adjacent to Cedar Creek, Minnesota

Flooded homes from the South Branch Kishwaukee River, Illinois

Flooded roads from the South Fork Chariton River, Iowa

Homes and buildings displaced by floodwaters from Garvin Brook, Minnesota

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