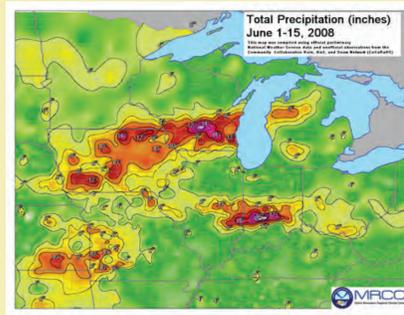


# Flood of June 2008 in Southern Wisconsin

In June 2008, heavy rain caused severe flooding across southern Wisconsin. The floods were aggravated by saturated soils that persisted from unusually wet antecedent conditions from a combination of floods in August 2007, more than 100 inches of snow in winter 2007-08, and moist conditions in spring 2008. The flooding caused immediate evacuations and road closures and prolonged, extensive damages and losses associated with agriculture, businesses, housing, public health and human needs, and infrastructure and transportation.

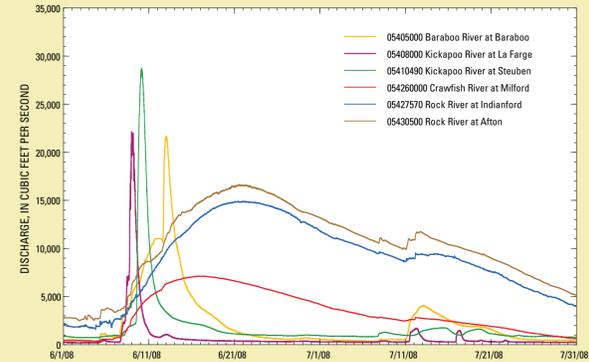
Record gage heights and streamflows occurred at 21 U.S. Geological Survey (USGS) streamgages across southern Wisconsin from June 7 to June 21. Peak-gage-height data, peak-streamflow data, and flood probabilities are tabulated for 32 USGS streamgages in southern Wisconsin. Peak-gage-height and peak-streamflow data also are tabulated for three ungaged locations.



Cumulative precipitation in the Midwest for June 1 through June 15, 2008. (image from National Weather Service, 2008, accessed October 31, 2008, at [http://www.crh.noaa.gov/news/display\\_cmsstory.php?wfo=mkx&storyid=14030&source=0](http://www.crh.noaa.gov/news/display_cmsstory.php?wfo=mkx&storyid=14030&source=0))

Table of association between flood probability and recurrence interval.

Flood probability	Recurrence interval (years)
0.2	5
0.1	10
0.04	25
0.02	50
0.01	100
0.005	200
0.002	500

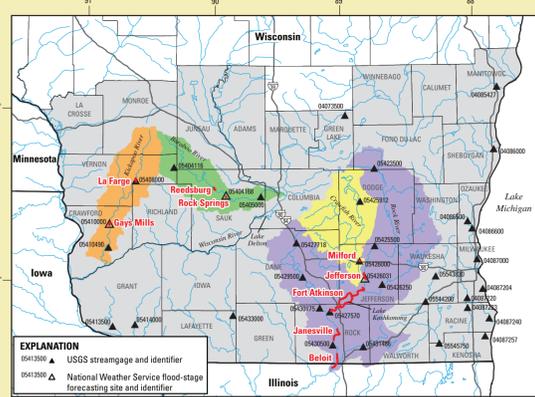


Hydrographs showing selected USGS streamgages in southern Wisconsin for June-July 2008

Baraboo and Kickapoo Rivers peaked quickly following major storms on June 6-7 and June 12. In contrast, the Rock River did not peak until late June and flooding occurred over months instead of days.

Table of selected provisional flood-peak gage heights, peak streamflows, and estimated flood probabilities for 8 USGS streamgages with record streamflows.

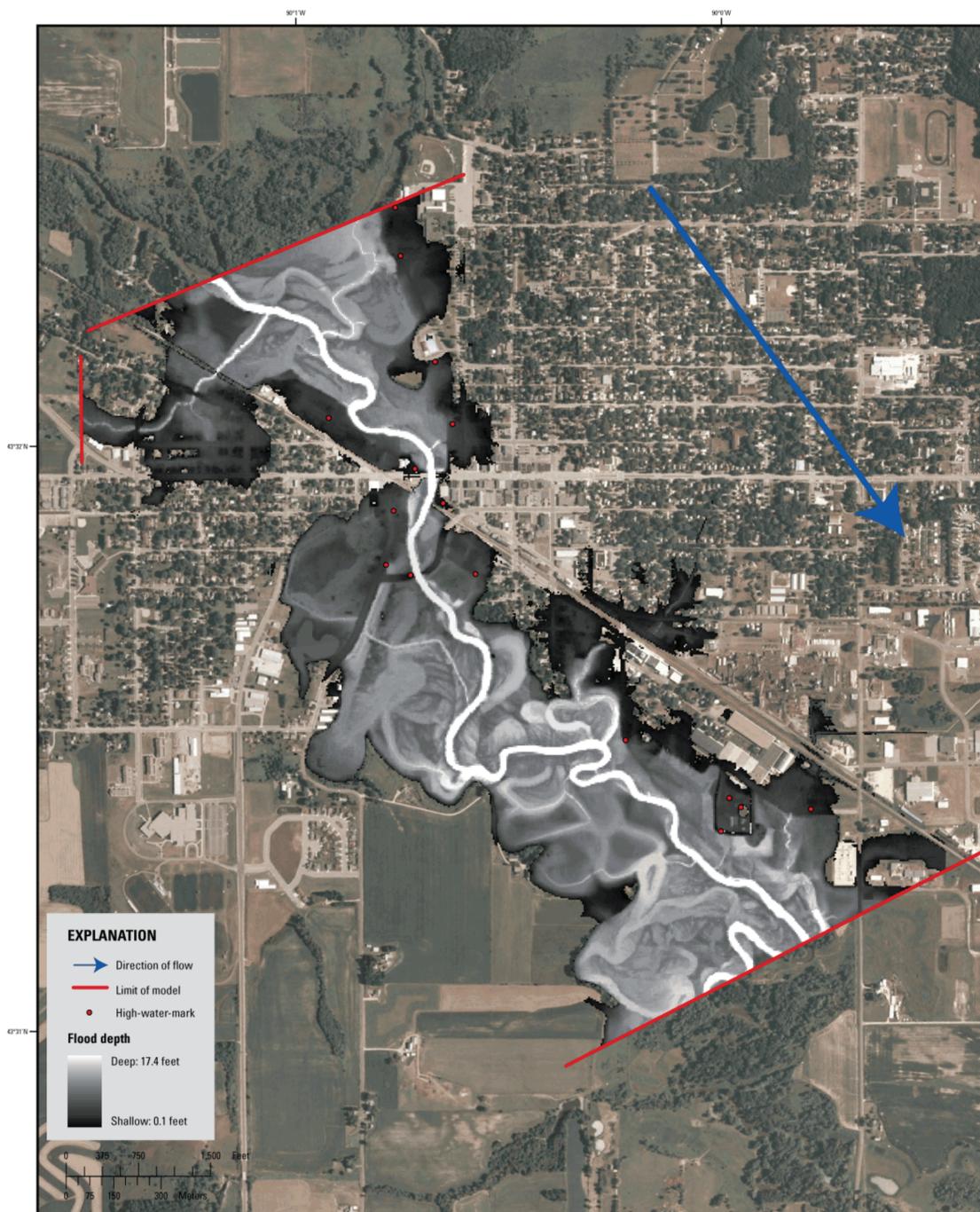
USGS station number	Stream and location	Maximum prior to current flood		Maximum for June 2008 flood			Estimated flood-probability range based on 95% confidence intervals		
		Date	Gage height (feet)	Discharge (ft <sup>3</sup> /s)	Date	Time		Gage height (feet)	Discharge (ft <sup>3</sup> /s)
05405000	Baraboo River near Baraboo	3/26/1917	17.50	7,900	06/13/08	0:30	27.51	18,000	0.002-0.005
05408000	Kickapoo River at La Farge	7/1/1978	14.92	14,300	06/08/08	23:15	15.78	22,100	0.002-0.01
05410490	Kickapoo River at Steuben	7/3/1978	14.81	16,500	06/10/08	3:15	19.16	28,700	0.002-0.01
05426000	Crawfish River at Milford	4/6/1959	11.15	6,140	06/16/08	15:45	13.59	7,110	0.002-0.01
05427570	Rock River at Indianford	4/5/1979	16.23	11,900	06/21/08	3:00	18.33	14,900	0.002-0.04
05427718	Yahara River at Windsor	7/6/1993	6.58	2,050	06/09/08	1:30	6.97	3,200	0.002-0.04
05430500	Rock River at Afton	3/23/1929	11.81	13,000	06/21/08	14:00	13.51	16,700	0.002-0.01



Study area in southern Wisconsin showing streamgages, river basins, and communities included in June 2008 flood study.

Extensive flooding along the Baraboo River, Kickapoo River, Crawfish River, and Rock River caused particularly severe damages in nine communities and their surrounding areas: Reedsburg, Rock Springs, La Farge, Gays Mills, Milford, Jefferson, Fort Atkinson, Janesville, and Beloit. Flood-peak inundation maps and water-surface profiles were generated for the nine communities in a geographic information system by combining flood high-water marks with available 1-10-meter resolution digital-elevation-model data. The high-water marks used in the maps were a combination of those surveyed during the June flood by communities, counties, and Federal agencies and hundreds of additional marks surveyed in August by the USGS. The flood maps and profiles outline the extent and depth of flooding through the communities and are being used in ongoing (as of November 2008) flood response and recovery efforts by local, county, State, and Federal agencies.

## Example flood-depth map for Reedsburg, WI



**EXPLANATION**

- Blue arrow: Direction of flow
- Red line: Limit of model
- Red dot: High-water-mark

**Flood depth**

- Dark gray: Deep: 17.4 feet
- Light gray: Shallow: 0.1 feet

Base from 2006 National Agricultural Imagery Program (U.S. Department of Agriculture, 2006)

## Field Surveys of High-Water Marks

A RTK-GPS system was used to survey high-water marks to an accuracy of 0.1 feet (NAVD 88).



Surveys were augmented with hand levels and auto levels

The high-water-mark surveys were done in August, 2008. Evidence of the extent of flooding was still abundant because of the severity of the flooding and the extensive amount of damage to buildings. High-water-mark elevations were verified with photos, aerial photographs, surveys done by local officials during the flood, and gage heights at USGS and National Weather Service gaging locations.



Photo of Rock Springs HWM 3, August 2008



Photo taken by Village of Rock Springs on June 10, 2008 near flood peak



Photo of Gays Mills HWM 2, August 2008



Kickapoo at La Farge, WI

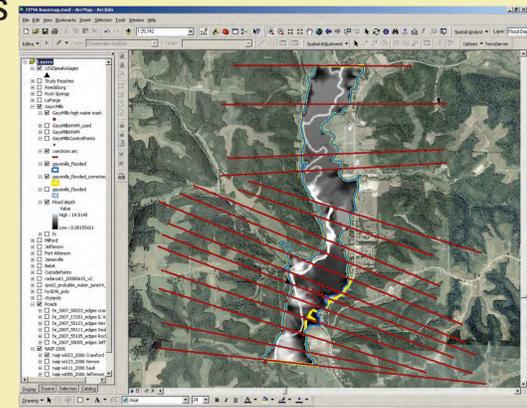
High-water marks were compared to gage heights at 5 of the streamgages

## Flood Inundation Maps

Flood-inundation maps were built from overlays of topological digital elevation data and high-water marks in a Geographic Information System

Quality of the underlying digital data was paramount in determining the accuracy and quality of the resulting inundation map.

Two maps were created, showing the spatial extent and depth of flooding. Flood profiles were also generated.



The report, maps, and digital data for nine communities are available on: <http://wi.water.usgs.gov/surface-water/flood2008>

For more information on the June 2008 flood or predictive flood mapping for your community, please contact Faith Fitzpatrick at [fafitzpa@usgs.gov](mailto:fafitzpa@usgs.gov) or (608) 821-3818

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