

Weather Home Companion



Volume 5 Issue 1

Summer 2008

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Welcome to Storm-Based Warnings

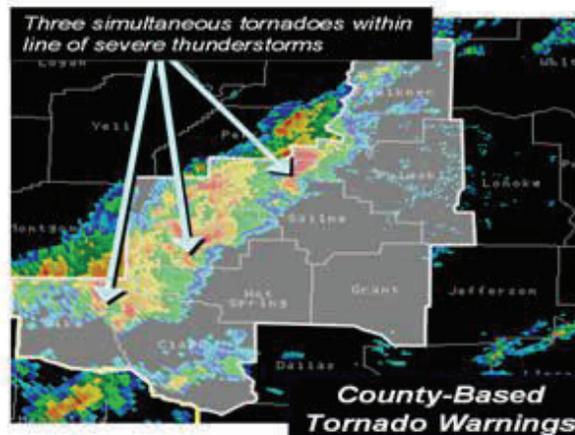
Donna Dubberke

Effective last October, the National Weather Service began issuing Storm-Based Warnings. This marks a shift in philosophy from the former county-based warnings. Forecasters issuing warnings in the storm-based era strive to be more precise than ever before. Early evaluations of this new philosophy suggest that by reducing the warned area to ¼ of the area of an average county, the economic value to the public due to reduced cost of sheltering is a minimum of \$100 million per year.

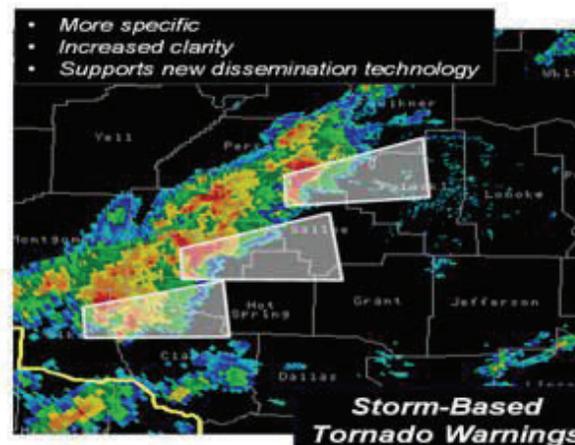
For the forecasters, the biggest change is a focus on outlining the area of greatest threat from the storm regardless of political boundaries. One of the biggest changes for citizens is that multiple warnings can be in effect for a county at the same time. For example, if you have a storm moving across the north and a completely different storm moving across the southern part of the same county, there could be separate warnings for each of these storms.

Storm-based warnings are best viewed

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**8 counties under warning
Almost 1 million people warned**



**70% less area covered
~600,000 fewer people warned**

Weather Home Companion is a semiannual publication of the National Weather Service office in the Quad Cities.

If you have an idea for an article or a question you would like to see answered, please write to us.

Contact information can be found on page 10.

NWS Quad Cities Honored by NOAA

Steve Kuhl

I am proud to announce National Oceanic and Atmospheric Administration (NOAA) officials selected the staff at the National Weather Service (NWS) Quad Cities forecast office for the rare honor of receiving two, prestigious Department of Commerce Bronze Medals.

Our staff was recognized for issuing life-saving forecasts and warnings during the April 13, 2006, tornado outbreak in eastern Iowa and northwestern Illinois, and for the historic ice storm and blizzard of February and March 2007.

April 13, 2006 Tornado Outbreak

During the tornado outbreak, NWS Quad Cities staff issued more than 70 severe weather warnings, including 15 life-saving tornado warnings. At

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More About Storm-Based Warnings:

www.weather.gov/sbwarnings

More About the Storm-Ready program:

www.weather.gov/quadcities/?n=stormready

Weather Home Companion On-Line Archive has more information on these events:

Iowa City Tornado:

www.crh.noaa.gov/images/dvn/newsletters/Spring06.pdf

2007 Ice Storm and Blizzard:

www.crh.noaa.gov/images/dvn/downloads/fall07.pdf

Welcome to Storm-Based Warnings

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graphically because the threat area can be difficult to describe in words for text warnings and radio. Viewing the warnings graphically via the internet or TV allows you to see quickly where the threat has

been identified. GIS-based computer programs can also easily plot the warnings and display them with other relevant information such as radar.

You can view Storm-Based warn-

ings in action on the new Watches/Warnings portion of our web site. Visit www.crh.noaa.gov/hazards/dvn and check it out!

StormReady in Your Community

Donna Dubberke

Since its inception in 1999, the StormReady program has been growing steadily. StormReady sets an industry standard for severe weather preparedness and communication. Although it started with counties and cities, it has since spread to universities, businesses, Indian reservations, and even military bases. In the local area, 5 counties (Stephenson County, IL, McDonough County, IL, Benton County, IA, Johnson County, IA, and Des Moines County, IA), 5 towns (Galva, IL, Kewanee, IL, Good Hope, IL, Prairie City, IL, and Blandinsville, IL), as well as the University of Dubuque are currently recognized as Storm-Ready.

StormReady Supporters

Many businesses and organizations have an effective severe weather strategy, but the full StormReady program guidelines (which were designed with governments entities in mind) don't really apply. In these cases, the StormReady Supporter program fits the bill.

StormReady Supporters apply the principles of the StormReady program to their own organization in an effective way. The Johnson County Conservation Board was

the first StormReady Supporter recognized in our area (Oct. 2007), followed by the Howard H. Cherry Scout Reservation (Jan. 2008) and then Deere & Company World Headquarters (Jan. 2008).

We would like to extend our congratulations to all of the communities, towns, and organizations that have been recognized through the StormReady program for implementing exceptional severe weather strategies.



NWS Quad Cities Honored by NOAA

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St. Patrick's Church in Iowa City, 75 parishioners attending services evacuated to an adjacent basement following a tornado warning and sirens, which sounded 37 minutes before the storm struck the church. When the tornado hit, the steeple, choir loft and part of the roof and walls collapsed onto the evacuated area.

February and March 2007 Ice Storm and Blizzard

Our forecasters coordinated with other weather service offices serv-

ing Iowa during the February 23-25 ice storm and March 1-2 blizzard of 2007. NWS staff coordinated closely with state and local officials and the media to collect and share information on the ice storm and blizzard developments. These storms resulted in four fatalities, 250,000 homes losing power and the closure of six interstate highways and eight state highways. Accurate weather forecasts and warnings prepared by Quad Cities and other NWS offices serving Iowa, enabled officials to prepare storm shelters,

keep highways open, deploy National Guard troops, and keep the public advised of the adverse weather conditions.

Retired Navy Vice Admiral Conrad C. Lautenbacher, Ph.D., undersecretary of commerce for oceans and atmosphere and NOAA administrator, presented the Bronze Medals to myself and Terry Simmons, Data Acquisition Program Manager, during a ceremony on April 18th in Washington, D.C.

The 2007-08 Winter In Review

John Haase

Bill Nichols

Overview:

The winter of 2007-08 was a long one. The weather pattern was very active beginning at the end of November and continuing through the end of April. Many people remarked how it reminded them of the 1978-79 winter season. Forecasters at the National Weather Service office in the Quad Cities were kept very busy. There were a total of 23 separate precipitation events that required headlines (winter weather advisories, watches or warnings) compared to only 16 during the previous winter season.

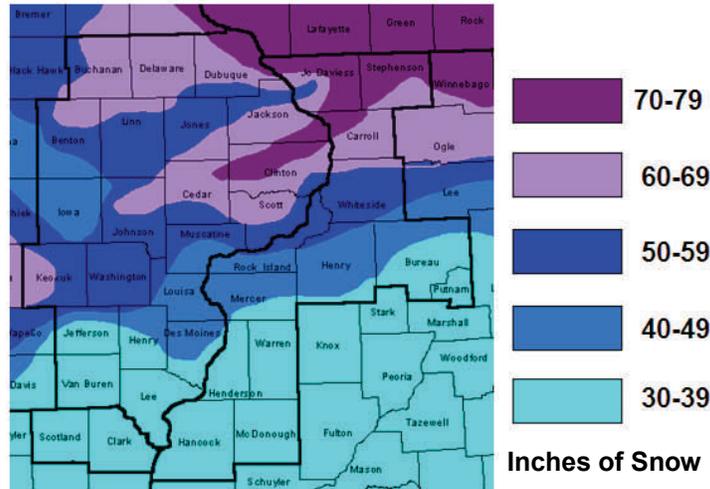
Seasonal snowfall totals ranged from 50 to nearly 80 inches along and north of Interstate 80, to 30 to 45 inches to the south. A record seasonal total was established at Dubuque, Iowa with 76.5 inches. This broke the old record of 75.7 inches set during the 1961-62 season. The cooperative observer at Lowden, Iowa in Cedar county measured a record 40.3 inches in the month of February, resulting in a total seasonal snowfall of a whopping 78.2 inches! This site had the most of any in eastern Iowa. In Illinois, Apple River Canyon State Park in Jo Daviess county, had 72.0 inches of snow. Further to the north, Madison, Wisconsin recorded over 100 inches during the winter season, far exceeding the previous winter record of 76.6 inches in 1978-79.

Highlights:

December

There were two ice storms in December, each producing over an inch of ice accumulation at some locations. The ice storms occurred on December 1 and again on December 10-11, 2007. These were followed by an intense winter storm that struck on

2007-2008 Seasonal Snowfall Totals



December 22-23, 2007.

January

Incredibly, a big warm-up occurred during the first week of January melting much of the snow. At some locations, record high temperatures in the 60s were recorded on January 6-7, 2008. With the warm air melting the snow, several days of dense fog plagued the region. The warm air culminated in a few large hail reports during the early morning hours of January 7. Later that afternoon, a rare major winter tornado outbreak formed from southeast Wisconsin to Arkansas. A couple of strong tornadoes struck portions of northern Illinois into southeast Wisconsin. Not long afterwards, winter returned to the Midwest.

February

The month of February was very active with three major winter storms. A thundersnow event occurred on February 3, near record snows fell on February 5-6, and a major winter storm struck on February 16-17. The February 5-6 event dumped near record

snows of 12 to 18 inches across a large portion of eastern Iowa and northwest Illinois. The most snow reported during this event was 18 inches at Winslow in northern Stephenson county.

March

Most of the month of March was quiet as far as snowfall, but due to several heavy rain events and melting of the snow depth, flooding became a concern for much of the month.

April

Cool weather continued well into April. In fact, the first 70 degree maximum temperature of the spring season did not occur in Moline until the 16th. Sleet and snow showers were observed as late as the 28th. This was followed by frost and freezing temperatures on April 29th.

Causes:

The reasons for our record snowy and colder winter are complex and still not fully understood. Increasing evidence leads to three

(continued on page 4)

...there were 23 separate precipitation events requiring winter weather advisories, watches or warnings, compared to only 16 during the previous winter season...

Highest seasonal totals in the NWS Quad Cities service area:

Iowa: 78.2 inches, Lowden Cooperative observer (Cedar County)

Illinois: 72.0 inches, Apple River Canyon State Park (Jo Daviess County)

The 2007-08 Winter In Review

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critical relationships. We will discuss these in order of impact on our local Upper Midwestern climate

1) Ocean Temperature

Several recent studies have emphasized the strong relationship between changes in sea surface temperatures and changes in the long term average temperatures over land. This is primarily for two reasons: 1) the world's oceans cover over 70 percent of the planet's surface; and 2) the amount of heat captured in the oceans (called specific heat capacity) is roughly *five times* that of the earth's land mass. Because the oceans are also deep and undergo mixing (or convection), this allows for added heat storage or release of up to *5,000 times* that of the land mass. Statistical data indicates a strong relationship between North American temperatures and sea surface temperatures in the Pacific and Atlantic, both of which have cooled noticeably over the past year.

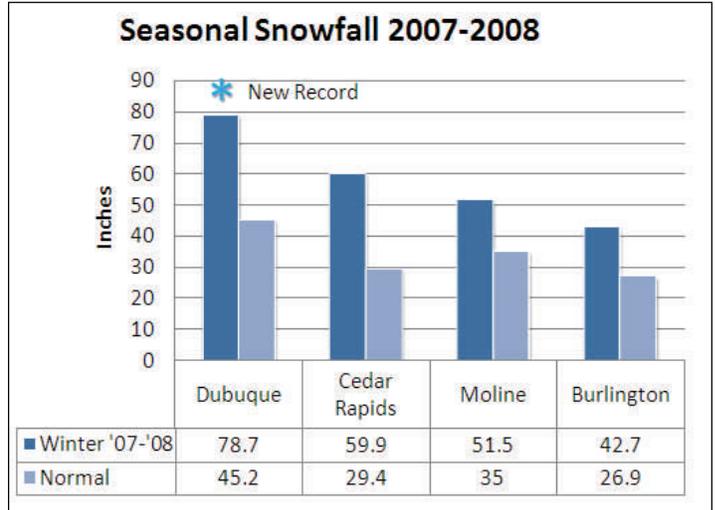
2) Strength of the Sun

Remarkably, the sun's rays are not constant. Past evidence indicates that the strength of the sun's rays (called solar irradiance) varies only slightly, yet still enough to have impacts on our climate. A key indicator of this relationship of changes in the strength of the sun appears to be related to the number of sunspots.

Increasing data suggest the number of observed sunspots are abnormally low and we are entering a "quiet phase" of sunspot activity. This would suggest a slight reduction in the amount of energy from the sun reaching the earth's surface. The discovery of this relationship is fairly new, with significant amounts of additional research needed over the next several years.

...the amount of heat captured in the oceans is roughly 5 times that of the earth's land mass...

...We are entering a "quiet phase" of sunspot activity...



Snow totals for the winter of 2007-2008. A new record was set at Dubuque, where a total of 78.7 inches fell for the season. This broke the old record of 75.7, set in the winter of 1961-62.

3) La Niña

This term relates to the temperature in the Pacific Oceans within 5 degrees of the equator between South America to east of the Philippines. La Niña is the "cold" phase of the more commonly known El Niño (warm phase). Since this phenomena covers smaller area of the world's oceans, and is further away from

North America, the impact is less.

So our remarkably snowy winter appears to be related to the recent cooling in ocean temperatures, and possibly to a slightly cooler sun. Scientists will continue to monitor these factors and gather more information to better understand their impacts on our weather.



Heavy snow and strong wind combined to produce this large drift by a house in Norway, Iowa, February 18, 2008. Norway is southwest of Cedar Rapids. Photo Courtesy of Richard Percifield.

It Seems Like My NOAA Weather Radio Keeps Waking Me Up...

Donna Dubburke

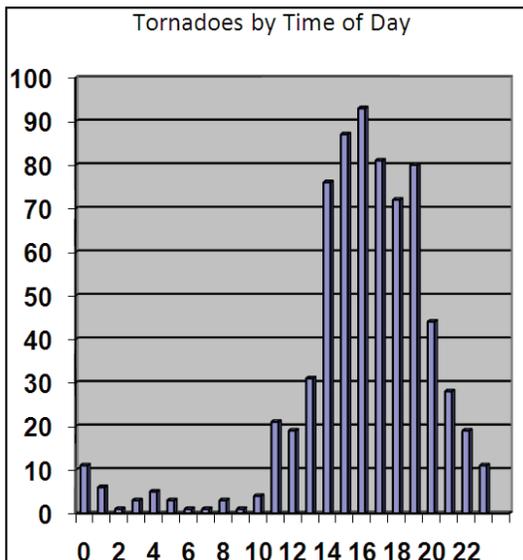
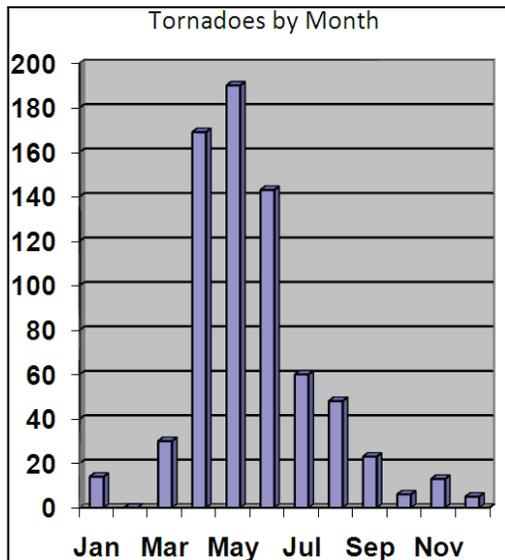
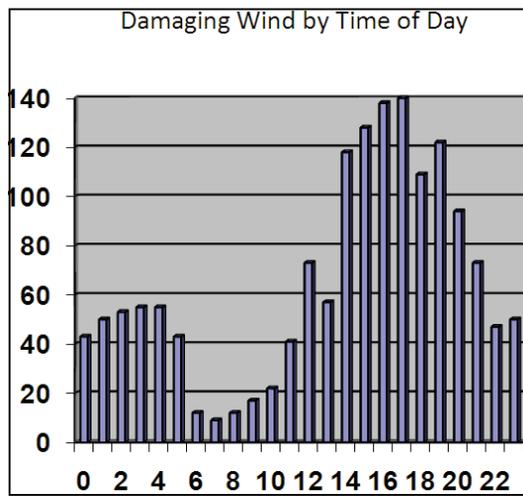
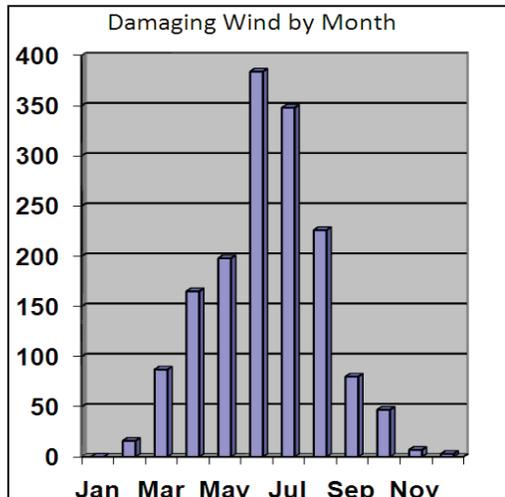
Does it seem like your weather radio is always waking you up? We decided to take a look at some statistics to find out more about warnings and when they are issued in our local area (eastern Iowa, western Illinois, and extreme northeast Missouri).

Here's what we discovered...

We have thunderstorms about forty days per year on average. Over the course of those days, we average

roughly ten severe thunderstorm warnings, one flash flood warning, and one tornado warning for any given county per year. That means that only about 25 percent of thunderstorms are intense enough to warrant some kind of warning.

Of course, most thunderstorms occur during the warmer months from March through October and during the afternoon and evening (see graphs on this page).



Tornado Statistics

Did you know...

 Only 1% of all tornadoes are rated EF4 or stronger (winds estimated at 166 mph or higher) on the Enhanced Fujita scale. Yet this tiny percentage accounts for 67% of tornado fatalities.

 The last EF5 rated tornado was...

Parkersburg, IA *- May 29, 2008 (6 fatalities - preliminary)

Prior to that: Greensburg, KS, May 4, 2007 (10 fatalities)

Iowa (prior to Parkersburg): Jordan - June 13, 1976 (0 fatalities)

Illinois: Plainfield - Aug. 28, 1990 (29 fatalities)

Missouri: Kansas City - May 20, 1957 (44 fatalities)

 40 years ago, on May 15, 1968, two F5 tornadoes touched down in Iowa within an hour of each other. Commonly referred to as the Oelwein tornado and the Charles City tornado, the two caused a combined 13 fatalities and over 50 million dollars in damage.

*More information about the devastating tornadoes that impacted Parkersburg, New Hartford, and Dunkerton, Iowa in May can be found at the following link from NWS Des Moines website:

www.crh.noaa.gov/dmx/?n=parkersburg

Spring 2008 Flood Review

Jeff Zogg

The spring of 2008 brought widespread flooding to much of our region. In fact, this flood event was our region's worst flood event since the spring of 1997. Although the flood of 2001 brought higher crests on the Mississippi River, that event was mainly confined to the Mississippi River itself. This spring, however, the Mississippi River as well as many of its tributaries saw major to near-record flooding. In addition, ice jams led to record flooding on the Rock River in Illinois early in the season.

April Rainfall		
		% of Normal
Cedar Rapids, IA	6.55	203
Dubuque, IA	6.03	173
Iowa City, IA	6.35	169
La Crosse, WI	6.74	199
Madison, WI	6.43	192
Quad Cities, IA/IL	3.89	102
Waterloo, IA	10.79	334

Editors Note:

The excessively wet weather pattern has continued since this article was written.

Widespread historic and devastating flooding occurred along the Iowa tributary rivers and the Mississippi River south of the Quad Cities in June 2008.

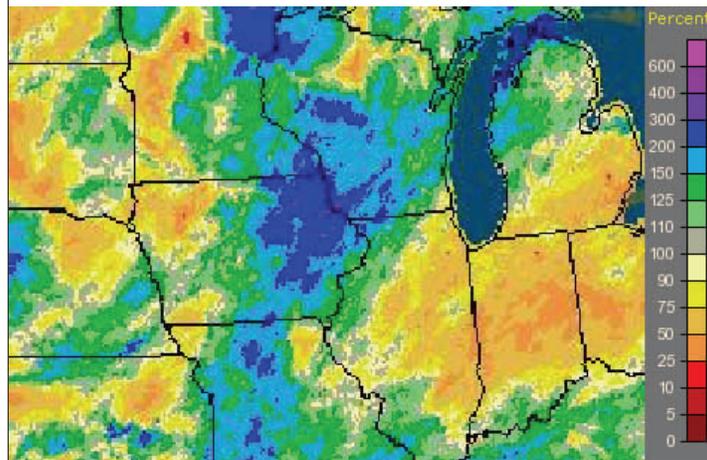
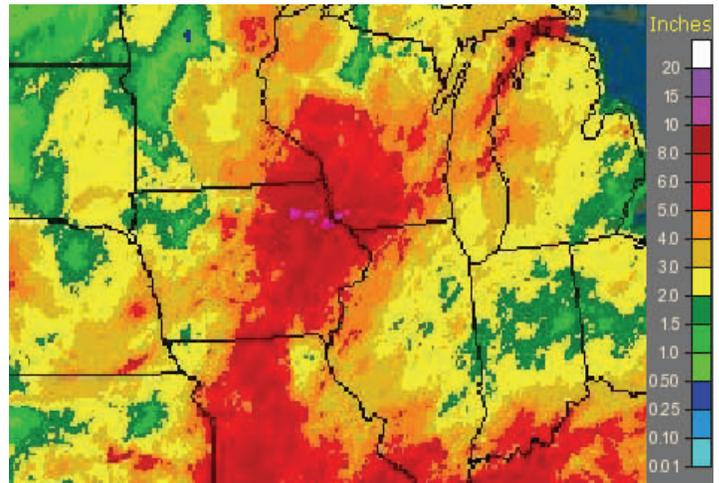
More information about this flooding will appear in later additions of this newsletter.

What caused the flooding?

The combination of heavy rainfall and snow melt produced the flooding. Snow pack across our region was much above normal. Some places reported record snow depths. In addition, much of our region saw heavy rainfall in April. Since our area rivers typically see their snow melt-related crests in April as well, the heavy rainfall combined with the snow melt to produce widespread flooding.

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Map of rainfall totals for the month of April 2008 (in inches). Magenta color over northeast Iowa represents over 10 inches.



Map of rainfall totals for April 2008, in percent of normal (based on 30 year record 1970-2000). Dark blue over east-central and northeast Iowa represents totals exceeding 200 percent.

Spring 2008 Flood Review

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Table of Preliminary Crests From Spring 2008 Floods*

River	Location	Flood Stage	Crest	Flood Severity
Mississippi River	Dubuque, IA	17	20.3	Moderate
	Camanche, IA	15	20.2	Major
	Muscatine, IA	16	21.5	Major
	Burlington, IA	15	21.2	Major
	Keokuk, IA	16	19.8	Major
Maquoketa River	Manchester, IA	14	19	Moderate
	Maquoketa, IA	24	27.5	Moderate
Wapsipinicon River	Independence, IA	10	18.0	Major
	Anamosa, IA	14	22.3	Major
	De Witt, IA	11	13.3	Major
Cedar River	Vinton, IA	15	17.2	Moderate
	Cedar Rapids, IA	12	17.1	Major
Iowa River	Marengo, IA	14	18.0	Moderate
	Lone Tree, IA	15	16.9	Moderate
	Columbus Jct, IA	19	24.5	Major
Pecatonica River	Wapello, IA	20	26.6	Major
	Freeport, IL	13	14.3	Moderate
Rock River	Joslin, IL	12	13.6	Minor
	Moline, IL	12	12.6	Minor

...this flood event was the worst in our region since 1997...

...the amount of water passing by the Quad Cities was enough to fill over 160 Olympic size swimming pools every minute...

* These were later exceeded at many sites by the historic flooding in June 2008

Many locations from eastern Iowa into southwestern Wisconsin saw April rainfall totals of six or more inches, which was 150 to 400 percent of normal. Images on page 6 show the April rainfall totals and percents of normal for selected larger cities in our region.

How severe was the flooding?

As stated earlier, this flood event was the worst such event in our region since 1997. While many area rivers experienced flooding, the Mississippi River as

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Spring 2008 Flood Review

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...The Rock River at Joslin, Illinois was above flood stage for more than 74 consecutive days...

well as its tributaries in east central Iowa were hit the hardest. The table on page 7 shows the preliminary crests for selected locations on our area streams.

It is interesting to put into perspective the amount of water involved during the height of the flooding. In the Quad Cities, when the Mississippi River crested at 19.2 feet, the volume of water passing by was 236,000 cubic feet per second. At that rate the Mississippi River would be able to fill 2 and 2/3rds Olympic-size swimming pools every second, or over 160 Olympic-size swimming pools every minute. It is also important to note that some locations saw prolonged flooding. One extreme example was the Rock River near Joslin, Illinois. The Rock River was above flood stage there from March 3rd through May 16th, or for 74 consecutive days.

Ice jam flooding

The Rock River experienced record flooding in the Moline, Illinois, area in early March due to an ice jam. The river crested there at 16.38 ft on March 6th. The previous record was 16.15 ft set on April 26, 1973. The rapidly rising water required quick evacuations, in some cases by boat because of the already high river stages. Ice jams led to flooding in other locations, too. For example, ice jams on Mill Creek in Milan, Illinois, led to flooding that forced the closing of I-280 on March 3, 2008. This was the second time ever, and in nearly as many weeks, that flooding occurred there.

...It was the heavy rainfall that led to the severe flooding...



Flooding on the Wapsipicon River in downtown Independence, April 27, 2008.

How well did the spring flood outlooks predict the flooding?

This spring we issued three spring flood outlooks. We issued them on February 22nd, March 6th and March 28th. The March 28th outlook called for a 50 to 60 percent chance of the Mississippi River reaching flood stage upstream of the Quad Cities, and a 70 to 80 percent chance downstream. The outlook called for varying chances of the tributaries reaching flood stage. In addition, our outlooks called for a higher than average risk of flooding.

Upon considering the fact that the entire Mississippi River as well as many of its tributaries not only reached flood stage but also experienced major to near-record flooding, one may conclude that our last outlook under-forecast the rivers. This was not the case. It is important to understand the assumptions that go into our outlooks. That is, the outlooks assume near normal temperatures and precipitation during the outlook period.

Both temperature and precipitation are important in the spring because (1) temperature affects the rate and amount of snow melt; and (2) precipitation can have a significant impact on the severity of flooding. If temperatures or precipitation are not near normal, then the actual risk of flooding may be different than what our outlook indicates.



Flooding along the Wapsipinicon River in Anamosa, April 28, 2008.

In the case of this spring, temperatures were nearly ideal and minimized the impact of snow melt on our rivers in spite of

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Spring 2008 Flood Review

(continued from page 8)

the record snow pack that existed. Precipitation, on the other hand, was much above normal. In fact, some locations reported record rainfall amounts. It was the heavy rainfall that led to the severe flooding. If precipitation had been near normal, then most locations would have experienced minor flooding at worst. Due to the heavy rainfall, however, many locations experienced major flooding.

Another way of looking at this situation is that the snow melt alone plus normal rainfall would have led most area rivers, including the Mississippi, to crest near flood stage. The differences in river levels between flood stage and the observed crests were due mainly to the heavy rainfall.

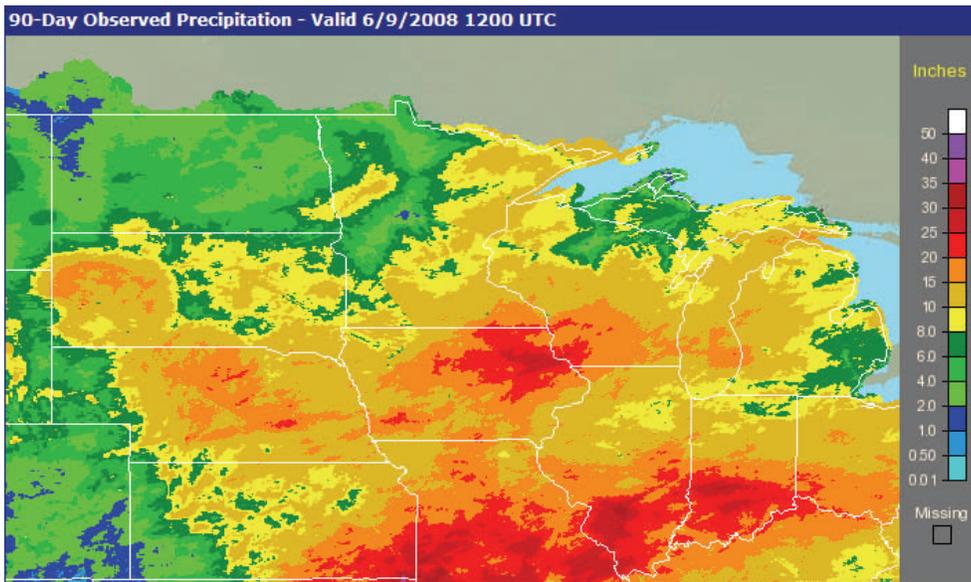


Flooding along the riverfront in downtown Davenport near lock and dam 15. Photo by Jeff Zogg on April 29, 2008, looking east from the sky bridge.

...Due to heavy rainfall, many locations experienced major flooding...

Update - 2008 Flooding Worsens

Editor's Update



Excessive rainfall amounts from late May into mid June lead to another round of flooding, which at many sites, far exceeded that of 1993. This map shows 90 day precipitation totals for the period ending June 9, 2008. Widespread rainfall amounts over 15 inches, and as high as 30 inches, are indicated over much of eastern Iowa into northwest Illinois. As a reference, for the spring months of March, April, and May, the normal precipitation in Cedar Rapids is 9.30 inches. At Moline, the normal is 10.99 inches.

...The wet weather pattern has continued, resulting in record and unprecedented flooding...

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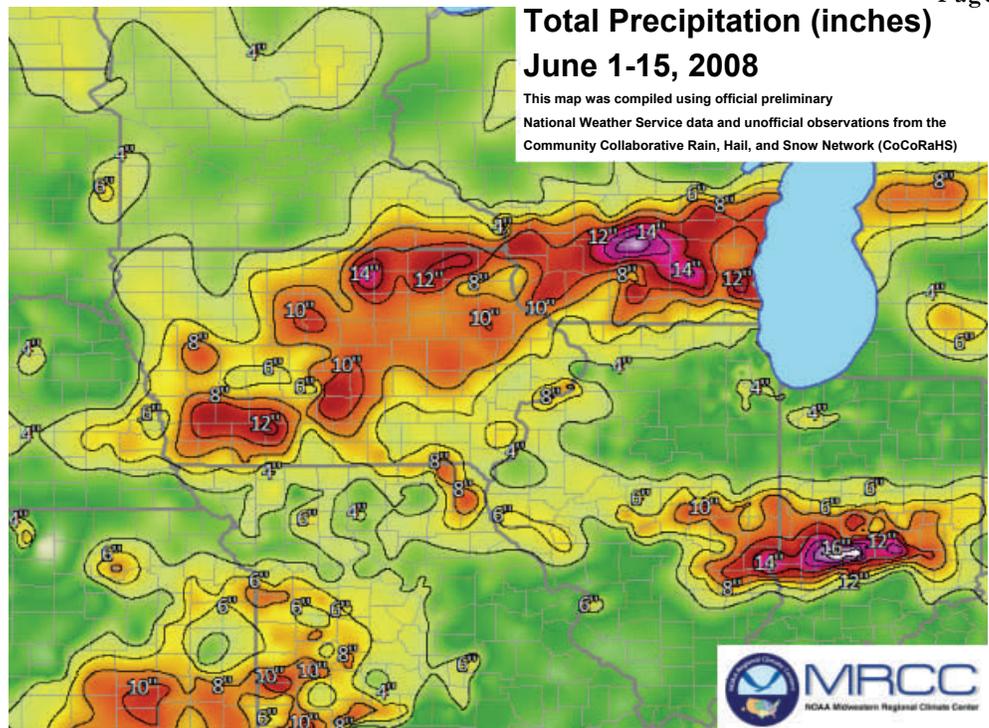
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Very heavy rainfall in the first half of June 2008, contributed to record and historic flooding across portions of eastern Iowa and northwest Illinois. More information on the conditions this past winter and spring that led up to the flooding can be found inside this newsletter. More complete details and photos from the historic June flooding will appear in later additions of *Weather Home Companion*.