



## NWS La Crosse Leadership Team

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## Your Local National Weather Service: A Quality Investment

Welcome to the second edition of the National Weather Service (NWS) La Crosse Shareholders' Report. As a taxpaying citizen of the United States, your federal tax dollars have supported NWS services at a rate of just under \$3 per person across the country. For that tax investment, you receive continuously updated forecast and warning services throughout the year. We are confident these services have benefited you on a day to day basis, and likely provided important safety information on a number of critical weather days as well.

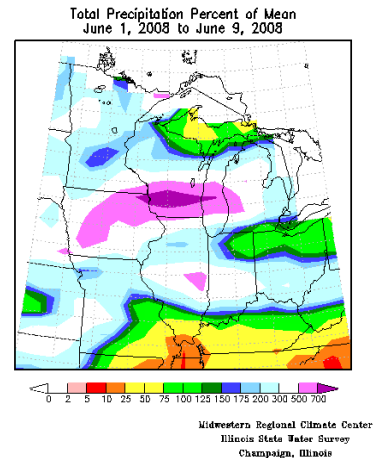
Significant weather events once again impacted the area during the past 12 months. The historic flood event which began on June 7, 2008 caused record-setting river levels at 14 river gauge sites in our area. Portions of all 3 states (Iowa, Minnesota and Wisconsin) were significantly affected by high water once again, less than 10 months after the record-setting floods of August 2007.

Extensive cold and snow during the winter of 2007-08 also high-

lighted the year. La Crosse finished the snow season with the 5th greatest snowfall total since records began in 1909, and record-setting snowfall fell southeast of our area in Wisconsin and Illinois. The spring snowmelt, along with April rainfall, led to additional flooding in the Upper Midwest as well.

During this past year, the NWS La Crosse staff has consistently focused their efforts on providing timely, accurate and useful weather information on a daily basis. From text and graphical forecasts, to outlooks and warnings, to web-based event summaries, the NWS La Crosse staff has maintained a reputation within the NWS for leadership and high-level service. I am very proud of the many accomplishments of the local NWS staff.

This report details some of the activities of the NWS La Crosse office during 2008. It also reflects on areas where we believe we are making a difference in



June 1-9, 2008 percent of normal precipitation.

your lives. I hope you find our work demonstrates the sort of stewardship you expect from your public servants. I welcome your comments regarding how we can provide an even better investment for you.

Glenn R. Lussky  
Meteorologist in Charge (MIC)

## Communicating With Partners

The La Crosse NWS office strives to work closely with our partners. Communicating before and during a potentially hazardous weather event can help with overall public preparedness and improve teamwork.

To assist Emergency Management officials in this process, the NWS La Crosse conducts conference calls leading up to

significant weather events. These events may include the possibility of numerous or large tornadoes, widespread wind damage, a high flooding threat, or a major winter storm. Calls are scheduled as needed, coordinated with county directors, state Emergency Management, FEMA personnel and, in some cases, local officials. Besides a briefing from NWS forecasters

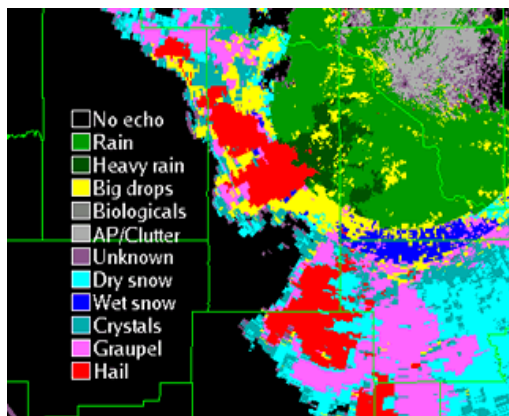
regarding expected weather and impacts, the calls also give the opportunity to ask further questions or coordinate actions.

Overall, the conference calls have been a huge success since they commenced in May 2004.

Coordination also takes place routinely with television media (continued on page 3)

## The Future of Radar—Dual Polarization

The United States WSR-88D Doppler Radar network has had a remarkable impact on the quality of warning services provided by the agency since the early 1990s (as shown in the article below).



The Dual Polarization Hydrometeor Classification Algorithm recognizes different types of precipitation within radar data.

Even so, new radar technologies promise even greater results, and they are coming soon!

The WSR-88D network is expected to be upgraded to include dual-polarization in the next 3 years. This upgrade will change the way we use weather radar and will give forecasters new information which will improve forecast and severe weather warning decisions.

Forecasters who have used early versions of this technology indicate it provides information to improve identification of precipitation type. In the summer, this may mean distinguishing between large hail, small hail, and large precipitation drops. In the

winter, it will help separate the ice crystals from frozen droplets. As a result, this information helps the forecaster avoid false alarms and enhances the overall accuracy of the weather warning process.

The dual-polarization upgrade is just one component of a future forecast system whereby forecasters will have the potential to use local high-resolution model information to warn not only for ongoing thunderstorms, but also for storms that have not completely developed. This will be an exciting new challenge for NWS meteorologists, and a potentially tremendous benefit to the general public!

## Warning Verification Demonstrates Warning Dependability

In the late 1980s, the National Weather Service was preparing to install the first WSR-88D Doppler radars. This technological upgrade, along with enhanced outreach and training programs at NWS offices, promised to have a significant impact on NWS warning operations.

*“The average warning lead time for tornadoes rose from 2 minutes in 1987 to 14 minutes in 2007.”*

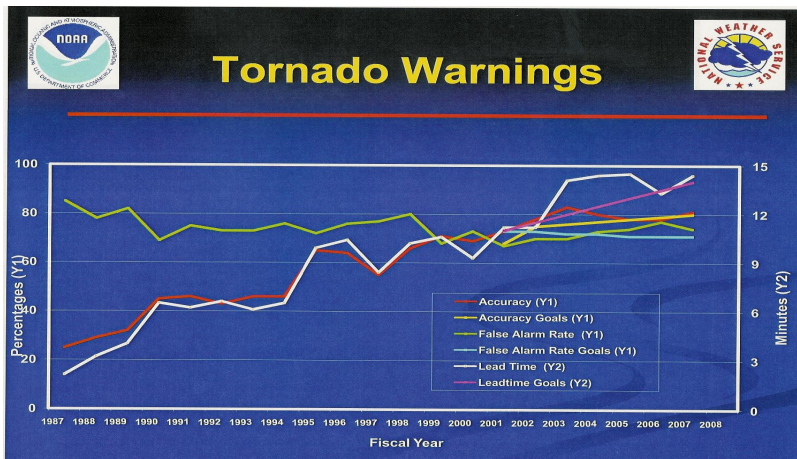
This promise was fulfilled. Verification of NWS warnings (see image to the right) show that only 25% of 1987 tornadoes were associated with tornado warnings. This number increased to over 80% by 2007. During this 20-year period when the ability to identify tornadoes increased dramatically, so did the warning lead time for the tornadoes. The average warning lead time for tornadoes rose from 2 minutes in 1987 to 14 minutes in 2007. This increase in dependability and lead time ultimately results in a much greater chance that the public will be able to reach safety based solely on NWS tornado warnings during tornado events.

A similar result is apparent when reviewing U.S. flash flood warnings. In 1987, less than 20% of flash flood events were accompanied by

flash flood warnings. In 2007, around 90% of flash flood events had accompanying warnings. As was the case with tornado warnings, the average warning lead time for flash flood events has risen dramatically, from about 5 minutes in 1987 to around 70 minutes in 2007.

Most importantly for the citizens of the United States, this verification demon-

strates a much higher level of dependability related to NWS warnings. As a result, each warning becomes more meaningful, thereby enhancing public response to the warnings. Ultimately, this is the greatest benefit to warning improvement, as greater public response to warnings will save lives!



Verification statistics for U.S. tornado warnings, 1987-2008 (red = percent accurate warnings; white = average lead time; green = percent false alarms).

## Turn Around—Don't Drown

Turn Around—Don't Drown is a National Weather Service campaign to warn people of the hazards of walking or driving a vehicle through flood waters.

Each year, more deaths occur due to flooding



than from any other severe weather related hazard. Over half of all flood-related fatalities occur when a vehicle is driven into hazardous flood water. The second highest percentage of flood-related deaths is due to walking into or near flood waters.

Many people underestimate the incredible power of moving water. A mere six inches of fast-moving flood water can knock over an adult and two feet of rushing water will carry away most vehicles. Many fatalities are



preventable, but people continue to drive around barriers that warn when a road is flooded.

The NWS La Crosse warning area contains many locations with high flood danger. Flooding we experienced in 2007 and 2008 reflects those dangers quite well.

Our office outreach includes safety talks to many groups. A part of the message we provide is: **Turn Around Don't Drown™**. Heeding this important message will save lives!

## Emergency Preparedness and Safety

StormReady, an NWS-sponsored program that recognizes communities that are well prepared to deal with hazardous weather events before, during, and after the event, provides formal recognition of communities that are prepared to deal with dangerous weather situations.

The community of Hillsboro, WI (Vernon County) became StormReady in 2008, based on a strong local program to monitor hazardous weather and alert citizens in their town. They will remain recognized through at least 2011. Other StormReady communities in the NWS La Crosse service area include: Dover, MN; Eyota, MN; Edgewood, IA; and Viroqua, WI.

No community is completely storm proof, but StormReady can help communities save lives. For additional information, please check our StormReady web page at: <http://weather.gov/lacrosse/?n=stormready>.

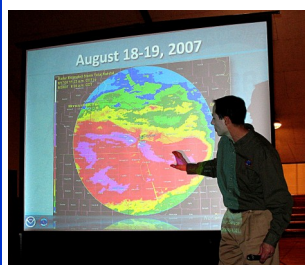
***“No community is completely storm proof, but StormReady can help communities save lives.”***

Another area where the La Crosse NWS contributes to local severe weather readiness is through our public outreach program. In 2008, safety information was passed along to numerous school groups, civic clubs, industries, and through various city and county events. Some of the highlighted activities include:

- A booth at the annual La Crosse Area Boat, Sport, and Travel Show where close to 900 people stopped by.

- Booths at area career fairs.
- Special presentations with school district offices in Wisconsin covering methods to stay aware of hazardous winter weather conditions.
- A presentation at the statewide conference of the Wisconsin Park and Recreation Association covering lightning safety and other severe weather hazards.

We continue to work closely with our partners, including emergency management personnel, media associates, law enforcement, amateur radio volunteers, and others who assist our efforts to save lives and protect property all year long.



NWS La Crosse Warning Coordination Meteorologist, Todd Shea, discusses the August 2007 flood event with partners.

## Communicating With Partners (continued from page 1)

partners using web-based chat software (called NWSChat). This software allows our operational staff and television meteorologists the opportunity to share critical warning decision expertise and other types of significant weather information.

This information exchange is

important since media partners play a key role in communicating the NWS's hazardous weather messages to the public.

NWSChat also provides partners the ability to immediately communicate significant event reports back to NWS operational personnel who, in turn,

utilize the information to make effective warning decisions.

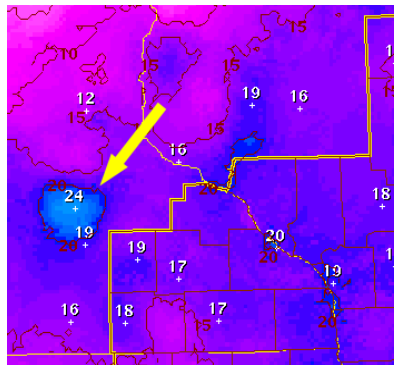
Communication is a key step in the warning and preparedness program. We appreciate the participation in our calls and chat, and the professional collaboration associated with the process.

## Ensuring Quality Data - NWS Quality Control (QC) Processes

Each NWS Office receives thousands of weather observations every day. QC of this data is important because there is an increasing use of observational data by the research community, the media, private industry, and the general public.

Observations come from varying networks with differing standards and equipment. Due to a variety of factors, sometimes the data can contain errors. The NWS Office is the first line of defense in making sure the public receives the high quality weather data they need.

Weather observations are initially run through a real-time spatial quality control process (visual inspection of graphical



Example of a bad data point (yellow arrow) prior to quality control processes. This data is removed to ensure only representative data is included in the final official graphical dataset.

data fields). All observations that are unrepresentative of current conditions are deleted. The NWS works with cooperating agencies and observers to ensure sites with routine errors receive technical assistance to get accurate data flowing once again from the site.

At the end of each month, the NWS reviews monthly data to identify further errors. Additional inspection of this data is done by our data resource partners (State Climatologists, Regional Climate Centers, and the National Climatic Data Center).

The NWS La Crosse has been a leader in establishing strong QC standards which are now used at each of the 38 NWS offices in the central United States.

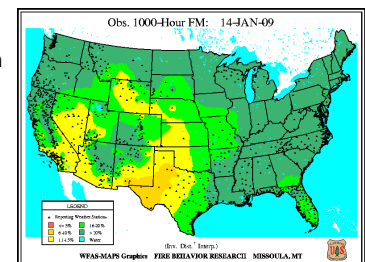
## Fire Weather

NWS La Crosse implemented a fire weather program in 1998. Over the last 10 years, we have provided critical fire weather information to the Minnesota and Wisconsin State Departments of Natural Resources, U.S. Fish and Wildlife Service, U.S. Forest Service, National Park Service, and several Nature Conservancy agencies.

During the fire season (typically from late March to early December), we provide a twice-a-day narrative Fire Weather Forecast, National Fire Danger Rating System Point Forecasts, Spot Forecasts (for prescribed

burns and wildfires), and Fire Weather Watches/Red Flag Warnings (as needed). Each year, our office meets with our fire weather customers to exchange ideas and possible changes that will enhance the information provided to the customers.

We are excited that we will commence providing fire weather services to our customers in northeast Iowa in 2009. We will work with our customers to define their information needs to ensure safety for the fire protection agency personnel as well as the general public in the area.



NIFC 1000-hour fuel moisture map, available on the NWS La Crosse Fire Weather web site.

The NWS La Crosse Fire Weather web site is accessible at: <http://weather.gov/lacrosse/>

## Joe Strub Award - Area Recognition

At the most recent conference of the Association of Minnesota Emergency Managers, Bob Bilder (Winona County Emergency Management Director, pictured at right) was presented the **Joe Strub Award** for his work and support during the August 2007 floods that ravaged Winona County. The award also recognized his past dedication and support regarding hazardous weather preparedness, an active storm spotter program, past work with NOAA Weather Radio expansion, and his overall support of our mission.

The Joe Strub Award is given to the Minne-



sota Emergency Management Director who best assists the NWS through the year and is nominated by forecast offices in conjunction with the

Department of Homeland Security in Minnesota.

In 2007, Jon Turk (Emergency Management coordinator for the city of Rochester, MN and previous Olmsted County Emergency Management director) was a Joe Strub Award winner. Bob and Jon were nominated by the NWS La Crosse office.

We congratulate both Bob and Jon as recent Joe Strub Award winners!

## New Research

NWS La Crosse staff members perform weather research in a continuing effort to improve services and public safety. Much of our research evaluates past storms that had a significant impact on the public. We evaluate the service we provided and collect lessons learned we can apply when the next BIG ONE comes! During 2008, approximately 10 local research projects were completed by NWS La Crosse staff. The following 6 studies were presented at regional and national conferences:

### NWA Severe Storms Conference, Des Moines, IA

- The 18-19 August 2007 Historic Flash Flood Event in the Upper Mississippi River Valley: A Meteorological Assessment (S Binau)
- The 18-19 August 2007 Historic Flash Flood Event in the Upper Mississippi River Valley: The Impact on Victims and Communities (T Shea)
- The 18-19 August 2007 Historic Flash Flood Event in the Upper Mississippi River Valley: The Impact of Forecast Services on Public and Emergency Response (G Lussky)
- Convective Season Synoptic Climatology by ENSO Phase in the North Central U.S. (J Boyne, G Lussky)

### Northern Plains Winter Conference, St. Cloud, MN

- Using Short-Range Ensemble Applied Products to Enhance Precipitation Type Forecasts (D Baumgardt)
- A Review of Traffic Accidents Compared with Observed Snowfall (T Shea)

Recent work in our office has utilized an ensemble of about 20 forecast models to identify the probability of weather event outcomes. We are able to provide this type of information to the public through confidence expressed in our forecast discussions. Recently, we have also incorporated evaluation of societal impacts of weather into our public service. The "traffic accident study" noted above is one example, through which we learned that snow has a greater impact on society during rush hours, especially on Fridays!

There is a wealth of information available on our local research web page (<http://weather.gov/lacrosse/research.php>). Questions regarding these local scientific studies may be directed to NWS La Crosse Science and Operations Officer Dan Baumgardt at: [dan.baumgardt@noaa.gov](mailto:dan.baumgardt@noaa.gov).

## Awards, Recognition and Personnel Changes

Once again, 2008 was a year of accomplishment and innovation by NWS La Crosse personnel. In addition to the high quality day-to-day forecast and warning information provided by office staff members, many staff members also contributed to improvements in various regional and national programs.

These efforts were again recognized through the NWS Cline Award process. The Cline Award is the highest regional and national award conferred by the NWS.

*"The NWS La Crosse was recognized for the 6th year in a row by having at least one of its employees selected as an NWS Central Region Cline Award winner."*

Competition for the Regional Cline Awards pits local La Crosse nominees against nominees from 38 other forecast offices, along with regional office personnel. The high level of

innovation and accomplishment by NWS La Crosse personnel was recognized again in 2008. For the 6th year in a row, the NWS La Crosse office had at least one of its employees selected as an NWS Central Region Cline Award winner.

This year, 3 NWS La Crosse employees were recognized as regional Cline Award winners! Congratulations to Meteorologists Seth Binau and Todd Rieck, and Electronics Technician Matt Gasperich, for their Regional Cline Awards in the areas of Meteorology (Seth and Todd) and Engineering, Electronics and Facilities (Matt).

Seth and Todd were recognized for providing background research and a proposal which led to a climatologically-based realignment of Wind Chill Warning and Advisory criteria throughout the central United States. Matt was recognized for his development of a new method to log and monitor radar performance data to assist electronics technicians in

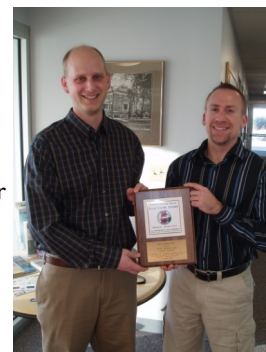
their radar diagnostic processes.

All NWS La Crosse staff received additional honors during 2008, as the entire staff received the Department of Commerce Bronze Medal for providing timely and accurate life-saving flash flood information related to the historic flash flood of August 18-19, 2007. This award recognized the impact of critical information provided by the NWS relating to emergency services, transportation, and citizen preparedness for this incredible event, which caused \$150 million in damage and resulted in a Presidential Disaster Declaration for 7 of our counties.

We are excited to be adding one more staff member in the very near future, as a Service Hydrologist position has been added to our office staffing structure. This position will be a great asset in our flood-prone warning area, as we work to enhance preparedness activities and public readiness, increase scientific capabilities and data resources, and enhance technological capabilities and communication through local initiatives.



Electronics Technician Matt Gasperich with his 2008 Regional Cline Award for Engineering, Electronics and Facilities



Meteorologists Seth Binau and Todd Rieck with their 2008 Regional Cline Award for Meteorology

National Weather Service  
La Crosse, WI

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<http://weather.gov/lacrosse>

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## Our Mission Statement

### National Weather Service Mission

“Provide weather, hydrologic and climate forecasts and warnings... for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by others in the global community.”

### NWS La Crosse Mission Statement

“Dedicated to continuous improvement in the provision of high quality weather-related warning, forecast and educational information for the safety and overall benefit of the citizens we serve.”

## The June 2008 Flash Flood and Flood Event

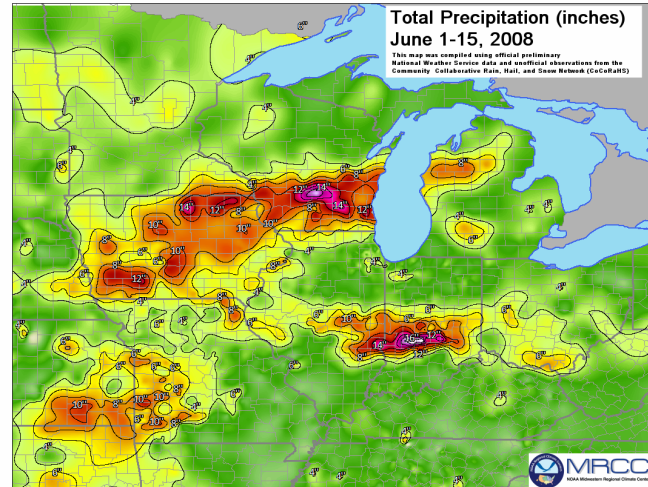
For the second year in a row, historic flooding struck parts of the Upper Mississippi River Valley. Very heavy rain during the first half of June, including one major event on June 7-8, led to extreme river flooding that set records at river gage sites across the NWS La Crosse service area. Historic flooding also severely impacted other parts of Iowa (including Cedar Rapids and Iowa City), as well as parts of Illinois.

In total, 19 counties in the NWS La Crosse service area were declared Federal Disaster areas due to the flooding. Unlike the flooding of 2007, no lives were lost in our service area, as flash flooding was less intense. But river flooding, property damage and impact to citizens was extreme. Damage to infrastructure and crops was preliminarily estimated at \$25-35 million in southeast Minnesota, \$70-80 million in northeast Iowa, and

**“Estimated property damage topped \$10 billion in Iowa.”**

\$75-85 million in southwest Wisconsin. Statewide flood damage in Iowa was estimated to be over \$5 billion, as record flooding further downstream on the Cedar River inundated downtown Cedar Rapids.

14 locations in the NWS La Crosse service area set all-time crest levels on area rivers, including most of the Kickapoo,



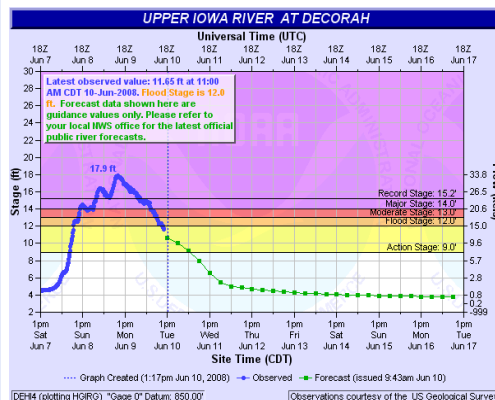
Above: Observed storm total precipitation from June 1-15, 2008 across the Upper Midwest. Below: Observed precipitation reports in the La Crosse warning area from June 7-8, 2008.

Location	County	Amount
Reno, MN (3 miles SW)	Houston	10.10"
Ontario, WI	Vernon	9.84"
Westby, WI (3 miles ENE)	Vernon	9.24"
Valley, WI (1 mile NW)	Vernon	9.00"
Viroqua, WI	Vernon	8.46"
Hillsboro, WI	Vernon	7.55"
La Farge, WI	Vernon	7.53"
La Crosse, WI (5 miles SE)	La Crosse	7.44"
Harmony, MN	Fillmore	7.35"
Dorchester, IA	Allamakee	7.30"
Edgewood, IA	Clayton	7.28"

Upper Iowa and Turkey Rivers. Several towns on the Kickapoo were evacuated for the 2nd time in under a year, and water levels on the Cedar River actually exceeded some of the river gage reading capabilities.

The La Crosse NWS team issued excessive rain outlooks days in advance of the heavy rains, including a Flash Flood Watch prior to the weekend of June 7-8 and 11 warnings for flash flooding and rises on area rivers. In addition to the flood problems, there were also 6 tornadoes during that time, causing isolated damage in a number of communities.

Locally, there were 76 new daily precipitation records established. 10 communities had their wettest June ever, and 3 had their wettest month ever, including Dorchester, Iowa, which recorded 15.13" of rain for the month.



Hydrograph with record river levels at Decorah.