Weather Brew

NWS Milwaukee/Sullivan

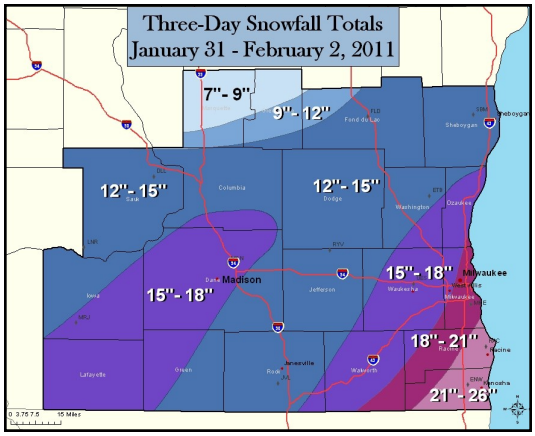
Spring/Summer 2011

Volume 3, Issue 1

Ground Hog Day Blizzard: From Inside MKX

By: Ashlie Sears, Meteorologist

Punxsutawney Phil might not have seen his shadow on February 2nd, indicating that there was going to be an early spring, but to the residents of Wisconsin who woke to see between one and two feet of snow outside their homes, spring was something not fathomable but probably very much wanted. While the snow stopped by mid morning, elevated winds persisted through the day, with gusts up to 30 mph in many areas, hampering the clearing of the snow and creating snow drifts up to 8 feet. Good thing Phil was located elsewhere, for had he been in Wisconsin, he might have been snowbound and not even able to emerge.



Southern Wisconsin was impacted hard by multiple snow storms that produced snow for three straight days. A strong low pressure system passed south of the state through southern Illinois into central Indiana on the 1st. This path placed southern Wisconsin in prime location to have heavy snow and strong winds. Blizzard conditions persisted through most of the overnight hours between the 1st and 2nd, with wind gusts reaching up to 60 mph in Milwaukee and to 50 mph in Madison. Ahead of this low, two weaker disturbances passed through the region Sunday and Monday, bringing 2-3 inches of snow in the southern counties and 5-6 inches north of a Madison to Milwaukee line. Overall, multiple records were broken or nearly broken during this three day period.

Milwaukee Records

- Feb 2 daily snowfall record with 9.1 inches
- 4th for any 24 hour period snowfall with 16 inches
- 4th for any 48 hour period snowfall with 19.6 inches

Madison Records

- Feb 1 daily snowfall record with 8.3 inches
- 5th for any 48 hour period snowfall with 14.3 inches
- 2nd for any 72 hour period with 18.7 inches

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Inside this issue:

MKX National Weather Service

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

Blizzard cont...

The forecasters at the NWS in Milwaukee-Sullivan began noticing the chance for a strong storm to move through the region the week prior to the storm. At first the low pressure system looked to track farther north, which would have brought a better chance for mixed precipitation rather than the all snow we ended up observing. Over the weekend, the models began coming together in showing the track of the low farther south, closer to the path it ended up taking. Noting this track, the weekend forecasters realized the potential for heavy snow and strong winds to occur and began preparations for the possibility of a blizzard. The tricky aspect for the forecast was distinguishing each individual system that was coming through and the threat each posed to the area. Three different weather features were forecast to impact the area. Lake effect snow was expected to persist Sunday evening through Wednesday afternoon, while the first disturbance was forecast to pass through Monday and Monday night. The second and stronger system would then come through late Tuesday and last into Wednesday. A wide range of winter storm products were issued as the forecasters tried to accurately capture what would be happening, when it would happen and where exactly it would be happening, all the while avoiding any confusion to the public. While Winter Weather Advisories were sufficient for the snow Sunday through Tuesday morning, on Sunday a Blizzard Watch was issued for Tuesday overnight into Wednesday with the hope this would provide ample time for preparations. This watch was upgraded to a warning on Monday afternoon as the timing and locations were finally determined.

While the public began preparations for the blizzard themselves, we began our own preparations here in the office. The first was ensuring we would have plenty of people manning the desks, staying on top of the forecasts and manning the phones to receive storm reports or to talk with the media. Part of our job is knowing that our schedule might be changed at any time to fit in when weather is going to occur, and everyone was willing to work as needed. The forecasters who ended up working the overnight shifts came in prior to the start of the storm Tuesday, bringing extra food, sleeping bags and air mattresses, knowing it might be a good while before they would be able to head home. The forecasters took turns sleeping, so that there were always fresh eyes to make any updates needed. One forecaster who was unable to make it in prior to the start of the storm but was determined to show up for his midnight shift tried driving in as the wort of the storm hadn't quite hit yet. Unfortunately his car still ended up stuck in the snow about a quarter mile from the office, but he made it for his shift! Other forecasters ended up in the office for over 24 hours, taking a quick nap here and there to remain rested. The MIC's office and conference room were turned into sleeping quarters, allowing the forecasters to have at least a little silence from the operations floor. There were always three people focusing on what was happening, keeping the emergency managers updated and releasing local storm reports of snowfall amounts, wind gusts and visibility measurements. The state maintains a website that enables us to constantly keep all the emergency managers updated as to the progression of the storm , while they can report to us any significant impacts currently occurring. Updates are constantly made to reflect what is being reported and these are then posted to our websites so all of the public may see. Fortunately the worst of the blizzard occurred overnight when the fewest amount of people were out and about. Even so, there were still those who needed to be driving, whether for work or an emergency.

Photos Courtesy Steve Hentz,
Lead Forecaster—NWS MKX

(continued on Page 3)

Blizzard cont...

Unfortunately for these people, many ended up stranded on the roadways, sometimes with emergency personnel not being able to even reach them. A Civil Danger Warning was issued for the first time in the office's history, informing people traveling that if they became stuck in the snow, emergency personnel would not be able to assist them. Parts of Interstate 94 and 43 were shut down as heavy snow fell and the strong winds created high drifts.

The following morning, although the storm had begun to weaken over our area, the foot of snow that covered the roadways created nearly impassable conditions, making it near impossible for many of the forecasters to arrive to relieve the overnight forecasters. Even though the plows were on top of things and were out doing their job early in the morning, the high winds blew the snow right back over the roads, making their work never ending. So those who had worked the storm kept on trucking along, right up until their relief finally made it in by late Wednesday morning. Our office MIC, with his massive truck, was able to assist those along the local roadways, pulling them out of ditches as well as helping some of the forecasters leave and arrive that morning.

For those who might not have known, the National Weather Service office very rarely closes down (and if we have to, we have back up offices to take over for us). We will always be here for the public, whether it is issuing warnings as needed, informing the state emergency managers of the expected conditions or answering any inquiries made by the general public. Great care to prepare properly is taken ahead of time when we know of a high impact event and each person is willing to sacrifice what is needed to accomplish our mission of protecting the public.

MKX Radar after the Blizzard
Photos Courtesy Steve Hentz,
Lead Forecaster—NWS MKX

MKX Radar on a normal Winter Day
Photos Courtesy Steve Hentz,
Lead Forecaster—NWS MKX

Lead Forecaster and Met Intern Show High Spirits After the All Night Shift

From the Warm South to the Cold North...

In January, MKX welcomed our newest employee, Jake Wimberley. As has been an interesting trend in the last couple of years, Jake comes to Wisconsin from a southern state.

Jake grew up in Tennessee, and holds an undergraduate degree in meteorology from Mississippi State University and a Masters degree from St Louis University. Jake's previous job was with a private weather company in Alabama, where he served as a Data Services Meteorologist developing software to process raw meteorological data into useful products for the broadcast media, aviation and marine sectors. Jake is excited to be here at MKX, but he's not real sure about all the snow we've seen so far since he's been here. Jake has a strong programming background and will help maintain local models at our office.

Jake is filling a spot left open by Chris Franks, who accepted a position at the NWS office in Minneapolis, Minnesota last fall.

ET Lands ESA Job in Colorado

In the middle of March, we'll say goodbye to one of our Electronic Technicians at MKX. Chris Kornkven has accepted a promotion to Electronic Systems Administrator at the Grand Junction, Colorado office. Chris has been here at the Sullivan office since 1996. In his 15 years here, Chris has become an expert in maintaining much of the equipment needed to keep our office functioning and allowing our office to fulfill the mission of the NWS in protecting life and property. For the past several years, Chris has been the primary contact for radar operations at MKX. Chris and his family are excited about their upcoming move to Grand Junction. It's a location Chris has been interested in living for many years.

We will miss Chris, but we wish him the best in his new position in Grand Junction!

Storm Spotter Training Classes

Are you interested in being a trained weather spotter? If so, make plans to come to one of our storm spotter training classes! Being a storm spotter doesn't take a lot of time out of your busy day. It just means that you are trained to watch for severe weather. We may call you during weather events to ask if you have seen any hail or wind damage, or other significant weather in your area. You also have the opportunity to call us or submit a severe weather report online.

The classes last about two hours, and participants are taught how to recognize what makes a storm severe or tornadic, what to look for, and what to not be fooled by.

One or more staff members of MKX NWS will provide this training. There is no charge and most classes are open to the public. This year, we're also providing a limited number of advanced spotter training courses that are a little more in-depth than most classes.

If you are interested in becoming a trained storm spotter, or simply want to learn a little bit about severe weather, please join us at one of the training classes in your area. Plan to arrive 15-20 minutes prior to the start time of the class, as some classes fill fast, and we ask that everyone sign in at the door.. Prior registration through the office for the course is not needed.

For more information and a schedule of this year's classes, visit http://www.crh.noaa.gov/mkx/?n=spotters.

April 11-15, 2011 - Wisconsin Tornado and Severe Weather Awareness Week Drill Day is Thursday April 14, 2011 from 1 to 2 PM.

County	Date	City
Columbia	March 31	Wisconsin Dells, Portage
Dane	March 24, 29	Mt. Horeb, Cottage Grove
Dodge	March 21	Beaver Dam
Fond du Lac	March 8	Fond du Lac
Green	March 9	Juda, New Glarus
Green Lake	March 10	Green Lake
Iowa	March 14	Dodgeville
Jefferson	March 28	Jefferson
Kenosha	April 4, 28	Kenosha
Lafayette	April 21	Darlington
Marquette	April 27	Montello
Milwaukee	March 26, 30	Oak Creek, Franklin
Ozaukee	March 23	Port Washington
Racine	April 19	Sturtevant
Rock	March 15	Janesville, Milton
Sauk	March 22	Baraboo
Sheboygan	March 16	Plymouth
Walworth	March 17	Whitewater, Lake Geneva
Washington	April 20	West Bend
Waukesha	March 7	Summit, Waukesha

Rusty's Roundup

By Rusty Kapela, Warning Coordination Meteorologist

Wrap-up of 2010 Tornado Season

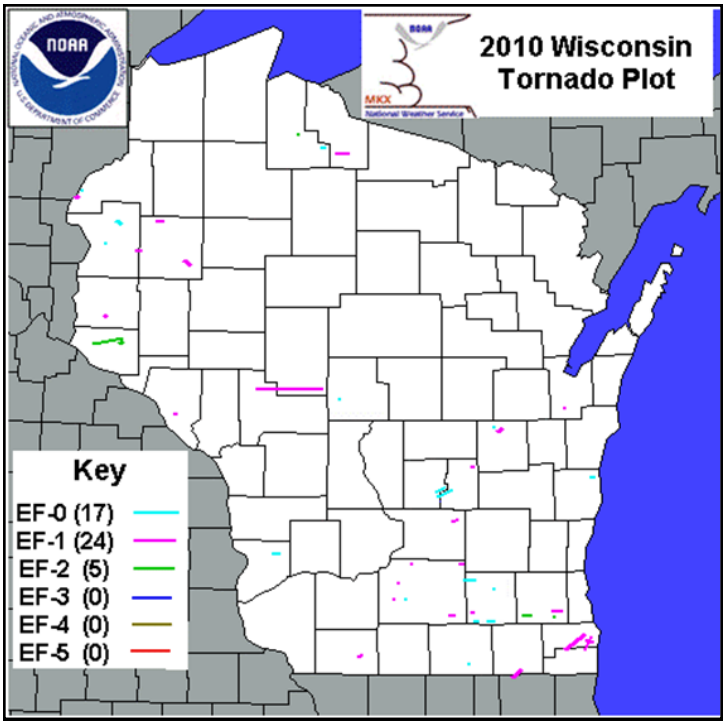
Wisconsin experienced an unusual severe weather season in 2010 in that tornadoes occurred in every month from April through November. The total of 8 months with tornadoes in 2010 is the greatest monthly total for any year. The years of 1992, 1971, and 1979 each had 7 months with tornadoes.

Another interesting fact for 2010 was the total of 24 tornadoes in Wisconsin in July. This is the tied for the 5th highest monthly total. Here's the listing of the most active tornado months in Wisconsin (with at least 20):

30 – June 2005, 28 – June 1993, 27 – August 2005, 25 – July 1983, 24 – July 2010, 24 – May 1988, and 22 – June 2008.

Other notable tornado facts from 2010 (compiled by Alex Lamers, Met Intern Duluth):

- 2nd most tornadoes in WI for a year (46)
- 2nd most tornadoes in MKX CWA for a year (25)
- The two tornadoes on November 22nd were the 6th and 7th latest tornadoes ever recorded in a calendar year in Wisconsin.
- July 22, 2010 tied for the 9th most active tornado day in state history (10 tornadoes).
- Since all 10 of those tornadoes occurred in the MKX CWA, it was the 2nd most active tornado day in the MKX CWA.
- The tornado that tracked across Jackson and Clark Counties on July 14th was the 10th longest track in WI since 1982 (when more rigorous investigation started)



Skywarn Weather Safety Program

MASA (Milwaukee Area Skywarn Association) and Milwaukee County Emergency Management will be hosting a spotter class open to the general public in May. Many different speakers from around the area that have a connection to meteorology will be doing presentations, including our very own WCM, Rusty Kapela. For more details about the event, please check out our spotter talk schedule (click here).

When : May 21st, 2011

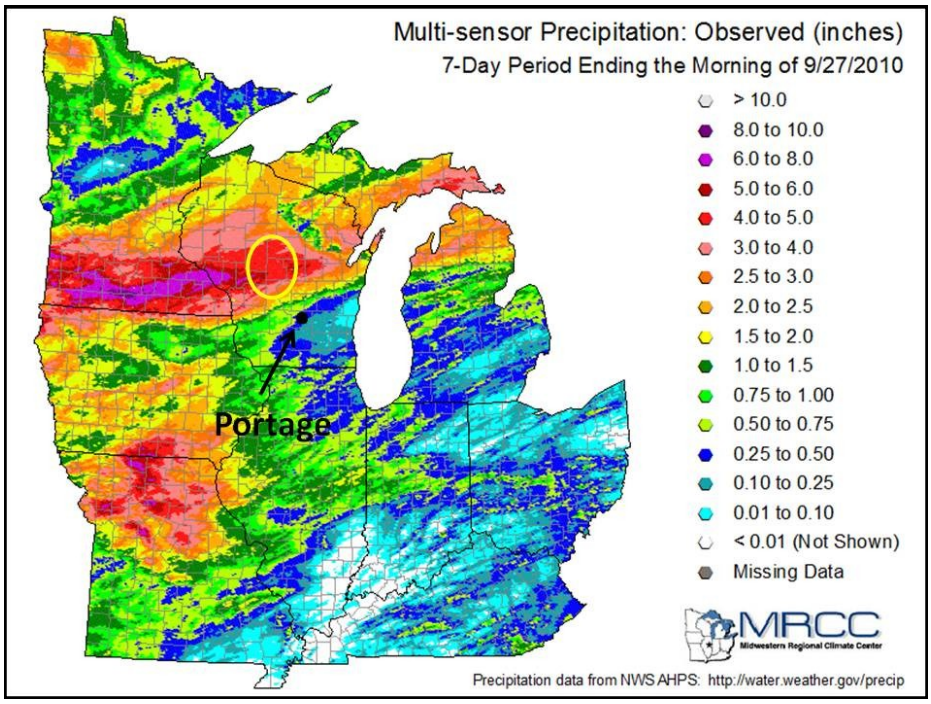
Time: 11 am (lasting into the afternoon with an hour lunch break)

Where: Franklin - Milwaukee County Sheriff Training Academy, 9225 South 68th St

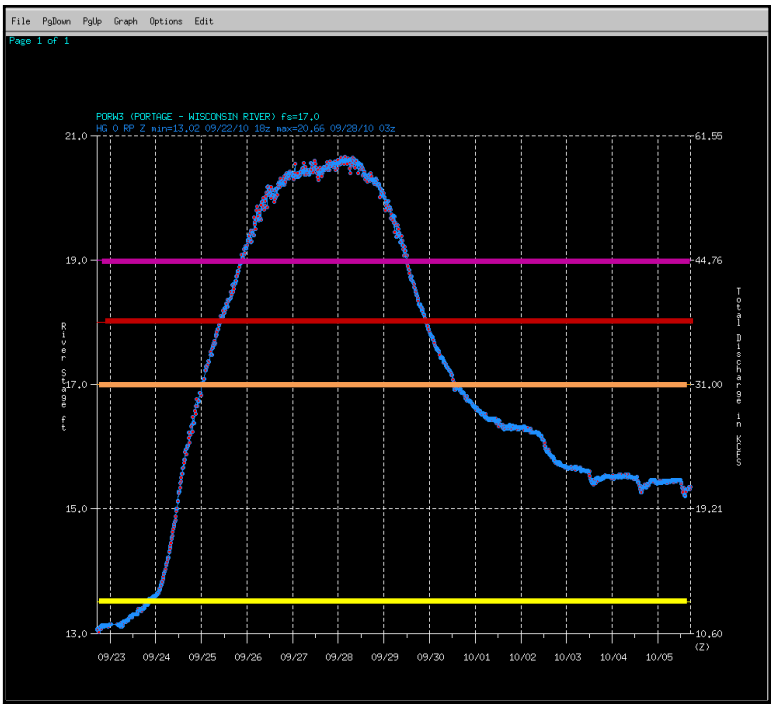
Record Flood Event for the City of Portage

By Penny Zabel, Meteorologist

A heavy rain event across southern Minnesota and west central Wisconsin in late September resulted in a record flood event along the Wisconsin River in the Portage area. Although Portage itself saw very little rain (less than half of an inch), a large area north of Tomah and Wisconsin Rapids received 4 to 6 inches of rain. This area is within what we call the Wisconsin River Basin. The basin includes all the small creeks and streams, and other rivers that eventually flow into the Wisconsin River.



The map to the right shows an analysis of rainfall through the event. The area inside the yellow circle shows the heavy rain in the Wisconsin River Basin. The River rose rapidly at the site of the river gauge from late on the 23rd until the 26th. The river then continued to rise gradually until its crest shortly before midnight on the 27th. On the 23rd, the height of the river was just over 13 feet. The river crested late on the 27th at 20.66 feet. This topped the previous record of 20.50 feet set in September of 1938. Flood stage at this location is 17.0 feet



Water surrounded one neighborhood southwest of the city of Portage, and evacuations took place. Sand levees along the river were partially eroded from below, but no significant levee breaches occurred.

A river gauge at the Wisconsin Dells recorded a maximum height of 17.56 ft on the 27th. This level was just below moderate flood stage and did not rank in the top 10 crests.

The gauges at the Wisconsin Dells and Portage are the only locations we have continuous data from. Flooding also occurred at other locations in Sauk and Columbia counties.

The picture to the left depicts the river heights in time from left to right. Anything above the orange line is minor flooding (17 ft), above the red is moderate flooding (18.0 ft) and above the magenta line is major flooding (19.0 ft). This spot has only reached major flooding stage 3 other times since records began here.

2011 Spring and Summer Preview

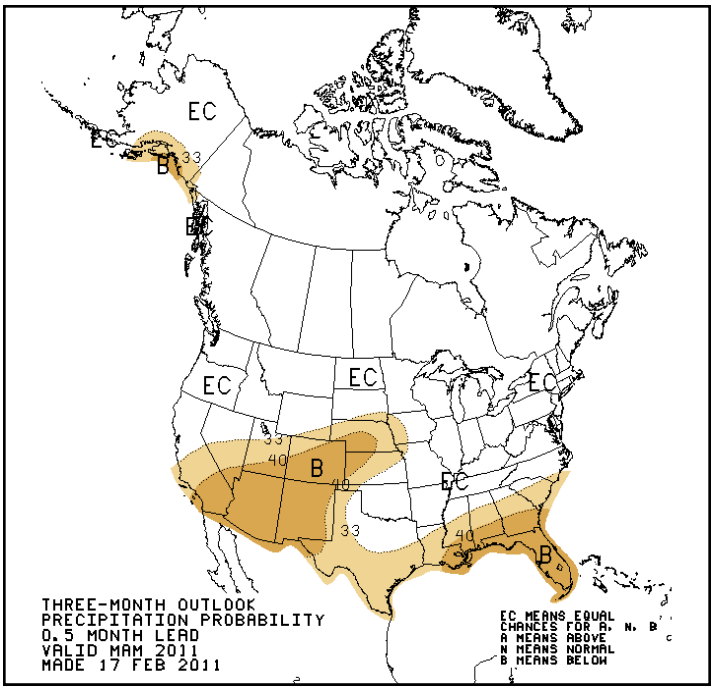
By: Ashlie Sears, Meteorologist

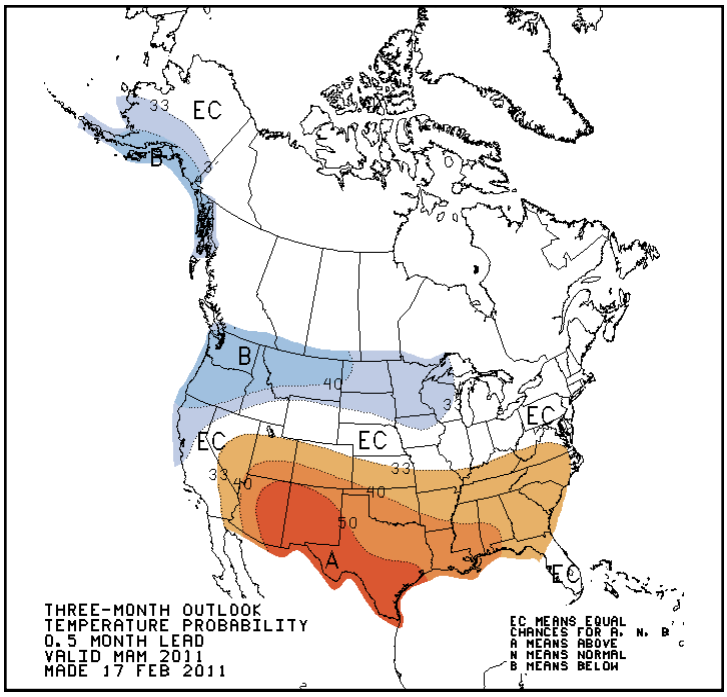
In the Fall 2010 newsletter, our office provided an overview of the El Nino Southern Oscillation (ENSO) phenomenon and how it would impact the United States, particularly southern Wisconsin. At the time of printing, the Climate Prediction Center (CPC), a branch within the National Weather Service that issues climate outlooks, as well as predicts whether a La Nina or El Nino event will occur, had issued a La Nina Advisory. This prediction materialized as a moderate La Nina was noted throughout the winter months, helping to initiate below normal temperatures and above normal snow fall amounts.

Looking ahead to the spring and summer months, the CPC continues to issue a La Nina Advisory, stating that La Nina conditions are expected to persist through at least June. While the La Nina conditions are forecast to continue, close examination of the equatorial Pacific shows conditions that would lead to a weakening La Nina during the spring months and the potential return to ENSO-neutral conditions by summer.

For information concerning the analysis conducted by the CPC, please feel free to visit their discussion by clicking here.

So what does a weakening La Nina mean for the spring months in southern Wisconsin? The most recent three-month outlook for temperature and precipitation produced by the CPC indicate that southern Wisconsin has an equal chance of seeing above, below and near normal conditions for both temperature and precipitation. As can be seen in the graphics below, southern Wisconsin is right on the edge of the area expected to see below normal temperatures during the coming three months. With the CPC outlooks in mind, let us now take a closer examination of our area using data from previous years in which we saw similar La Nina conditions.





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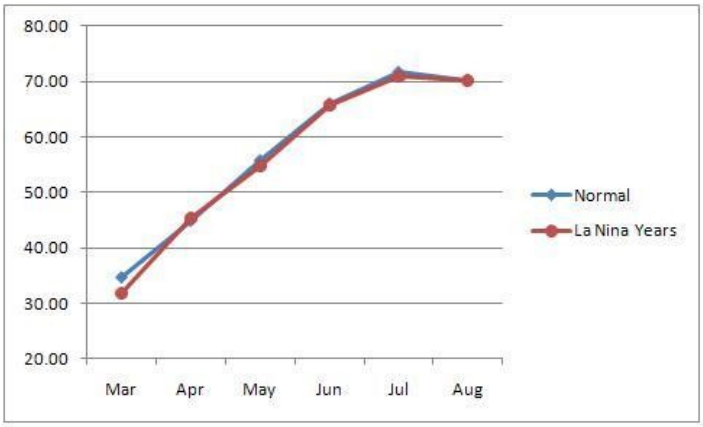
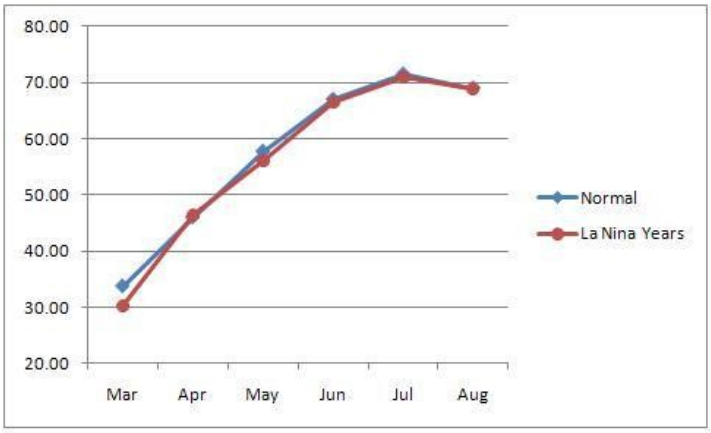
2011 Spring and Summer Preview Cont...

In years where there was a moderate La Nina during the winter months, which had immediately been preceded by an El Nino, and then followed by a weakening of the La Nina during the spring and summer months, little difference is noted in the average temperatures for both Milwaukee and Madison. We can expect slightly below normal to near normal temperatures early in spring, with temperatures rebounding to near normal by the summer. However, the total monthly precipitation has shown a different story. While Milwaukee seems split, with the spring months seeing mostly above normal precipitation amounts and the summer months seeing mostly below normal precipitation amounts, Madison is nearer the normal precipitation amounts for the time period between March and August. Granted, May is below normal and June above normal, averaged out, the precipitation seen during this time period after a La Nina winter appears much closer to average than what is observed in Milwaukee.

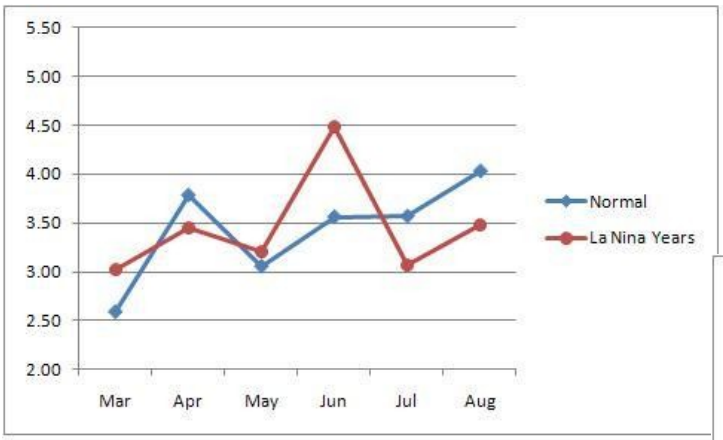
Milwaukee Temperature



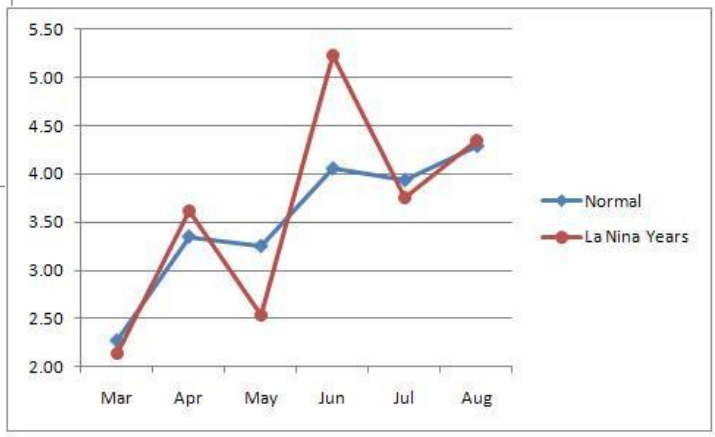
Madison Temperature

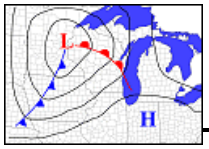


Milwaukee Precipitation



Madison Precipitation





Improve Your Weather Knowledge

By: Jake Wimberley, Meteorologist

What is the difference in tornadic and straight-line winds?

The key difference in these two types of winds is whether the air is moving along a straight path, or whether it is swirling around in a spiral pattern. Severe winds are generated by many different types of storms, and to fully understand the differences in the winds, we must first understand the structures of the storms that produce them.

Figure 1: Spiral pattern left on field by tornado near Manchester, SD, June 24, 2003 (Photo: NWS Sioux Falls, SD)

A *tornado* is a column of violently rotating air that extends between the ground and a cloud base above. Tornadoes are associated with certain types of organized, local-scale storm systems. A *supercell* is one type of storm that is capable of producing a tornado. Supercells often have a distinct shape on a radar image, with a small extension commonly called a "hook" or "pendant." It is in this part of the storm that a tornado may form. A tornado forms when air begins to rotate in a vertical column inside the cloud of a supercell, then intensifies and stretches until the air under the clouds also rotates, spiraling inward and upward. Tornadoes are generally less than a mile in diameter, so the winds have a distinct curve to them. The damage left behind by a tornado usually reflects this fact; for example, trees may be knocked down in different directions, and when viewed from above, a spiraling pattern can be seen (Figure 1). The phrase *tornadic winds* is used to describe the winds associated with a tornado.

Straight-line winds are associated with some types of local-scale storms as well. A *derecho* is a type of storm that is responsible for much straight-line wind damage. In a derecho, several small storms form a cluster. The downdrafts of cold air produced by the storms combine, creating one large advancing burst of wind. On radar, the leading edge of the derecho takes on a shape often called a *bow echo*, with the winds generally being oriented perpendicular to the "bow" and blowing in the same direction as the movement of the storm cluster. The damage caused by straight-line wind events is characterized by objects being blown uniformly, in the same direction (Figure 2).

Figure 2: Trees blown down by straight-line winds, Sawyer Co., Wis., July 1977. (Photo: T. T. Fujita)

With larger storm systems associated with a low pressure center, commonly called *cyclones*, winds flow into the center of the system from all directions, and cloud formations appear in a spiral on satellite imagery. Hurricanes are a type of cyclone. Despite the large-scale spiraling pattern of winds associated with a cyclone, these winds are not considered tornadic since on a local scale the winds move roughly in a straight line.

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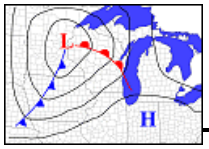


Improve Your Weather Knowledge Cont...

What is Heat Index?

As we all probably experience at some point during the summer, when the air temperature is warm and very humid, it can be quite uncomfortable outside. The human body relies on sweating in order to keep cool. As sweat evaporates, it absorbs heat from the skin, keeping the body temperature from rising to an unsafe level. However, if the ambient air is already very humid, the evaporation process is inhibited and it is harder for the body to maintain a comfortable temperature.

NOAA's National Weather Service

Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	126	130					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Streuous Activity

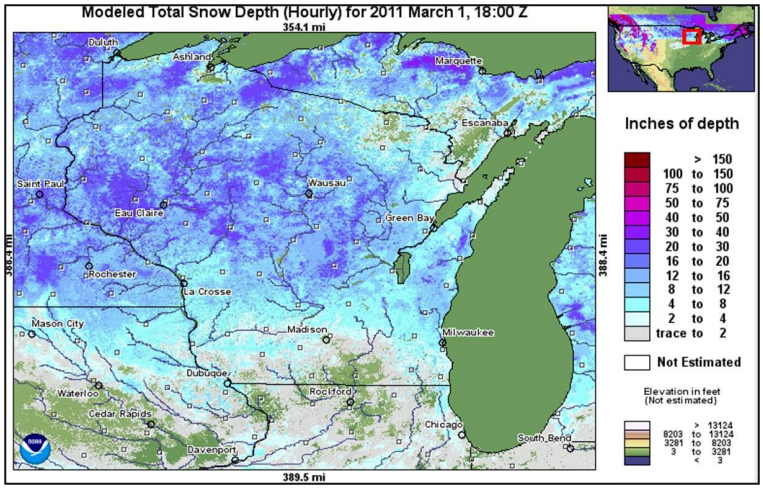
Caution | Extreme Caution | Danger | Extreme Danger

Heat index is an expression of the combined effects of air temperature and humidity on human comfort. Generally, as air temperature and/or relative humidity rise, so does the heat index. Heat index is given as a temperature that describes how hot it "feels," and for this reason it is sometimes called *apparent temperature*.

Heat index is usually not calculated unless the temperature is 80°F or higher. The NWS frequently uses heat index to determine whether heat advisories should be issued. Here at the Sullivan office, a Heat Advisory is issued if the heat index is expected to be 100°F or above during the daytime period; an Excessive Heat Warning is issued when daytime heat index is expected to reach 105°F or above.

Spring Flood Outlook

Each spring, the North Central River Forecast Center issues an outlook for potential spring flooding across the area. The outlook takes into account several factors including snow depth, soil moisture and soil temperature.



Although much of southern Wisconsin has lost significant snowpack in the second half of February, central Wisconsin has kept a pretty significant amount of snow. Many locations had more than 15 inches of snow depth on March 1. As this snow melts in March and April, the water will drain into area rivers and streams. Consider also that frost depths are relatively deep across the state, which will keep the ground frozen and prevent the ground from absorbing the runoff.

Combining these and other factors, the forecast for spring flooding in southern Wisconsin is for above normal chances of many or our rivers reaching flood stage.

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Spring Flood Outlook Cont...

A summary of flood potential:

Rock River: 20-50% Greater than normal chance of reaching flood stage.

Baraboo River: 35-55% Greater than normal chance of reaching flood stage.

Wisconsin River at Portage: 28% Greater than normal chance of reaching flood stage.

Milwaukee River at Cedarburg: 37% Greater than normal chance of reaching flood stage.

Fox River at Berlin: 78% Greater than normal chance of reaching flood stage.

Fox River at Burlington and New Munster: 15-25% Greater than normal chance of reaching flood stage.

Root River: Near Normal

Ultimately, the rate at which the snowpack melts, and the amount of spring rainfall the area receives will be the driving factors in whether or not these rivers rise above flood stage.

For more information visit:

Hydrologic Outlook Issued by the NCRFC

MKX Visits the Milwaukee Boat Show

By Bob McMahon, Lead Forecaster

The Milwaukee/Sullivan National Weather Service office staffed a booth at the 2011 Milwaukee Boat Show, which ran from Friday, January 21st through Sunday, January 30th at the Wisconsin Expo Center at State Fair Park. Nearly 20,000 people attended the show during the 10-day run of the show. The slightly higher attendance numbers from previous years were surprising given the fact that show management trimmed 4 hours from the show on Sunday January 23rd due to the Packer-Bear NFC Championship game being played that afternoon in Chicago. They realized that in Wisconsin, nothing is more important than the Packers.

The nine NWS staffers who manned the booth during both weekends of the show, had a great opportunity to interact with a variety of folks from across, not only our local forecast area, but from many parts of Wisconsin and northern Illinois. We were able to talk with many boaters, from inland waters and Lake Michigan, as well as non-boaters who were escaping the winter chill and dreaming of warmer weather, or perhaps thinking of getting into boating themselves.

We demonstrated how to get and interpret the marine and public weather information available on our local website, as well as on the various NWS sites on the Internet. Staff answered questions about the forecast products and procedures employed by the NWS, with the help of not only the internet sites but with a variety of informational brochures as well.

The NOAA Weather Radio Display proved show-goers with a nice cross-section of the various types of NOAA All-Hazards weather radios available, and an opportunity for staffers to promote the safety benefits of owning and using a NOAA Weather Radio. We also had the office "Tornado Machine" at the booth, which attracted a lot of attention and led to interesting discussions about severe weather safety, the NWS severe weather program and the differences between watches, warnings and advisories. It also provided a number of show-goers, young and old alike, the chance to "stop a tornado" with their bare hands!

With the approach of a significant winter storm for early in the week following the show, there were many questions about it's strength and timing, not only from show-goers, but also from vendors and show management, who needed to schedule the breakdown and removal of display material and the return of boats to the dealerships around the region before the storm hit. The approaching storm gave us a chance to do a little "on-site" decision support.

The show was a great opportunity to meet and share information with the wonderful people we have the privilege to serve here in southern Wisconsin.

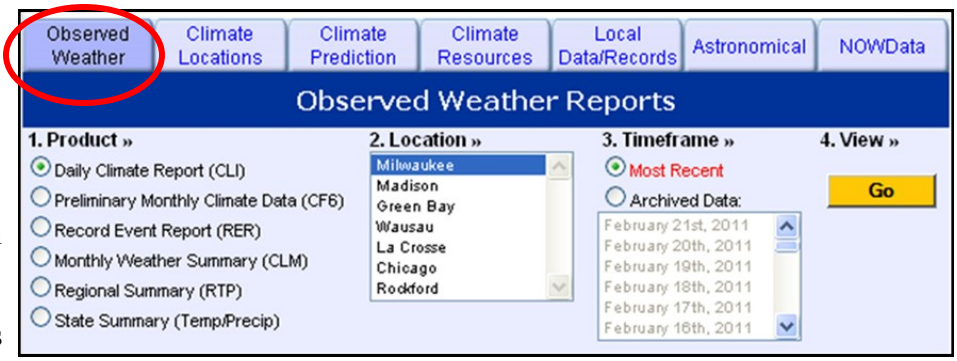
Find It On Our Web Site

By Chris Kuhlman, Meteorologist

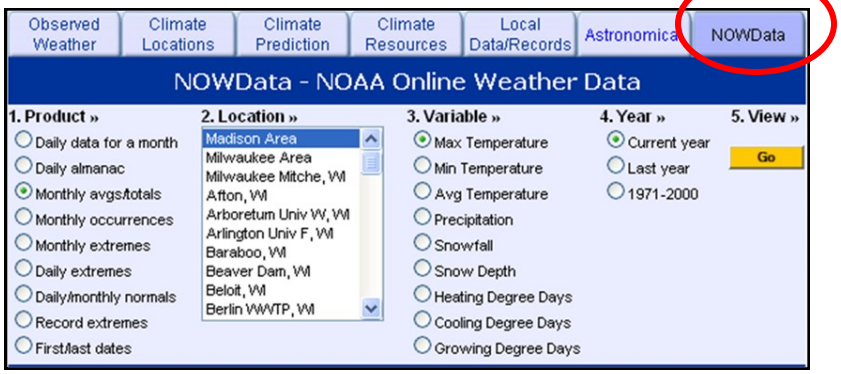
Did you know our web site offers a wide variety of local climate information from around southern Wisconsin?

To locate our local climate page, visit www.weather.gov/mkx and click on the *Climate* tab.

The ***Observed Weather, Local Data/Records, and NOWData*** sections of our climate page house the majority of the available local climate data.



Under the *Observed Weather* tab, you can find climate information for several 24/7/365 manned locations in the region. To do this, first select the *Product* you want, then the *Location*, followed by the *Timeframe* of the climate information you are interested in, and finally click on the *Go* button to view the information. Whether you want to look at daily weather information (such as yesterday's temperature or the amount of precipitation that fell) or to find climate information for Milwaukee a couple of years ago, the information is available. For example, the *Preliminary Monthly Climate Data (CF6)* product is available for up to five years and provides daily temperature, precipitation, and wind information. Note that this information is preliminary and not official. You can find official climate records by visiting the National Climatic Data Center webpage www.ncdc.noaa.gov or by calling (828) 271-4800.



Another useful section is located under the *NOWData* tab. *NOWData* is a database of local climate data collected by local volunteers mostly through the Cooperative Observer Program (COOP) www.weather.gov/mkx/?n=coop. Daily high and low temperatures, precipitation, snowfall, and snow depth are available for all reporting locations for the current and previous year under the *Daily almanac* product. To find how much snow fell in a particular month during the current or previous year, simply select *Monthly avgs/totals*, choose the *Location*, under *Variable* select *Snowfall*, pick the timeframe, and hit the *Go* button. The snowfall amounts are listed for each month for the year selected.

Our climate webpage also has a *Local Data/Records* section which has unique climate information about our Milwaukee/Sullivan local area and for the state of Wisconsin. For instance, our page has statewide monthly precipitation and snowfall images, as well as statewide seasonal snowfall images. You can also find daily or monthly normal and extreme temperature and precipitation records for Milwaukee and Madison. If you are curious about what the record high (extreme) temperature for any day in Milwaukee, click on the *Normals and Extremes for Milwaukee and Madison* link. Then in the three boxes provided select *Milwaukee*, *Extremes*, and the desired month. This will bring you to a document that shows the daily records for Milwaukee in that month.

Student Volunteer Creating Frost Depth Automation

Each year, students majoring in meteorology or a similar field have the opportunity to participate as a student volunteer in the office. We have highlighted a couple of these projects in the past and would like to highlight a current volunteer and his research in this issue.

Mike Zeamer is currently a senior studying mechanical engineering at the University of Wisconsin – Milwaukee. In addition to his major, he is working on a minor in atmospheric sciences. Mike is an Earnest F. Hollings Undergraduate Scholarship recipient, an award presented to undergraduates to help promote training in the oceanic and atmospheric sciences. Each recipient is provided academic assistance as well as an opportunity to full -fill a 10-week intern position in any NOAA facility. Due to his engineering background and interest in the instrumentation used with the atmospheric sciences, Mike was assigned to an internship with the National Weather Service in Kansas City during the summer of 2010. While in Kansas City, he gained valuable experience that enabled him to determine his research project.

Mike's research is focused on defining an automating technique to observe frost depth. His main objective is to refine a technique originally developed by the Department of Transportation in Minnesota. The technique involves placing a probe deep in the ground. An instrument is placed over the probe above the ground and emits an electrical signal. The time it takes for the signal to hit the probe and return can determine the frost depth. Mike compares the depth he measures using this technique against the current manual method of measuring frost depth and refines the electronic technique as needed. Automating the frost depth will allow for measurements to be more readily available to the public.

In addition to the research he is conducting for his scholarship, Mike is assisting in creating a display interface which will supply real time data from sensors at our office. This data will be displayed on our webpage, providing visitors another real time data source in southern Wisconsin.

Mike has always been passionate about the weather and is enjoying being able to combine this passion with his engineering background. In the future, he would like to end up in the meteorology field, preferably doing something that involves meteorological instrumentation. After graduation, he hopes to enter the private sector to gain valuable experience before returning to the NWS.

You Could Be a Future Volunteer!

Three new student volunteers have been chosen to work in our office this coming summer:

- Scott Trevorrow, a junior Meteorology major from the University of Wisconsin—Madison
- Stephaine Lein, a freshman Environmental Geoscience major from Northland College
- Keith White, a junior Atmospheric Science major from the University of Wisconsin—Milwaukee

These three volunteers will begin this summer to learn how the office functions. They will come to the office once a week for an eight hour day. During their time, they will interact with each of the forecasters to learn different forecasting techniques as well as the tasks that are required on a daily basis, such as taking an observation. In the past, volunteers have even had the opportunity to accompany the forecasters on storm surveys. By the end of the summer, they will have also learned and, under supervision, helped in producing basic products, such as the state forecast and hydrology products such as river flood statements.

In addition to learning about the office, the volunteers will be assigned one or more projects to be completed by the end of their time here. These projects may be assigned by one of the meteorologists in the office, or the volunteer may present their own ideas for research. Previous topics have included looking at tornado tracks across the state and dew point trends.

We will begin taking applications for student volunteers for Fall 2011 this spring. The announcement will be placed in the Top News section of our website, so make sure to keep an eye out. For further information about the volunteer program, please contact our office at w-mkx.webmaster@noaa.gov.

CO-OP Corner

Silent Key

By Rudy Schaar, Data Acquisition Program Manager

The staff at the NWS Forecast Office remembers two Wisconsin Badger Net members who were part of the extended Sullivan family.

Lew Sheerar K9JPS, Wasusau, WI

Lew Sheerar K9JPS, Lewis Lincoln Sheerar, 94, died Tuesday, Nov. 23, 2010, at Wellington Place, Rib Mountain. Lewis served in the U.S. Navy during World War II. After his service, Lewis continued working at the Wisconsin Valley Improvement Co., Wausau, until his retirement in 1981. Survivors include his son, Clark; three grandchildren, Dagna Solveig Sheerar and Karl Konrad Sheerar, both of Madison, and Amy Chase (Mark) Sheerar; two great-grandchildren, Skyler and Brooklyn; stepgranddaughters, Jennifer Brassfeld Shepler and Michelle Brassfeld Sobottka; and two step-great-grandsons, Garrett Shepler and Noah Sobottka.

Thomas Milford Warrenburg KA9EKG, Delavan, WI

January 7, 1942 - February 23, 2011
Thomas Milford Warrenburg, 69, of W 8136 Island Road, Delavan, died Wednesday, Feb. 23, 2011, at Mercy Hospital and Trauma Center, Janesville, WI. Thomas was born Jan. 7, 1942, in Indianapolis, IN, the son of Lester and Helen (Worland) Warrenburg. Thomas was a former City of Delavan Police officer and a longtime member of the City of Delavan Street Dept. He married Cynthia Pinnow, in 1983 at Our Redeeemer Lutheran Church. Thomas was an avid Ham Radio Operator and for over 30 years he coached Little League Baseball. Mudlaff Oil was his team. Tom served in Viet Nam for a short time and was interested in Youth Programs.
Tom is survived by his wife, Cynthia Warrenburg of Richmond Twsp.; five sons: Duane (Melissa) Warrenburg of Delavan, Tom (Karin) Warrenburg of Wis. Rapids, WI, Matt (Nancy) Young of Lake Geneva, WI, Brian (Susan) Young of Jupiter, FL, and John Young of Lake Geneva; three daughters: Bambi (Jon) Matzke of Janesville, WI, Wendy (Charles) Malone of Anderson, IN, and Cheri (Matt) Diehls of Janesville; 22 grandchildren; and five great-grandchildren.

Comments and suggestions are always welcome. Your feedback is very important to us!

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All of our COOP observers are instrumental in the daily operations of the NWS office, and we thank each of our more than 80 co-op observers in southern Wisconsin!