The Newsletter of NOAA's National Weather Service in Green Bay, Wisconsin

www.weather.gov/grb

Packerland Weather News

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Inside this issue:

Are You Ready for Severe Weather?

By Jeff Last, Warning Coordination Meteorologist, NWS Green Bay

Last year's record number of tornadoes proves that Wisconsin can be a hotbed for severe weather. Preparation before storms strike can be the difference between life and death. That was no truer than on July 13, 2004, at Parsons Manufacturing in Roanoke, Illinois.

Company planning and paying attention to developing storms were key factors in protecting more than 140 employees when an F-4 tornado demolished the plant. National Weather Service (NWS) forecasts and warnings, including NOAA Weather Radio, worked as designed to provide timely public notice of an approaching severe thunderstorm and the tornado it produced. The foresight of the plant owner in developing and implementing a severe weather plan gave workers extra minutes to take shelter. Not a single injury was suffered by any of the 140+ employees on site at the plant during the storm. The weather safety plan has been in effect since the plant was built in the 1970s.

A major factor of that plan was having a designated in-house storm watcher responsible for monitoring the storm. The storm and tornado formed near the plant and movement was tracked by the storm watcher who gave the initial word for employees to get to the three designated storm shelters.

All businesses, hospitals, churches, schools, and outdoor events should have a weather safety plan in place. A weather watcher should be designated when severe weather threatens. The person should have access to NWS warnings using NOAA Weather Radio or the Internet, and be able to warn all if severe weather approaches. We can't prevent severe weather from occurring, but proactive planning can save lives.

Before and after pictures of Parsons Manufacturing in Roanoke, IL. The plant was hit by an F-4 tornado.

Comments or Suggestions?

If you have suggestions for articles, have comments about the newsletter, or would like to be removed from the mailing list, please contact us at:

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Making a Weather Forecast in the NWS

By Rich Mamrosh, Senior Forecaster, NWS Green Bay

Did you ever wonder how a weather forecast is made? No, we don't throw darts or roll dice. It's actually a scientific process.

Like all scientific endeavors, a prediction begins with observations. To forecast a phenomenon, you first must observe it. After you have observed it, you can formulate methods to try to predict it. The NWS uses a variety of systems to make observations–both on the ground and in the air.

Surface observations are normally done by automated systems, generally at airports. These systems employ electronic sensors to measure moisture, wind speed and direction, air pressure, and rain and melted snow. Since these systems are at airports, additional equipment is used to measure the height of the clouds above the ground and the visibility. Other observing equipment located at ground level includes wind profilers, lightning sensors, and Doppler radars.

To measure the weather above the ground, weather balloons, satellites, and aircraft are used. The NWS launches weather balloons twice a day from about 70 locations in the U.S., including Green Bay. These balloons carry instrument packages called radiosondes to heights of nearly 100,000 feet. The instruments measure temperature, humidity, pressure, and wind as they are tracked by a tracking antenna on the ground.

Satellites are another way to measure the weather above the ground. Geostationary satellites are located about 22,000 miles above the equator, and stay over the same place on the earth all the time. These satellites observe cloud cover, cloud temperature, water vapor in the atmosphere, and can even spot forest fires and volcanic eruptions! The pictures of cloud cover are very important to meteorologists making forecasts of large and small weather systems.

Finally, aircraft are becoming more utilized to measure weather conditions above the ground. Over 1,500 commercial aircraft now report wind and temperatures to the NWS as they fly across the country and around the world. The aircraft reports are especially useful over the oceans and other data sparse areas.

Senior Forecaster Jim Skowronski putting together a forecast.

Once all of the surface and upper air data are collected, they are checked for errors and then used in mathematical representations of the atmosphere called numerical weather prediction models. These computer models are run on supercomputers near NWS headquarters in Washington, D.C. The supercomputers provide meteorologists with a good approximation of what the general weather pattern will be over the next several hours or next couple of weeks.

The output from the numerical models is then compared to forecasts from other models and to the current weather that is occurring. Sometimes forecasts from different computer models produce vastly different forecasts. For example, one computer model can forecast a winter storm in Chicago, while another forecasts the storm over Milwaukee. That's where the forecaster's experience comes in. The output from the computer models are used by meteorologists in the 122 NWS Weather Forecast Offices to issue forecasts and warnings for their local area.

In the last 20 years, forecasts have become more accurate. Five day forecasts are now as good as three day forecasts were 20 years ago. And three day forecasts are now almost as good as one day forecasts were. Forecasts will never be perfect, but you can expect continuing improvements as the NWS develops better observing systems and numerical models.

Lance Stockinger Retires After 34 Years of Service

By Linda S. Skowronski,

Administrative Support Assistant, NWS Green Bay

Lance Stockinger, Electronics Systems Analyst, retired from the National Weather Service on January 3 after nearly 34 years of Federal Government service.

Stockinger began his service in the U.S. Army during the Vietnam War. After his honorable discharge, he went home to St. Cloud, Minnesota, and graduated from technical college. For the next several years, he worked for AT&T in Minneapolis, RCA at Thule, Greenland, and then with Ford Aerospace on Kodiak Island, Alaska.

In 1975, Stockinger accepted a position as an Electronics Technician with the NWS at Annette Island, Alaska. He subsequently held a similar position at weather offices in Marquette, Michigan, and Sioux City, Iowa. In January 1988, Stockinger was promoted to Area Electronics Supervisor at Sioux Falls, South Dakota. In January 1992, he transferred to Eastern Region Headquarters in Bohemia, New York, as Electronics Program Manager. Stockinger came to the Green Bay Weather Forecast Office in July 1994 as Electronics Systems Analyst, a position he held until his retirement.

Lance Stockinger (R) receiving a length-of-service award from Meteorologist-in-Charge Gary Austin.

Stockinger and his wife Candie have been married for 36 years. They have six children and two grandchildren. Their retirement home is a cabin they built in Bigfork, located in the north woods of Minnesota. However, they plan to spend the harsh winter months in warmer weather as well as travel throughout the year visiting their children.

New ESA Named at NWS Green Bay

By Linda S. Skowronski,

Administrative Support Assistant, NWS Green Bay

Robert Hoag has been promoted to the position of Electronics Systems Analyst at the National Weather Service Forecast Office in Green Bay. He succeeds Lance Stockinger who retired in January 2006.

Hoag joined the NWS in October 2001 as Electronics Technician. Prior to that, he spent 21 years in active duty with the U.S. Navy, retiring as a Chief Petty Officer. Hoag's field of expertise was electronics, which he utilized on ships and in ports around the world. In addition to receiving many hours of on-the-job training, Hoag was an instructor at the Great Lakes Naval Training Center. After retiring from the Navy, Hoag accepted an electrician position with Banta Books before joining the Weather Service.

NWS Green Bay Electronics Systems Analyst Rob Hoag.

A native of Manistique, Michigan, Hoag is married to Sandy, and they have three children.

The Cooperative Observer Corner

By Patrick Hein, Observing Program Team Leader, NWS Green Bay

First, I would like to thank everyone for the time and effort put forth in your observations. Many questions have arisen over the past year on how these observations are logged on the B-91 or E-22 forms. I'd like to address those questions here.

It is very important that you write down your observation under the current calendar day. This is the case for max/min/current temperature and 24 hour precipitation amounts. For example, if it's the first day of the month, enter everything under the 1st. I have found that some observers place the high temperature under yesterday's readings. While that is the day when the high actually occurred, it is not the way it should be logged. Just enter your observation under the day the observation was taken and you will be fine.

If you did not receive any precipitation in the last 24 hours, place a zero in the precipitation column. This verifies that you actually had no precipitation in the last 24 hours. When the forms are forwarded to the National Climatic Data Center to be added to the climate database, an empty entry means the data are missing. I'm sure in many cases you do not mean missing, but in today's modern age of computers, that's what happens.

It does help if you can enter either a straight or waved line in the precipitation hourly columns. A straight line means that precipitation ***was*** observed for the marked hours, while a waved line means that precipitation ***probably*** occurred over these hours. This helps verify your entry of precipitation in the preceding column and gives us an idea of when the precipitation fell.

We all take breaks from our daily routines, but how do you record this on your B-91? If you can, have another family member or responsible neighbor record your observation. If this is not possible and you miss your scheduled time of observation, write the time you took the observation in the remarks section. But what if you miss your observation for a few days? Your temperature readings may not represent the last 24 hours of highs and lows. If this happens, just reset your temperature unit when you get back and start taking your observation at your scheduled time. If you missed the previous day's high or low, place an "M" in that column for "Missing."

Holy Family Convent is the new Manitowoc COOP observation station. Pictured (L-R) are Sister Xaveria Wittmann, Sister Caritas Marie Le Claire, NWS Green Bay's Pat Hein, Sister Veronica S. Schad, and NWS Green Bay's Scott Cultice. A special thanks goes to Sister Lois Ann Gosch who graciously allowed this to happen.

Precipitation can be handled differently. Draw a line in the precipitation column downward through all the days you missed and write the total from the gage on this line. I realize that some of the precipitation may have evaporated, but it's better than no reading at all. In the remarks column, write the weekend total or week total for however long the gage was collecting precipitation. Snowfall and snow depth are too hard to measure after a few days, so just mark it as missing. As always, if you have any questions, feel free to call or e-mail me at pat.hein@noaa.gov.

Finally, I encourage you to visit the National Cooperative Observer web site, www.weather.gov/om/coop. Everything you need or want to know about the cooperative observations program is on this site. Feel free to browse through the site and sign up for the national cooperative observer newsletter.

On the Web

www.weather.gov/om/coop

New Partnership Benefits Mariners

By Teri Egger, Senior Forecaster,
NWS Green Bay

A new partnership between two government agencies has lead to the installation of two new weather observing sites on northern Lake Michigan, one at Kewaunee and the other at Marinette/Menominee. The National Weather Service (NWS) and its sister agency, the National Ocean Service (NOS), pooled resources last year in an effort to meet the goals of both agencies of saving life and property and enhancing the economies of the area.

The NOS is one of five line offices of the National Oceanic and Atmospheric Administration (NOAA), also the parent agency of the NWS. NOS is a scientific and technical organization that works to preserve and enhance the nation's coastal resources and ecosystems along the 95,000 miles of shoreline and 3.5 million square miles of coastal ocean. Its mission is to provide products, services, and information that promote safe navigation, support coastal communities, sustain marine ecosystems, and mitigate coastal hazards. In the Great Lakes, NOS's major role is to provide nautical charts and water level monitoring. NOS also manages the Thunder Bay Marine Sanctuary and provides immediate response support for hazardous spill events.

The new sites at Kewaunee and Marinette/Menominee were part of an upgrade of NOS's water level monitoring sites. The NWS provided monetary support for adding weather equipment and provided guidance on the placement of this weather observing equipment that was installed as part of the upgrade. Weather data from these two sites is currently available on the NOS website, www.glakesonline.nos.noaa.gov. A link to this website can be found on the NWS Green Bay Marine page. By this summer, look for the data to be broadcast on the NOAA Weather Radio. In the future, an additional observing site will be installed at the mouth of the Fox River in Green Bay.

On the Web

www.glakesonline.nos.noaa.gov

New Employee Joins Forecast Office

By Linda S. Skowronski,
Administrative Support Assistant, NWS Green Bay

Steven Fleegel joined the Green Bay Weather Forecast Office as a Meteorologist Intern on December 12, 2005. Before coming to Green Bay, Fleegel worked as an instructor, recruiter, and meteorology consultant at West Virginia State University. In addition to his work at the university, he was the Associate State Climatologist for West Virginia.

A native of Willmar, Minnesota, Fleegel graduated from the University of North Dakota with a Bachelor of Science Degree in Atmospheric Science. He is married to Kari, who is also a meteorologist with the National Weather Service.

We extend a warm welcome and best wishes for a rewarding career with the National Weather Service.

NWS Green Bay Meteorologist Intern Steve Fleegel.

Unprecedented Warmth in January

By Roy Eckberg, Forecaster,
NWS Green Bay

Subzero temperatures in northern and northeastern Wisconsin during the month of January are as common as the sun rising and setting. After a very cold start to the month of December, well above normal temperatures returned to the area on December 22. Green Bay then experienced an unprecedented string of 47 consecutive days where the mean temperature for the day was above normal. The string of above normal days ended on February 7th at Green Bay.

January 2006 went down in the record books as the warmest January on record at many locations across Wisconsin. When a monthly temperature record is broken, it usually exceeds the old record by a few tenths of a degree. Across north-central and northeast Wisconsin, the new January record smashed the old record by as much as 1.5 degrees, while a few locations broke their monthly record by 2.0 to 3.5 degrees!

Along with the unusual warmth, many different types of records were broken during the month. On January 27, several cities set daily record high temperatures including Wisconsin Rapids with 53 °F, Appleton and Oshkosh at 52 °F, Stevens Point with 52°F, and Green Bay at 51°F.

Many monthly records were also broken. For the first time since weather records began, Rhinelander and Wausau did not experience a subzero day during the month.

LOCATION	NEW JANUARY	OLD JANUARY	YEAR
APPLETON	29.3	26.9	1990
GREEN BAY	30.5	27.6	1933
MANITOWOC	31.0	30.2	1933
MARINETTE	28.7	25.2	1964
MARSHFIELD	25.6	24.5	1990
OSHKOSH	30.6	28.1	1933
RHINELANDER	24.8	24.1	1944
STEVENS POINT	27.6	27.0	1990
STURGEON BAY	29.3	26.9	1990
WAUSAU	26.8	25.1	2002
WISCONSIN RAPIDS	28.0	26.4	1921

Table showing mean January temperatures across central and northeast Wisconsin.

The minimum temperature for the month in Rhinelander was 0 °F on January 31 and 5 °F in Wausau on January 18. Records began in 1908 at Rhinelander and 1896 at Wausau. At Green Bay, the lowest temperature for the month was 14 °F. This is a new warmest minimum temperature for the month, breaking the old record of 6 °F set in 1990. This was only the sixth January on record when a subzero temperature was not recorded at Green Bay. The monthly snowfall total of 2.0 inches in Green Bay made it the third least snowiest January on record. The lack of snowfall closed many snowmobile trails across east-central Wisconsin. Green Bay also tied a record (31 days) with the most number of days where the snow depth was an inch or less. The record was last set in 1992.

Lightning Kills, Play it Safe

Summer is the peak season for one of the nation's deadliest weather phenomena—lightning. If you are outdoors and a storm approaches, move to a sturdy building or metal vehicle immediately. Remember, if you can hear thunder, you are close enough to that storm to be struck by lightning.

Coaches, sports officials, and others responsible for outdoor groups should have a NOAA Weather Radio handy for the latest weather information.

On the Web

www.lightningsafety.noaa.gov

NWS Meteorologist Takes Storm Chasing Vacation

By Phil Kurimski, Forecaster,
NWS Green Bay

Every spring storm chasers from all walks of life go to the U.S. Plains in search of towering supercell thunderstorms and tornadoes. While catching a tornado takes a combination of skill and luck, a supercell thunderstorm is not as elusive. Every year I take vacation time in late May or early June to chase these monster thunderstorms. One important thing to keep in mind about storm chasing is that it is very dangerous and should never be done alone.

Storm chasing offers the rare opportunity to see different parts of the country that one would not normally get to see otherwise. Last year's chase took me west to eastern Colorado and western Kansas, then south to the Texas panhandle and eastern New Mexico. I took the last week of May 2005 to chase with some friends and colleagues who share the same interest as I do.

The early part of the chase was unsuccessful as we waited in northern Kansas on May 21 and northern Oklahoma on May 22 for thunderstorms to initiate. Although temperatures reached the 90s, this was not enough to overcome the stable air in the lower atmosphere. On May 23 we had better luck as thunderstorms developed in northeast Colorado and quickly evolved into a large thunderstorm with intense inflow into the storm. The air flowing into the storm was so intense a large dust cloud overcame our group with near zero visibility.

May 24 was a very active day as storms once again developed in northeast Colorado then headed eastward into southwestern Nebraska. We witnessed several supercell thunderstorms develop. One of the storms produced a brief "gustnado," a ground-based whirlwind that sometimes forms along the leading edge of thunderstorm downdrafts. As the storms died, they produced large hail and winds to 75 mph as they tracked along the Nebraska and Kansas border. After the chase we had front row seats to a great lightning show near our hotel.

"Gustnado" (circled) that formed ahead of a thunderstorm downdraft. Picture by Phil Kurimski.

May 25 took us to eastern New Mexico as more supercell thunderstorms developed just east of the Rocky Mountains. Although the road network in New Mexico is not conducive to chasing, the storms were large enough to be seen from miles away. This day yielded wall clouds and a rotating eddy circulation very close to our position. Although May 26 did not produce any thunderstorms in eastern New Mexico, it offered the opportunity to view a part of the country I had not been to before.

May 27 was another successful day in eastern New Mexico as we witnessed a distant supercell thunderstorm to our northwest. This storm developed a wall cloud with a white hail shaft clearly visible in the distance. These features indicated the storm was intense; in fact, hail the size of golf balls fell as the storm moved south. We headed back home on May 28 as the storm potential was too far west to chase.

Although we did not see tornadoes, the chase was successful and enjoyable, even on the days we did not see any storms. It is important to stress that storm chasing is dangerous and should be left to the trained storm chaser or meteorologist.

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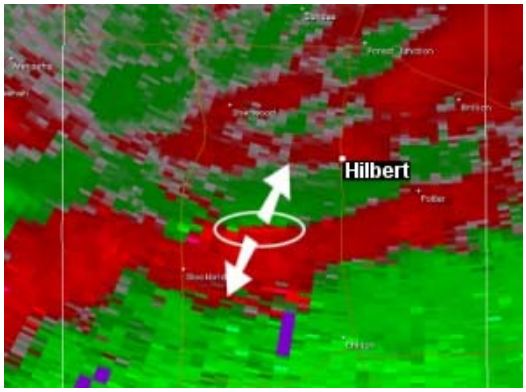
Microbursts Hit Calumet County

The first widespread severe weather event of 2006 hit the region late on April 13 and early on April 14. Thunderstorms with large hail and damaging winds were reported across central and east-central Wisconsin. The hardest hit area was Calumet County, which experienced a supercell thunderstorm that produced hail up to 1.25 inches in diameter and hurricane-force winds.

The storms that struck Calumet County produced three separate downbursts, relatively narrow but damaging straight-line wind events also known as "microbursts." The strongest hit around midnight, 4.5 miles southwest of Hilbert. The straight-line winds associated with the microburst reached an estimated 95 to 100 mph, damaging or destroying three barns and numerous agricultural buildings. Two large, leafless oak trees were also uprooted in this area. The path of damage with this microburst was about four miles long. Hail the size of half dollars was reported shortly after the strong winds moved through.



Doppler velocity image from the NWS Green Bay radar, taken at 11:56 pm on April 13. The arrows denote wind ("radial velocity") as seen by the radar. Area circled is strong divergence, a signature of a potentially damaging downburst.