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

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Packerland Weather News

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Record-Setting Storm Hits Midwest

By Jeff Last, Warning Coordination Meteorologist, NWS Green Bay

One of the strongest storms in central U.S. recorded weather history affected the region October 26-27, 2010. Wind gusts over 50 mph blew across much of the Midwest, while severe thunderstorms and tornadoes raced across southeast Wisconsin and northeast Illinois to northern Alabama. A blizzard affected northern Minnesota and North Dakota and dumped over a half foot of snow. As the storm reached peak intensity during the late afternoon on October 26 over Minnesota, the lowest barometric pressure readings ever measured in the central U.S. occurred. A reading of 28.21" (955.2 mb) was recorded at Bigfork, MN, a pressure that is found in Category 3 hurricanes! As the storm moved near Wisconsin, a new state record was set for lowest air pressure. Superior recorded a pressure of 28.39" on October 26. The previous state record was set in Green Bay in April 1982.

The intense storm produced wind gusts over 60 mph across Wisconsin on October 26 and early on October 27. Highest gusts across northeast and central Wisconsin included 79 mph in Sherwood (Calumet Co.), 68 mph at Algoma (Kewaunee Co.), 61 mph in Wausau, and 60 mph in Rhinelander. The high winds caused widespread power outages across mainly northern Wisconsin, leaving as many as 60,000 customers without power at the height of the storm. Trees were knocked down in scattered locations in the region--some falling on homes and cars. The persistent southwest winds pushed water out of the Fox River into the bay of Green Bay, causing the Fox River to fall three feet from normal, before rising to normal again a day later.

October 26, 2010 satellite image of the large cyclone over the central part of the country.

The persistent strong, southwest winds also created very large waves on Lake Michigan. The weather buoy east of Washington Island in the north-central part of the lake recorded a wave of 22 feet during the afternoon of October 26. This is likely one of the highest recorded waves ever measured on Lake Michigan.

In addition to the winds from the low pressure system, severe thunderstorms formed in the southeast part of the state. A tornado with winds estimated just over 100 mph near Racine caused damage to several buildings and numerous trees.

Last Mailing of Newsletter

Due to rising mailing and printing costs, this **Packerland Weather News** will be the final mailed edition.

This and future newsletters will be published electronically and available on the web:

www.weather.gov/grb

First Ever Scout Day a Huge Success

By Scott Cultice, Hydrometeorological Technician
NWS Green Bay

On a beautiful day in early October, nearly 100 Boy Scouts and Girl Scouts from numerous troops and packs in northeast Wisconsin participated in the first-ever Scout Day at the National Weather Service Office in Green Bay. The scouts have long been guided by their motto "Be Prepared," which applies to weather safety, a critical part of the National Weather Service mission.

The scouts participated in six different activities. Weather safety and preparedness were two of the main topics the Scouts learned about in meeting their "weather merit" (boys) and "weather-watch" (girls) badges. Other topics included an introduction to weather, clouds, the water cycle, precipitation, acid rain, and weather careers. One popular activity, which highlighted all topics, was Weather Jeopardy. There were also hands-on activities in which the scouts had the opportunity to build a simple weather instrument, like an anemometer. Their final stop was to observe an actual weather balloon release. The launching of a "radiosonde," or weather-instrument package, is used for collecting upper air weather data.

Scout Day at the NWS Green Bay office. NWS forecast staff and volunteers from the local chapter of the American Meteorological Society helped make the event a success. Clockwise, starting with upper left: NWS Green Bay's Scott Berschback and Scott Cultice (center, in blue shirts) assist a Boy Scout with the launch of a weather balloon; Meteorologist-in-Charge Gary Austin talks to scouts about thunderstorms; Forecaster Tasos Kallas speaks to scouts about the hydrologic cycle; Senior Forecaster Teri Egger goes over instructions on how to make a cloud; center picture: Pulaski, WI High School science teacher Jill Last helps a scout build an anemometer. Photos: Peg Zenko.

Thanks to All of Our Volunteers

By Gary Austin, Meteorologist-in-Charge
NWS Green Bay

NOAA's National Weather Service in Green Bay could not perform its forecast and warning mission successfully without volunteers—cooperative observers, hazardous weather spotters and amateur radio operators ("hams"). Their contributions are selfless, personal commitments to take and report daily weather observations, observe and report hazardous weather, relay weather observations, or even serve as a backup communications source during unexpected outages. Further, six hams volunteer their personal time directly at our station to establish and maintain communications equipment and support our hazardous weather operations—serving as our "receivers of information" relayed from other ham radio storm spotters in the field.

Cooperative observers record temperature and precipitation every day of the year. Some have done so for many years in succession—that's awesome dedication! Their observations, carefully measured in accordance with NWS guidelines, provide us with information that is invaluable on a daily basis. The observations permit us to know what has happened "on the ground" and assist us in making forecast decisions and providing information to the public. The observations also serve as the foundation upon which a national climate database is maintained, permitting the study and identification of long-term trends of weather patterns by a wide variety of organizations.

Weather (or "storm") spotters assist us during significant weather events, in real-time in any season of the year, providing us with information about hazardous weather. Although we have high-tech equipment like radars and satellites, we still rely on observers' eyes to let us know what is happening in their community so we can make appropriate warning decisions.

Without the volunteer service of our observers, spotters and hams, we could not provide the valuable services expected of us by our tax-paying community. We and the citizens of northeast Wisconsin are truly indebted to you!

NWS Green Bay Forecaster Receives Cline Award

Senior Forecaster Jim Skowronski received the 2010 Isaac M. Cline Award during a ceremony in July. He was nominated by his co-workers for his work in developing tools used in the graphical forecast editor, the software staff uses daily to develop weather forecasts.

As a local winner in the category of meteorology, Skowronski became eligible to advance to the regional and national Cline Award levels.

The prestigious award is named in honor of Isaac M. Cline, one of the most recognized employees in National Weather Service history. Cline made numerous contributions to the mission of what was then called the Weather Bureau. His most noteworthy accomplishment was the life-saving actions he took during the Galveston hurricane of 1900, the deadliest weather event in U.S. history. The Cline Award is presented annually to NWS staff in nine categories of accomplishment.

Meteorologist-in-charge Gary Austin (L) presents the Cline Award to Jim Skowronski.

Congratulations on a job well done!

La Niña to Dominate Winter Weather Pattern Over the U.S.

By Gene Brusky, Science and Training Meteorologist
NWS Green Bay

The latest forecast from NOAA's Climate Prediction Center (CPC) indicates moderate to strong La Niña conditions will dominate the weather patterns over the United States this winter.

La Niña refers to a periodic cooling of the ocean surface temperatures in the central and eastern equatorial Pacific Ocean that occurs roughly every 3 to 5 years. La Niña represents the cool phase of the El Niño/ Southern Oscillation (ENSO) cycle. El Niño and La Niña are naturally occurring phenomena resulting from interactions between the ocean surface and the atmosphere over the tropical Pacific Ocean. Changes in the ocean surface temperatures affect the tropical rainfall patterns and atmospheric winds over the Pacific Ocean, which in turn impact ocean temperatures and currents. The El Niño and La Niña related patterns of tropical rainfall cause changes in atmospheric weather patterns around the globe. During a typical La Niña winter, the jet stream (upper-level winds that steer surface weather systems) becomes more variable and amplified (Fig. 1).

Expected impacts in the United States (Fig. 2) for the upcoming winter include an enhanced chance of above-average precipitation in the Pacific Northwest, Northern Rockies and Ohio Valley, while below-average precipitation is most likely across the south-central and southeastern states. An increased chance of below-average temperatures is predicted across the northwest and north-central U.S., with a higher possibility of above-average temperatures for the southern and central U.S.

For northeast and north-central Wisconsin, the impact of La Niña is more uncertain. Based on historical data since 1950, there have been 19 documented La Niña events during the winter months (December-February). 12 of 19 (63%) of these winters had below normal temperatures. There were no clear signals in precipitation or snowfall trends during the La Niña winters.

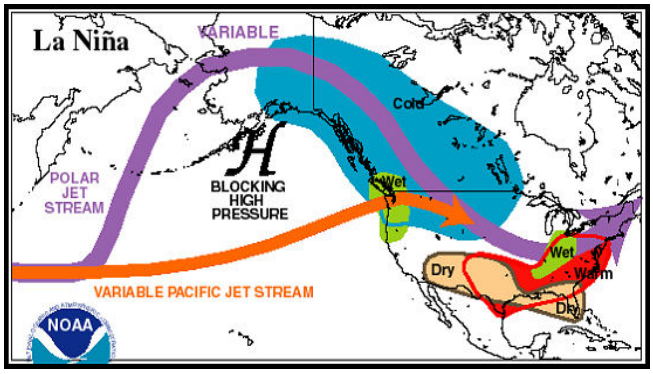


Figure 1. Typical impacts of moderate to strong La Niña. Courtesy NOAA CPC.

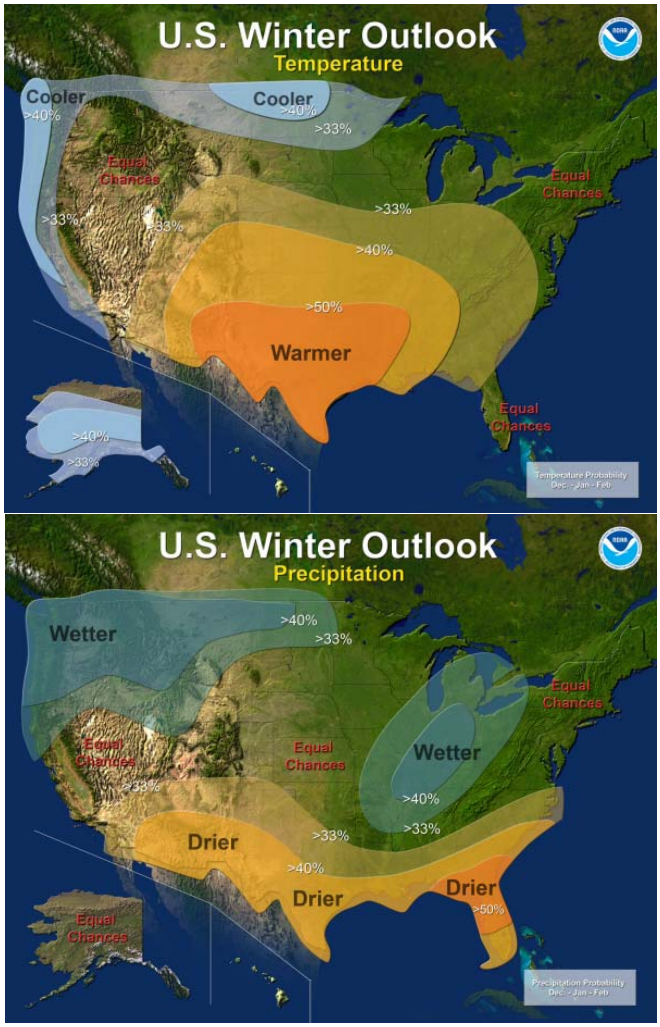


Figure 2. 2010-11 winter outlook for temperature (top) and precipitation. Courtesy NOAA CPC.

Late September Flood in Central Wisconsin

By Tom Helman, Senior Forecaster
NWS Green Bay

Very heavy rain fell across portion of central and northeast Wisconsin on September 23-24, 2010. Four to six inches of rain were measured over much of central Wisconsin, while two to four inches fell over the north-central and northeast part of the state. As a result, widespread flooding occurred in Wood, Portage, Marathon and portions of Lincoln, Waupaca, Shawano and Outagamie counties, forcing the closure of many roads. Runoff from excessive rainfall damaged portions of roads in Wood and Portage counties on the 24th. Sections of Highway 54 from Dexterville to Stevens Point, and Highway 66 from Wisconsin Rapids to Stevens Point, were closed due to high water. In addition to the roads, hundreds of homes and buildings were impacted by the heavy rain and flooded rivers. Agriculture was also impacted, as farm fields became flooded and fall crops could not be harvested.

Later in the event, flooding began to concentrate on the main stem rivers, most notably along the Wisconsin and Yellow Rivers where "flood waves," or peak-river crests, developed and moved downstream. Flows from the headwaters of the Wisconsin River in north-central Wisconsin merged with the swollen Big Rib River and other tributaries in Marathon County, increasing river stages and flows downstream on the Wisconsin River. Peak-river crests occurred in Marathon City along the Big Rib River and in the Wausau and Rothschild vicinity along the Wisconsin River, on September 24. This flood wave continued downstream and crested on the afternoon of September 25 in Wisconsin Rapids, before moving farther downstream toward the city of Portage a few days later. A new record flood crest of 18.41 feet was established on the Yellow River in Babcock on September 24. The previous record in Babcock was 17.38 feet, set in 1952.

Pine River in Lincoln Co. overflowing its banks on September 23.

The Big Rib River merging with the Wisconsin River and other tributaries produced significant flooding in Marathon Co. Photo taken at Sherman Ave. in western Wausau on September 24.

Looking downstream at the Jackson St. bridge in Wisc. Rapids. Peak flow was over 78,500 cubic feet per second on September 25. Crest height was surveyed to be 15.10 feet, a modern-day record.

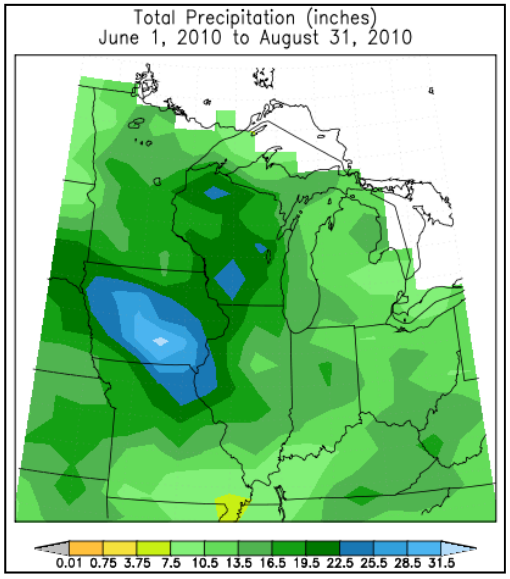
The Summer of 2010: Record-Breaking Rainfall

By Roy Eckberg, Forecaster

NWS Green Bay

Much of north-central and far northeast Wisconsin had been suffering from a long-term drought since 2003. When combined with a warm and dry weather pattern in the spring, the drought peaked in late May. The weather pattern abruptly changed to a cool and wet pattern during the first two weeks of June. A more typical summer-time pattern developed during the latter half of June with a warm and humid air mass remaining in place across much of the region. Unlike previous summers, there were fewer intrusions of dry Canadian air to replace the tropical air mass. Scattered strong thunderstorms brought torrential rains to north-central and far northeast Wisconsin on June 22 and 23, and again on June 26 and 27. Willow Reservoir received 6.32 inches of rain during those two events alone. Overall, June precipitation totals were well above normal with most locations receiving 6 to 10 inches of rain during the month. The highest precipitation totals for June were 11.38 inches at Willow Reservoir and 10.08 inches at Goodman.

The combination of a warm, tropical air mass in July and meandering cold fronts provided perfect ingredients for frequent, slow-moving thunderstorms. Some of the storms produced torrential rains. The heavy rains caused urban street flooding and rapid rises in small creeks and rivers. During the month, thunderstorms brought copious amounts of rain to many locations every three to five days. On July 14, thunderstorms brought over three inches of rain to Marshfield and Oshkosh. Green Bay broke or tied records for the most number of days with measurable rainfall, including 11 days of a quarter inch or greater rainfall, six days with a half inch or more, and three days with over an inch. July 2010 will go down in the record books as the wettest month on record at Appleton with 13.23 inches. New London also experienced its wettest month on record with 12.28 inches. Overall, precipitation totals for July ranged from four to seven inches over north-central and far northeast Wisconsin, to eight to thirteen inches south of Highway 29.



Even though August was drier than normal across much of the region, summer (June through August) as a whole was one of the top five wettest summers on record. Normal precipitation for the region is 10 to 13 inches. Some of the higher totals this summer included 23.71 inches at New London, 23.61 inches at Willow Reservoir, and 23.42 inches at Appleton. Below is a list of some of the highest totals from northeast and central Wisconsin.

Location	2010 Summer Rainfall (in)	Summer Rank (if available)
New London	23.71	Wettest
Willow Reservoir	23.61	Wettest
Appleton	23.42	Wettest
Buckatabon	22.82	Wettest
Hancock	23.18	3rd Wettest
St. Germain	22.49	Wettest
Marshfield	22.25	Wettest
Minocqua	22.22	2nd Wettest
Oshkosh	21.41	Wettest
Babcock	20.76	
Green Bay	20.66	Wettest
Shiocton	20.46	
Rest Lake	20.43	4th Wettest
Green Bay (Bot. Gard.)	20.31	
Rhinelander (4 NE)	20.09	
Eau Pleine Reservoir	20.02	Wettest
Eagle River	19.93	2nd Wettest
Wausau	19.80	
WI Rapids (Grand Ave)	19.79	2nd Wettest
Chilton	19.78	Wettest
WI Rapids (ASOS)	19.41	
Oshkosh (ASOS)	19.40	
Merrill	19.39	2nd Wettest
Goodman	19.34	2nd Wettest

ASOS - Automated Surface Observing System at airport

The Cooperative Observer Corner

By Pat Hein, Observations Program Leader, NWS Green Bay

Recognizing a century of cooperation, the National Weather Service presented Wisconsin Valley Improvement Company (WVIC) with a 100 Year Institutional Award for outstanding service in the Cooperative Weather Observer Program. The cooperative effort between NWS and WVIC began at the Big St. Germain Dam in 1910, where daily weather records were taken.

"Cooperative observers are the bedrock of weather data collection and analysis," said Gary Austin, Meteorologist-in-Charge of the Green Bay NWS office. "Numerous technological breakthroughs have brought great benefits to the Nation in terms of better forecasts and warnings. Without the century-long accumulation of accurate weather observations taken by volunteer observers, scientists could not begin to adequately describe the climate of the United States. We cannot thank WVIC enough for their years of service to America."

Pat Hein (L) congratulates Thomas Kipp (C) and Sam Morgan of Wisconsin Valley Improvement Company.

Austin and Pat Hein, NWS Green Bay Observation Program Leader, presented the award to Thomas Kipp and Sam Morgan of WVIC during a June 2010 ceremony.

Are You Ready for Another Wisconsin Winter?

Summer is long gone, and now is the time to prepare for the upcoming winter season. Get ready for winter by putting together a winter storm safety plan for you and your family:

- Check and winterize your vehicle before the winter season begins.
- Have a NOAA Weather Radio with a battery back-up to keep up-to-date on the latest weather situation.
- Store extra food that requires no cooking in the event electricity is cut off.
- Make sure your emergency heating source, such as a fireplace or space heater, has proper ventilation.
- Check the weather forecast before leaving for extended periods.

When traveling, carry a winter storm survival kit that includes blankets, a flashlight with extra batteries, a first-aid kit, high-calorie non-perishable food, a shovel and knife, a windshield scraper and brush, and a cell phone. Keep your gas tank near full to avoid ice in the tank and fuel lines. If you must travel in a winter storm, avoid traveling alone.

It's also important to know the difference between a watch and a warning. A winter storm watch is issued when there is a potential for a winter storm during the next one to three days. It doesn't always mean the area will be directly hit because of uncertainty in the path or timing, but it does mean that it's time to start planning just in case. A warning means a dangerous event is expected or occurring. Avoid unnecessary travel when winter warnings are in effect. Winter weather advisories are issued for events that are expected to be an inconvenience, and not life-threatening if common sense is used.

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Storm Spotters: It's Time to Get Out the Yardsticks

Last December's blizzard proved once again how valuable storm spotters are during winter storms. Your timely reports during and after the storm of snow, blowing snow, and road conditions provided important information to National Weather Service forecast staff, which resulted in more accurate warnings and advisories. Before you know it, arctic cold and snow will return to the area. Your accurate snowfall measurements will again be needed this season.

It is important to measure snowfall (and snow depth) in locations where the effects of blowing and drifting are minimized. Finding a good location where snow accumulates uniformly, simplifies all other aspects of the observation and reduces the opportunities for error. In open areas where windblown snow cannot be avoided, several measurements will be necessary to obtain an average depth—these measurements should not include the largest drifts.

In heavily forested locations, find an exposed clearing in the trees. Measurements beneath trees are inaccurate since large amounts of snow can accumulate on trees and never reach the ground. Avoid measuring directly on the grass; rather, use a snowboard or other hard surface away from the house. Make sure the snowboard is well cleared after your final measurement.

To help you sharpen your snow measuring skills, we've included a "Snow Quiz" in this edition of the **Packerland Weather News**. The quiz was written for NWS cooperative weather observers, but anyone who wants to accurately measure snow will learn something by taking the quiz. Good luck!