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

www.weather.gov/grb

Packerland Weather News

Volume 14, Issue 1 Winter 2016

Inside this issue:

Scary Summertime Circulations

By Gene Brusky, Science Operations Officer

They lurk among shadows of swirling rain shafts and disguise their location to the most savvy of spotters. They develop in an instant, moving swiftly, staying lean, and keeping close to the ground to elude the Doppler radar beam. Although their lifetimes are short, perhaps a minute or two, that is plenty of time for their rampage to brew. Thus was the summer of 2016, characterized by several sinister and elusive non-supercell tornadoes. Let's take a look at a few of these events to illustrate both the strengths and limitations of our current radar capabilities in detecting such creatures more common to this part of the country.

June 10, 2016 – Fox Valley Tornado

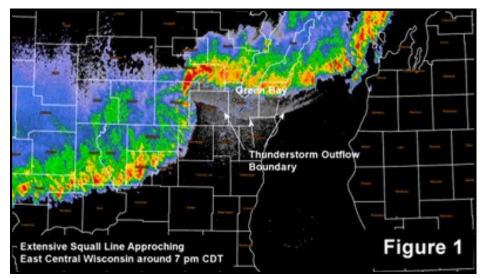

Figure 1

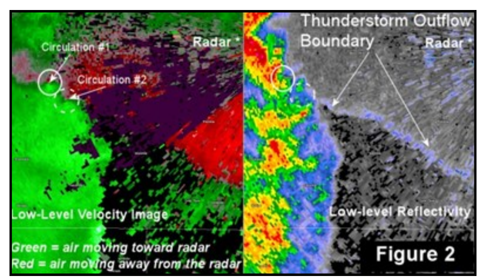

Figure 2

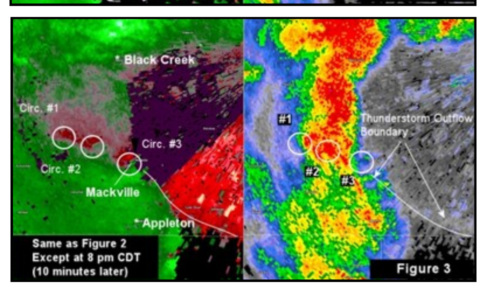

Figure 3

During the afternoon of June 10, two separate lines of storms merged into a very extensive squall line that extended from northern Lake Michigan to northeast Iowa. The squall line was primarily associated with modest straight line wind damage. However, as it approached east-central Wisconsin, very interesting storm-scale interactions took place. Figure 1 shows the squall line as it approached the Fox Valley around 7 pm CDT. The east to west line of storms north of Green Bay produced strong thunderstorm outflow that quickly moved south toward the Fox Valley. Several weak circulations developed where this thunderstorm outflow boundary intersected another north-south line segment approaching from the west (Figure 2). The first two circulations that formed were not tornadic. However, the third circulation that developed near Mackville did produce a weak tornado (Figure 3). A photo of the tornado is shown below. This photo was taken near Appleton looking northwest toward Mackville. The circulations described above were very short lived, lasting just a couple minutes. However, with a recent upgrade to the NWS Green Bay radar the warning forecaster was able to more easily detect these shallow, weak and transient circulations. This upgrade allowed for more

(continued on page 2)

frequent sampling of the low-levels of a storm. In this event the radar was able to make a low-level scan of the storm every 1-2 minutes! Prior to this upgrade the radar made only one low-level scan every 5 minutes. Non-supercell tornadoes (NST) such as the one described above typically form close to the ground then rapidly grow upward. They are also generally small, shallow, and short-lived lasting less than 5 minutes. Thus, with the recent radar upgrade, the warning forecaster had a better chance of detecting these weak but elusive tornadoes, especially those that evolved close to the radar.

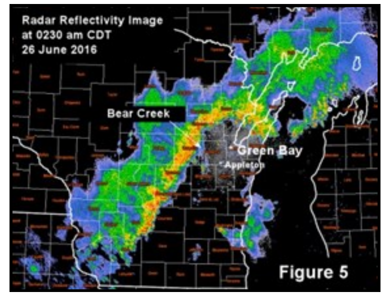

Figure 5

June 26, 2016 – Bear Creek Tornado

During the early morning hours of June 26, another squall-line approached Green Bay and the Fox Valley producing a weak (EF0) non-supercell tornado. This tornado also formed along the leading edge of the squall line and briefly touched down a few miles southwest of Bear Creek (Figure 5). Although this tornado produced considerably more damage compared to the previous example, it was more difficult to detect. In this case, even with more frequent low-level scans, the radar was unable to sample a discernable circulation before the tornado touched down (Figures 6, 7). This is because the tornadic circulation was much too narrow and too shallow to be easily detected by the radar beam at that distance (~ 30 nm). This illustrates that even with more frequent sampling of the low-levels of the storm, NST tornadoes can still go undetected due to the physical limitations of the radar beam itself.

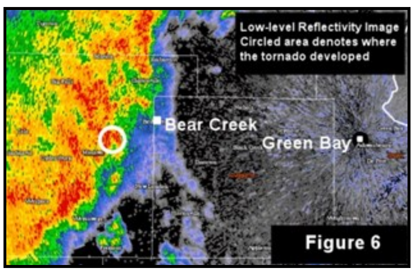

Figure 6

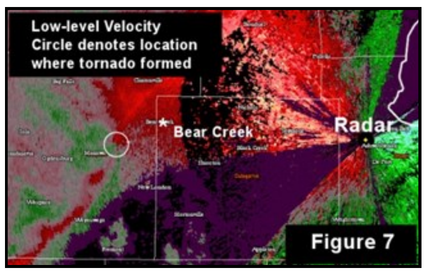

Figure 7

August 20, 2016 – Kewaunee Tornado

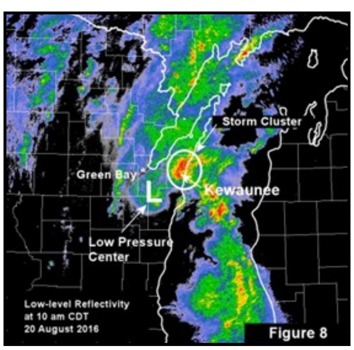

Figure 8


Storm Damage Near Kewaunee

The last tornadic storm we will discuss occurred at the unusual time of 10 am on August 20. The storm formed northeast of a low pressure center within a large cluster of heavy rain-producing rain showers (Figure 8). Prior to tornado formation, several discrete showers merged over Kewaunee County (Figure 9 – left). The cell mergers enhanced low-level convergence over Kewaunee County leading to a sudden and vigorous upward acceleration and stretching of the updraft within the storm cluster. The process is analogous to ice skaters who quickly bring their outstretched arms close to their body to rapidly increase their spin (conservation of angular momentum). The tornadic circulation (Figure 9-right), again formed very rapidly. By the time the parent circulation reared its ugly head on the NWS Green Bay radar, it was already on the ground! The tornado only lasted a few minutes but still caused notable damage near Kewaunee (photo above).

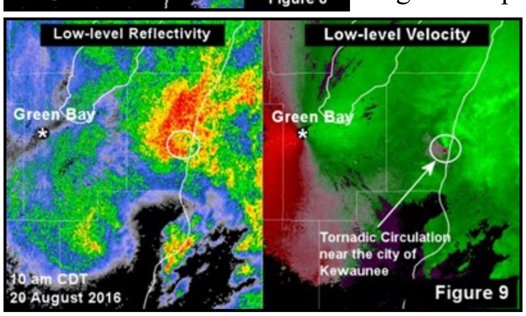

Figure 9

Northeast Wisconsin Severe Weather in 2016: A Typical Season

The 2016 severe weather season in northeast Wisconsin can be described in one word: “typical.”

The season started out a bit later than usual, as the first severe event of the year occurred on May 6. An isolated thunderstorm produced a wind gust of 68 mph near Manitowish Waters and downed a few trees. On average, the first severe event of the season is in the third or fourth week of April.

One of the biggest events of the year occurred on July 21, when a morning squall line raced across the state and produced widespread wind gusts over 55 mph. Trees and power lines were knocked down at many locations. Figure 1 shows the location of the storms across east-central Wisconsin at 8:30 am.

Through mid-September, there were over 140 reports of large hail, damaging thunderstorm winds, and tornadoes in northeast Wisconsin, which is close to the long-term average. Seven weak tornadoes were reported in northeast Wisconsin; again, right at the average. The tornadoes caused mainly minor damage and were relatively brief. Figure 2 shows the locations of severe weather reports across all of Wisconsin.

For the year, 16 tornadoes were reported in the state. Wisconsin averages 23 tornadoes each year.

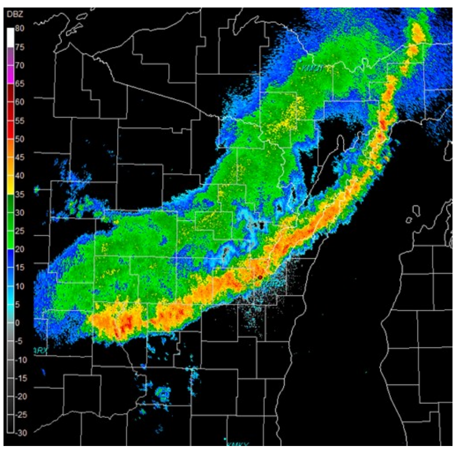

Figure 1. July 21, 2016, radar image showing thunderstorm squall line across Wisconsin.

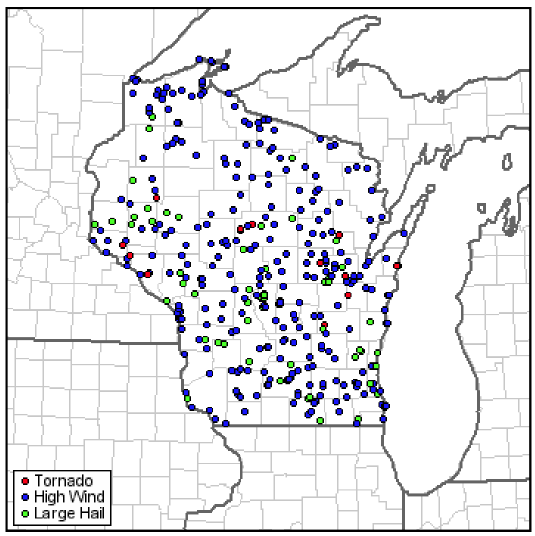

Figure 2. Location of severe weather reports in 2016. Data through November 15.

Help Build a Weather-Ready Wisconsin!

The devastating impacts of extreme events like record-breaking snowfall, violent tornadoes, widespread flooding, and drought, can be reduced by taking action, which is what the Weather–Ready Nation (WRN) initiative is all about. Building a weather-ready nation takes well-informed communities, businesses, and individuals that are ready, responsive, and resilient to extreme events. And this requires the participation and commitment of a vast nationwide network of “Ambassadors”—entities that contribute by promoting weather safety not only within their company or organization, but to the general public as well.

If your organization or business is committed to weather safety and willing to help spread the word and inspire others to take action, the National Weather Service wants to recognize your work! Become a Weather-Ready Nation Ambassador and help Wisconsin become weather-ready. For more information and an application, visit:

http://www.weather.gov/grb/wrn

AMBASSADOR™ WRN WEATHER-READY NATION

Winter 2016-17 Outlook

By Roy Eckberg, Forecaster

One of the strongest El Niños on record occurred across the equatorial Pacific Ocean during the winter of 2015-16. During an El Niño winter, the polar jet stream is further north than usual (see Figure 1), which allows for fewer intrusions of arctic air into the western Great Lakes. Last winter, the region experienced fewer days of below zero temperatures compared to normal. The winter of 2015-16 (December through February) went down in the record books as one of the warmest winters on record (Green Bay 5th warmest, Rhinelander 4th warmest and Wausau 3rd warmest). The winter was much wetter than normal (Green Bay 3rd wettest, Rhinelander 4th wettest and Wausau 2nd wettest), partly due to record precipitation totals during the month of December.

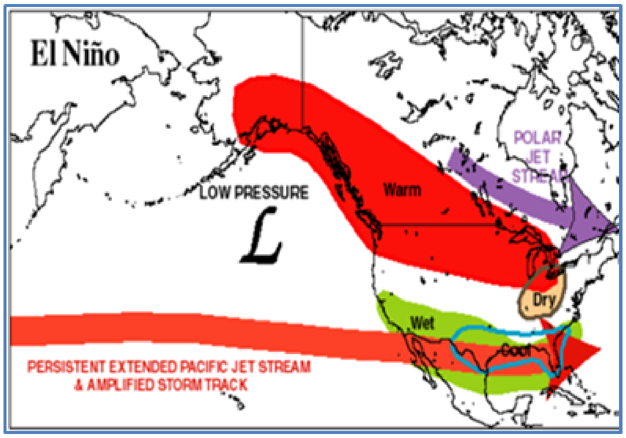

Figure 1. El Niño jet stream pattern

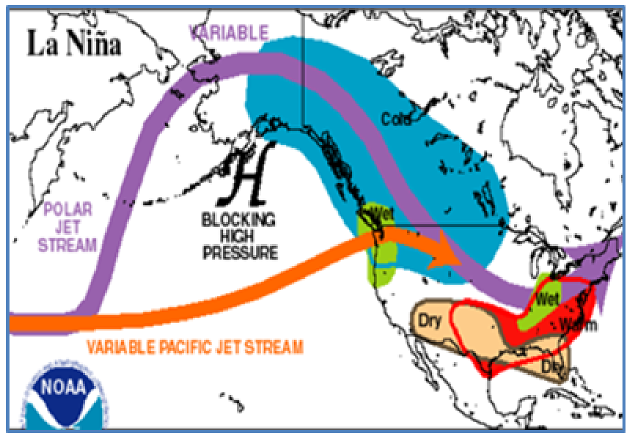

Figure 2. La Niña jet stream pattern

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Average First Date Of Measurable Snow

City	0.1"	1.0"	3.0"	City	0.1"	1.0"	3.0"
Antigo	Nov 9	Nov 13	Nov 25	Oconto	Nov 17	Nov 22	Dec 17
Appleton	Nov 15	Nov 26	Dec 19	Oshkosh	Nov 26	Dec 1	Dec 17
Brillion	Nov 20	Nov 23	Dec 13	Rhinelander	Nov 5	Nov 8	Nov 26
Chilton	Nov 17	Nov 22	Dec 16	Shawano	Nov 18	Nov 21	Dec 7
Clintonville	Nov 16	Nov 25	Dec 14	Stevens Pt	Nov 17	Nov 25	Dec 11
Florence	Nov 10	Nov 12	Nov 28	Sturgeon Bay	Nov 20	Nov 24	Dec 15
Green Bay	Nov 13	Nov 23	Dec 15	Suring	Nov 11	Nov 16	Dec 4
Kewaunee	Nov 26	Nov 28	Dec 13	Two Rivers	Nov 27	Nov 30	Dec 15
Lac Vieux Desert	Oct 17	Oct 23	Nov 10	Washington Is.	Nov 25	Nov 30	Dec 13
Laona	Oct 20	Nov 3	Nov 18	Waupaca	Nov 17	Nov 20	Dec 10
Marshfield	Nov 9	Nov 14	Dec 2	Wausau	Nov 3	Nov 12	Nov 28
Merrill	Nov 7	Nov 14	Nov 29	WI Rapids	Nov 16	Nov 20	Nov 28

For the upcoming winter, will mother-nature provide a repeat of last winter? The answer is no. The latest climate models are forecasting that neutral or weak La Niña conditions will occur in the equatorial Pacific Ocean., with less than a one percent chance of an El Niño occurring. During neutral or La Niña conditions in the equatorial Pacific, a ridge of high pressure sets up across the eastern Pacific Ocean and western United States (Figure 2). This pattern allows the jet stream to dip southward at times across the eastern United States, allowing for more intrusions of Arctic air and a greater chance the winter temperatures will end up below normal.

What is the forecast for the upcoming winter? The climate models are indicating a greater likelihood of below normal temperatures from the northern Plains into much of Wisconsin and Upper Michigan (see Figure 3). The climate models indicated a greater likelihood of above normal precipitation across much of Wisconsin (see Figure 4).

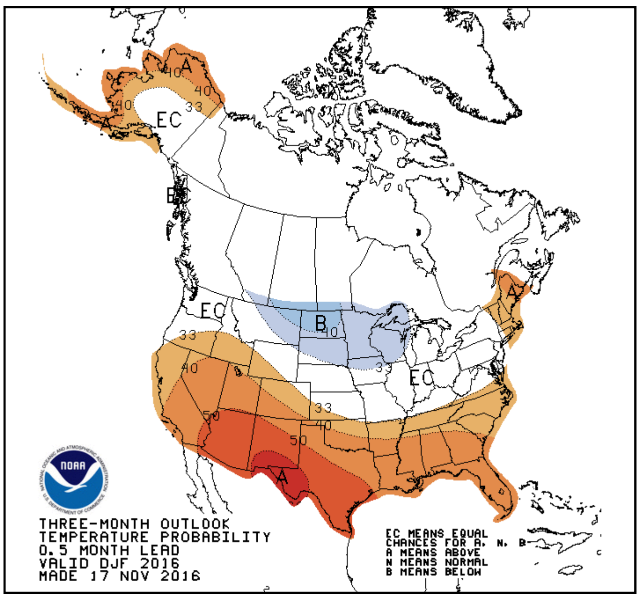


Figure 3. CPC Winter Temperature Forecast

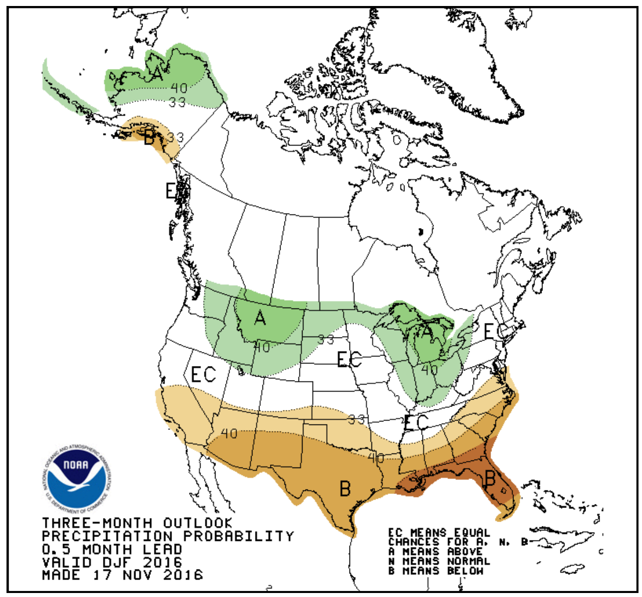


Figure 4. CPC Winter Precipitation Forecast

A recent study was done which examined the mean winter time temperature and precipitation at Green Bay. Of the 42 winters where neutral or La Niña conditions prevailed, nineteen ended warmer than normal, eighteen were colder than normal and five were near normal (within +/- 0.5 F). These results suggest it would be really hard to forecast whether it would be warmer or colder than normal for the upcoming winter. It is likely, however, that there will be an increase in the number of days with subzero temperatures due to the increased frequency of southward dips in the polar jet stream. The most likely impact of a neutral or La Niña winter will be increased snowfall compared to last winter. If a weak La Niña does develop this winter, there is a higher probability that it will be colder than normal while the amount of snowfall will be higher, but highly variable across the region. Before you know it, winter will be here!

DID YOU KNOW???

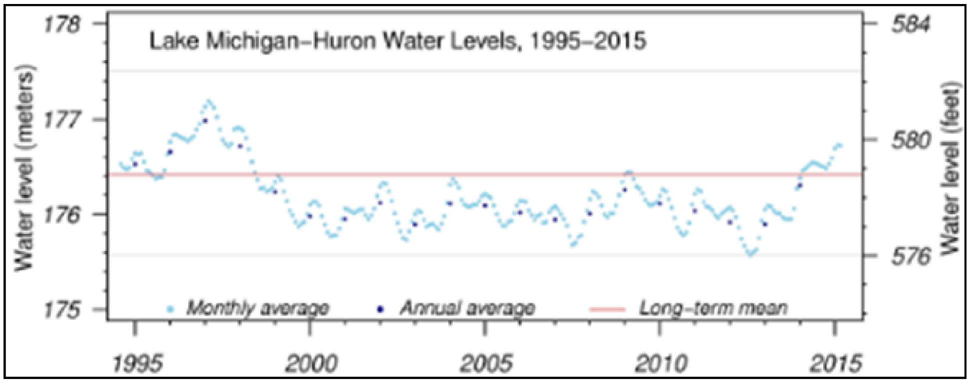
You can find the NWS Green Bay on Facebook & Twitter:

www.facebook.com/NWSGreenBay
twitter.com/NWSGreenBay

Lake Michigan Water Levels to Remain Above Normal into 2017

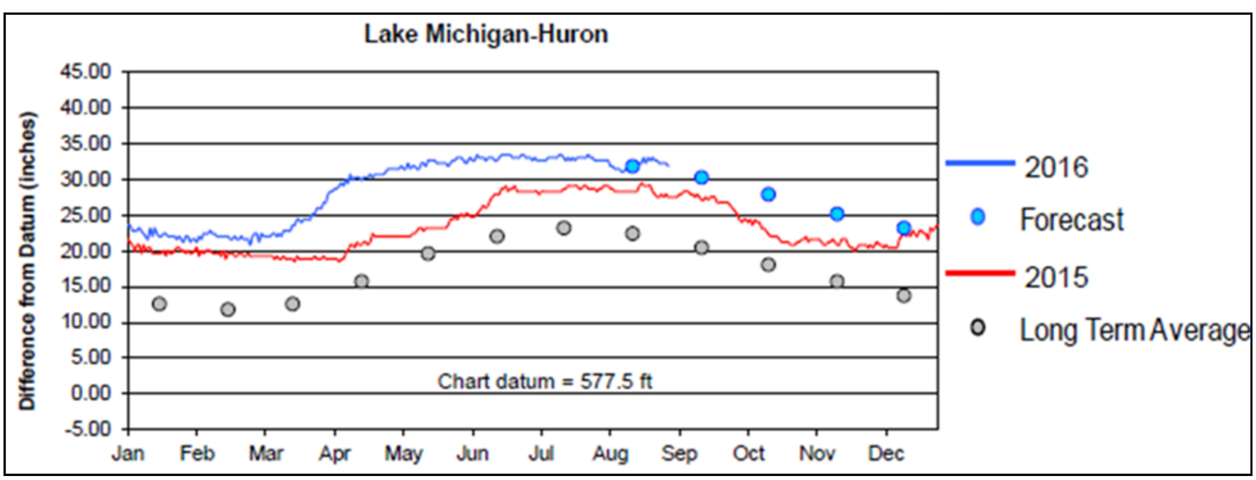
By Mike Cellitti, Forecaster

Late last summer, the Lake Michigan-Lake Huron basin observed a dramatic rise in water levels during the years of 2013-2015. This significant recovery of water levels was mostly attributed to extensive ice cover during the winter months combined with above normal precipitation during these years. From January 2013 to August 2015, the Lake Michigan-Lake Huron water level rose over 3 feet to above normal conditions, as shown on the graph below.



The water level can fluctuate on a monthly, seasonal, and annual basis depending upon a variety of factors including the amount of precipitation, evaporation, and rainfall-induced runoff. Precipitation and rainfall-induced runoff typically peak in late spring and summer as a result of thunderstorm activity. Although evaporation is difficult to measure, evaporation is highest when cold air flows over the relatively warm waters of the lakes in fall through late winter.

Looking ahead into early next year, Lake Michigan-Huron water levels are expected to decline, which is a normal occurrence during the fall and winter seasons. However, the forecast still shows it may fall to or below levels from a year ago. A couple of other factors may also support falling lake levels in addition to normal seasonal trends. The Great Lakes saw considerably less ice cover during the winter of 2015-2016 than the previous two winters. Furthermore, precipitation has been much closer to normal over the past several months across the region compared to the second half of 2015. Nonetheless, above normal lake levels look to continue into early next year. See the chart below for the forecast from the US Army Corps of Engineers.



Northern Wisconsin Lake Update

By Tom Helman, Lead Forecaster

A prolonged period of below normal precipitation from 2005 to 2012, which included mild winters and below normal snowfall along with warm summer temperatures, produced very low lake water levels across many northern Wisconsin lakes. These low lake levels particularly impacted spring-fed lakes. However, since 2012, several cold and snowy winters and periods of above normal precipitation continue to raise water levels over northern Wisconsin. Here is a look at just how much has changed over the past few years.

Several years ago:

Below is an aerial view and shoreline picture of Crescent Lake (Image 1) three miles west of Minocqua taken in 2010. The water levels lowered beyond the pier (Image 2). The minimum recorded water level was actually around 10 feet beyond the end the pier (not shown).

Image 1

Image 2

Lake levels today:

The image on the right (Image 3) was taken in late August 2016 with the same pier. Water was just beginning to cover parts of the pier.

That is quite a dramatic change in just a few years!

Image 3

Possible Impacts of a 10 Inch Rainfall Over Northeast Wisconsin

By Tom Helman, Lead Forecaster

On July 11, 2016, training thunderstorms over northwest Wisconsin produced a band of heavy rainfall ranging from 5 to 10 inches in 12 hours (Figure 1). Runoff from this heavy rainfall produced extensive damage to roads and culverts as well as marinas along Wisconsin's Lake Superior shoreline. The damage to area roads also cut off the city of Ashland for several days. Much of this runoff converged in smaller river basins which normally are reserved for snowmelt runoff in the spring, and located where the terrain drops to Lake Superior.

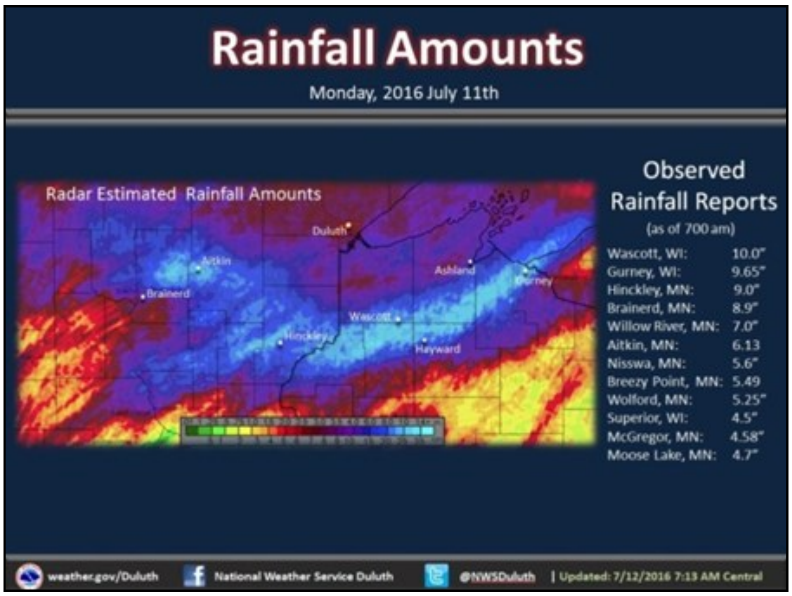


Figure 1. Photo courtesy of NWS Duluth

How would an 8 to 10 inch rainfall in 12 hours affect northeast Wisconsin?

A heavy rainfall of this magnitude would produce severe flash flooding, especially in urban areas. The intensity of the flooding in a river would depend on the coverage and orientation of the heavy rain band over the basin. If only a portion of the river basin gets 8 inches, then the flooding is diminished. If 8 to 10 inches covers a good portion of the river basin, the intensity of the runoff increases. As a result, the smaller basins would tend to have more of an intense, shorter period of flooding, while the larger basins would have a longer duration event. Many of the larger basins over northeast Wisconsin have dams; therefore the flood wave is more controlled as long as dams remain functional.

In the Fall of 2010, central Wisconsin observed a heavy rainfall event of 4 to 6 inches (Figure 2). The rain caused moderate to major flooding along the Wisconsin River and tributaries (Figure 3).

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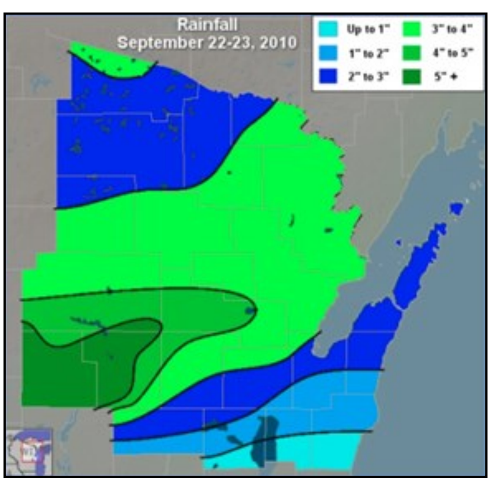


Figure 2.

Figure 3. Wisconsin River near Biron.

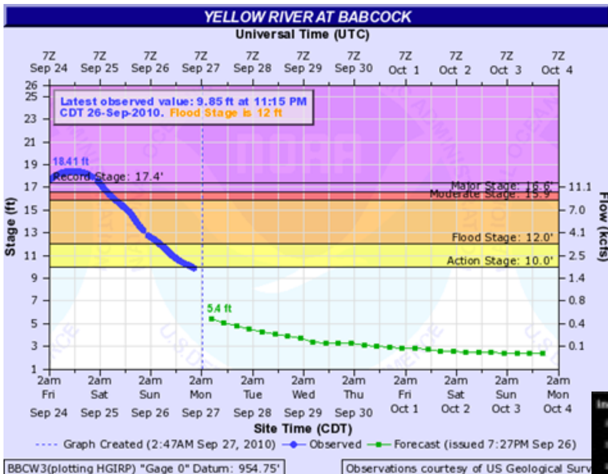


Figure 4. AHPS graph for Babcock. September 2010.

Record flood levels were recorded in the town of Babcock in Wood County (Figure 4). Up to 6 inches of water covered parts of Highway 80 near Babcock and up to a foot in parts of the town of Babcock. If this rainfall had been in the 6 to 10 inch range, water levels could have been up to 2 or 3 feet higher (Figure 5). Similar data for other river basins suggests possible flood crests could have reach 2 to 4 feet above current record crests for many rivers over northeast Wisconsin.

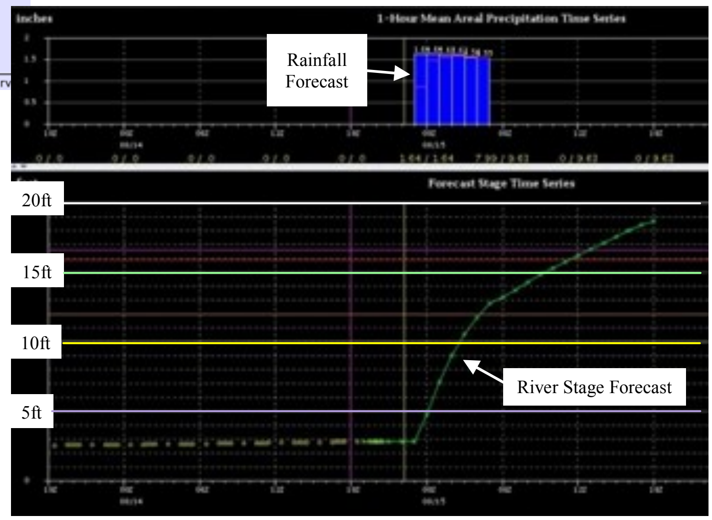


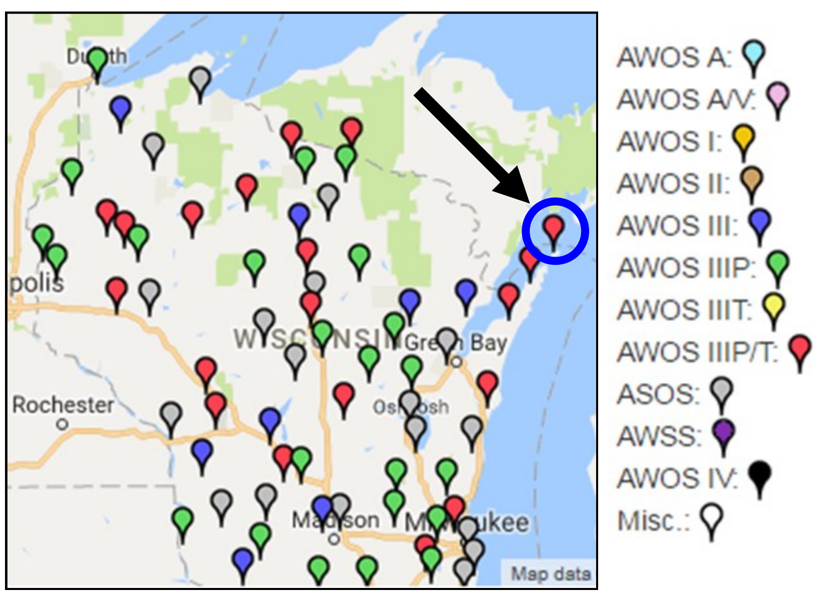
Figure 5. Model output with up to 10 inches of rain.

For a comparison to the devastating flood in the summer of 2016 in Louisiana, Lafayette picked up 10.39 inches in one day, and then received an additional 10.40 inches the next day, for a two-day total of 20.79 inches! Let's hope we never see those amounts over northeast Wisconsin.

New Weather Sensor at Washington Island

By Rich Mamrosh, Lead Forecaster

The Washington Island Airport (circled) was recently equipped with an Automated Weather Observing System (AWOS) that will help pilots use the airport safely, and also help meteorologists better observe and forecast weather conditions across northern Door County. While the equipment is at an airport, it will also benefit marine interests on the bay and Lake Michigan who rely on wind and weather information. The system reports weather, sky condition, visibility, temperature, dewpoint, winds and pressure. This map shows the location of automated weather stations at airports in Wisconsin.



ASOS/AWOS sites across Wisconsin

NWS Green Bay Welcomes Three New Employees!

Our office welcomed three new employees in 2016.

They are (from left to right):

Joseph Cournoyer - Electronic Technician
Timm Uhlmann - Meteorologist Intern
Kira Benz - Meteorologist Intern

We welcome Kira, Joseph and Timm to the NWS Green Bay team!

NWS Green Bay Participates in "NWS Week of Service"

The staff at the NWS in Green Bay once again participated in the "NWS Week of Service" which makes a concerted effort to reach out in our communities to help those in need.

This year, the NWS Green Bay staff collected and donated 276 food and 25 personal items, weighing over 267 pounds. The food/toiletry items were delivered to Paul's Pantry.

National Weather Service at EAA Airventure

The National Weather Service was just one of several Federal Agencies that participated in the Experimental Aircraft Association's Airventure in July. In support of the NWS mission to protect life and property, the NWS produces aviation forecasts and advisories to help foster safe and efficient flight. Meteorologists from the Aviation Weather Center in Kansas City, two Center Weather Service units, and local forecast offices in Green Bay and Milwaukee helped staff the booth.

The NWS display featured computer workstations with real time weather data that meteorologists could discuss with pilots, a hurricane simulator, a display of a new generation of weather satellites, and examples of different weather sensors installed on commercial aircraft. More than 600,000 people from around the world attended Airventure last summer.

We Need Your Help!

We've all seen days where it is sunny and dry at your house, but the neighbors across the street are in a downpour! The NWS has specialized equipment in the field to report rain and snow totals, however they are too far apart to see these localized situations. These small scale events can have major impacts on the forecasts and can even create a dangerous situation. That is why we need you to fill in the gaps in the NWS observations network. We are looking for volunteer Community Collaborative Rain, Hail, and Snow Network reporters, also known as CoCoRaHS. Your observations will be used by the NWS as well as by media, researchers, farmers, and even members of your own community. You don't need to be a scientist to join; anyone with an interest in weather, from young to old, can become a CoCoRaHS observer. If you would like to volunteer, please visit the links below for more information on how to join. Participation is greatly appreciated and remember: ***every drop counts***!

www.cocorahs.org

In addition, we also need precipitation-type observers. Weather radars are great at telling us where it may be raining or snowing aloft, but it won't tell meteorologists what's happening on the ground. You can give us that ground truth with no training or equipment necessary. All you need to do is look out the window and report what kind of precipitation is falling in your backyard. You then simply submit the report using an app for your mobile phone. Your submission of a precipitation-type report will assist local meteorologists assess what is happening at your location and help provide the most up-to-date and accurate forecast possible.

For more information on the Precipitation Identification Near the Ground project (or PING), please go to:

http://www.nssl.noaa.gov/projects/ping/

The NWS and your local community thank you for your observations and please know that every report is a valuable one. It's technology AND people working together that makes the weather forecast and warning process work!

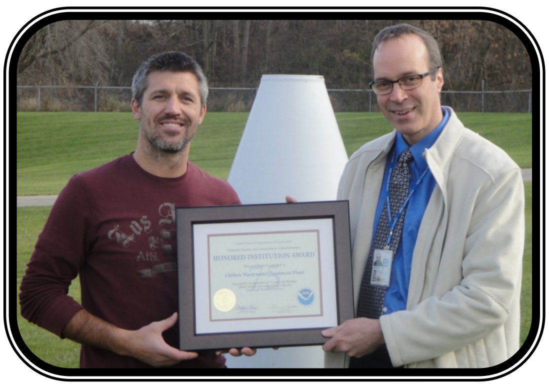
Storm Spotters: Time to Dust Off Your Yardsticks

Before you know it, bitter cold and snow will return to the area. Your accurate snowfall measurements will again be needed this season. Timely reports during and after snow, ice, blowing/drifting snow, and wind events provide important information to National Weather Service forecast staff and result in more accurate warnings and advisories.

It's 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. Snowfall should be reported in tenths of an inch (for example, 3.9 inches). Official spotters can call in their reports to the NWS at any time using the toll-free hotline or send them via our online reporting system: **www.weather.gov/grb/report**

COOP Awards!

Name	Location	Years
Tim Keuler & Eric Bunnell	Chilton WWTP (picture below)	75
Mark & Sue Steinhaus	Crivitz High Falls	30
Jim Koth	Rice Reservoir - Tomahawk	25
Tom Tiffany	Willow Reservoir	25
Dan Konopacky	Rainbow Reservoir - Lake Tomahawk	20
David Alberts	Ephraim WWTP	10
Tom Rodgers	Pulaski WWTP	10



Eric Bunnell (left), Waste Water Treatment Plant Operator - Chilton, WI, receives a 75 year award from NWS GRB Meteorologist In Charge Matt Lorentson (right).

Earliest/Latest Dates Of First Measurable Snow

City	Earliest Date / Latest Date	Records Began	City	Earliest Date / Latest Date	Records Began
Antigo	Sept 26, 1942 / Dec 15, 1999	1918	Oconto	Sep 26, 1965 / Jan 19, 1961	1924
Appleton	Oct 10, 1990 / Dec 19, 1965	1901	Oshkosh	Oct 10, 1932 / Jan 3, 2003	1918
Brillion	Sep 26, 1942 / Dec 29, 2015	1925	Rhinelander	Sep 21, 1913 / Dec 6, 1931	1908
Chilton	Oct 17, 1952 / Dec 29, 2015	1948	Shawano	Sep 26, 1965 / Dec 24, 2001	1923
Clintonville	Sep 26, 1965 / Dec 15, 1999	1953	Stevens Pt	Sep 26, 1942 / Dec 18, 1998	1918
Florence	Oct 13, 2009 / Dec 12, 1999	1998	Sturgeon Bay	Oct 9, 1925 / Dec 31, 1960	1906
Green Bay	Oct 9, 1925 / Dec 30, 1923	1886	Two Rivers	Oct 7, 2000 / Jan 12, 2002	1952
Kewaunee	Oct 13, 1936 / Jan 13, 2002	1928	Washington Is.	Oct 13, 2009 / Jan 6, 2003	1948
Lac Vieux Desert	Sep 7, 1983 / Nov 23, 1994	1948	Waupaca	Oct 9, 1932 / Dec 18, 1998	1918
Marshfield	Sep 26, 1965 / Dec 12, 1919	1913	Wausau	Sep 26, 1942 / Dec 26, 1960	1895
Merrill	Sep 22, 1913 / Dec 19, 1939	1906	WI Rapids	Sep 26, 1965 / Dec 23, 2001	1948

WORD SEARCH

D	O	Y	W	C	S	R	L	H	S	E	E	N	U	A	W	E	K	O	H	P	T	T	T	F
J	B	J	S	H	P	D	H	A	J	A	F	Y	P	O	B	Z	U	H	O	E	R	G	I	R
K	O	B	K	S	M	H	N	I	N	B	C	W	P	B	O	W	A	U	S	A	U	K	E	E
J	F	N	P	O	X	W	Z	E	N	T	N	A	B	H	K	C	O	W	O	T	I	N	A	M
M	E	L	J	K	D	B	L	L	E	E	I	O	P	O	L	Y	G	M	A	S	T	Z	W	T
X	L	F	N	H	L	Z	S	X	V	N	L	G	I	U	N	N	S	X	N	T	W	R	Z	W
D	L	G	O	S	E	G	D	Y	U	J	A	A	O	L	A	A	P	I	O	E	O	O	Z	W
W	I	O	T	O	I	R	F	A	J	A	W	H	N	A	L	W	W	C	A	V	R	D	A	W
H	V	Q	L	T	F	L	Y	B	D	A	S	A	S	D	M	I	D	A	L	E	I	A	M	N
N	N	Q	I	E	H	C	O	N	N	Y	F	V	U	U	E	Z	R	J	H	N	V	L	I	O
S	O	Z	H	L	S	T	B	E	W	C	Y	L	B	S	R	R	G	B	C	S	E	T	T	T
A	T	E	C	U	R	O	S	E	F	S	C	B	O	I	A	I	Q	V	G	P	R	U	D	E
A	N	P	T	R	A	C	N	R	I	N	I	L	P	R	I	U	N	Q	D	O	S	O	Z	L
N	I	D	A	W	M	O	D	G	H	H	A	R	D	B	E	Q	M	G	B	I	P	C	F	P
T	L	A	A	C	G	N	R	N	S	T	U	R	G	E	O	N	B	A	Y	N	K	I	J	P
R	C	W	X	X	P	T	Z	A	G	J	B	J	Z	Y	G	E	C	S	Y	T	D	Q	Z	A
J	F	Q	Q	K	Z	O	Y	W	T	M	A	T	T	N	P	C	G	E	I	L	X	I	S	H
K	B	V	F	M	E	R	R	I	L	L	K	A	V	J	U	R	Z	D	F	J	L	M	C	R

Antigo	**Laona**	**Shawano**
Appleton	**Manitowoc**	**StevensPoint**
Brillion	**Marshfield**	**SturgeonBay**
Chilton	**Merrill**	**Suring**
Clintonville	**Neenah**	**TwoRivers**
Florence	**Oconto**	**Waupaca**
GreenBay	**Oshkosh**	**Wausau**
Kewaunee	**Rhinelander**	**Wausaukee**

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