

Top Weather Events of 2010

(Listed in Order of Occurrence)

1.) **A Snowy January for Southern Wisconsin**

Much of the major snowfall for the southern portion of the state fell within the month of January. A week after the first of the year on January 6th into the 7th, SE Wisconsin saw 6 inches of new snow, with areas along the lake seeing up to 12 inches due to lake enhancement. As a result, vehicle spinouts and accidents were fairly widespread. About 2 weeks later, southern Wisconsin saw a round of freezing rain added to the mix on January 21st, and to top everything off, one more system moved through on the 24th, first dropping a mix of rain, sleet, and snow before turning to all snow that ended two days later, leaving behind 8-16 inches of snow on the ground.

2.) **February 8th-9th Snowstorm**

A low pressure system dropped down from Canada through Minnesota, and passed along the southern border of Wisconsin. An initial volley of snow fell, and as the low moved to the east, lake-enhancement added to the totals, producing 10-14 inches along the Lake Michigan lakeshore. Inland counties saw only between 4-7 inches. There were numerous traffic accidents reported, including a tanker truck that rolled over. This system produced one fatality in Milwaukee County; an elderly man with heart complications died from shoveling snow.

3.) **The 10th Snowiest March in Madison**

At the end of the meteorological winter, the end of February, Madison had accumulated 48.4 inches of snow, over 14 inches above normal. Most of the snow had fallen in January, with only one significant event dropping around 4-7 inches in Dane County. Milwaukee's winter snowfall placed much lower, its Dec-Jan-Feb total of 36.8 inches was only the 42nd highest total.

4.) **Heavy Fog in March**

Early in the month of March we saw several cases of dense fog across the southeast and south central portions of Wisconsin. The first started on the 5th, in which a high pressure system brought mostly clear and quiet conditions, allowing for fog to build in the early morning from recent rain and snowmelt. It was estimated that visibilities were down to 20

feet, and during one hour two series of accidents occurred: one involving 31 cars, the other 7 cars. One serious injury was reported with fourteen minor ones following. Another round of fog hit 2 days later, aided by a breeze off the lake, delaying flights and causing more accidents, with a third case of fog stretching from the 8th to the 11th. Several spotters make note that this was the lowest visibilities they had ever seen.

5.) Icy March Snowstorm

A fairly light snowstorm fell over March 19th into the 20th across much of southern Wisconsin, with a snow:water ratio of 10:1 to 12:1. The snow didn't accumulate on the ground or most roads, but stuck to rapidly cooling bridges and highway overpasses. This led to icy conditions that caused several accidents, including 7 injuries. Interstate 39-90 was closed for 90 minutes as a result.

6.) Zero Snow in La Crosse for March

Beating 1990, which measured just a trace of snow, La Crosse measured absolutely 0 inches of snow for the month of March, making it the most snowless month on record.

7.) April Wildfires

4 separate fire events occurred on April 1st, 15th, 17th, and 19th, in the counties of Jackson, Monroe, Trempeleau, and La Crosse Counties, respectively. The 15th and 19th started as controlled burns that got out of control. A high pressure system allowed extremely dry conditions to remain in place, which allowed the fire to spread quickly. It is unclear what caused the April 1st fire, but 30 acres were burned, with no surrounding structures damaged. The 17th's fire injured 2 people and fatally wounded a third after a tractor ignited a dry cornfield.

8.) Late April Tornadoes

On April 30th, a cold front cut through the state with unstable air ahead of it, generating thunderstorms that produced damaging winds, hail, and several tornadoes. The hail was reported in La Crosse and Green Lake Counties, ranging from ¾ to an inch in diameter. Taylor and Winnebago Counties experienced



gusts up to 61 knots which downed trees. A total of 3 tornadoes were confirmed in Marquette and Green Lake Counties, with an EF1 in Berlin, and two EF0s west of Grand River. Property damage was around \$130,000 from snapped power poles, damaged cars, and a broken TV antenna in Berlin, but the EF0s produced little to no structural damage.



9.) Strong Winds Take Control of Fire

On May 5th, strong SW winds swept through the state, producing gusts in excess of 40 knots. In addition to numerous power lines and trees blown over, several police officers were injured in Dane County during a training exercise as the wind blew a piece off wall down. A debris fire in SE Dane County was blown into a barn, which housed 5 boats, 3 classic cars, and various equipment and machinery. This property was totaled at over \$300,000. Other property damage from power lines was estimated around \$10,000. Power poles and wind damage was also reported in Waupaca County.

10.) May Snowstorm Leads to Heavy Crop Damage

An unusually late snowstorm swept through NE/NC Wisconsin on May 8th, depositing on average 6+ inches of snow on the ground. 3-5 inches of snow fell in Marathon County, covering mesh overlays used to shade ginseng plants. The crops were crushed under the heavy wet snow, leading to 15 million dollars in damage. Marathon produces 95% of the entire nation's ginseng.

11.) June 21st Tornado Outbreak

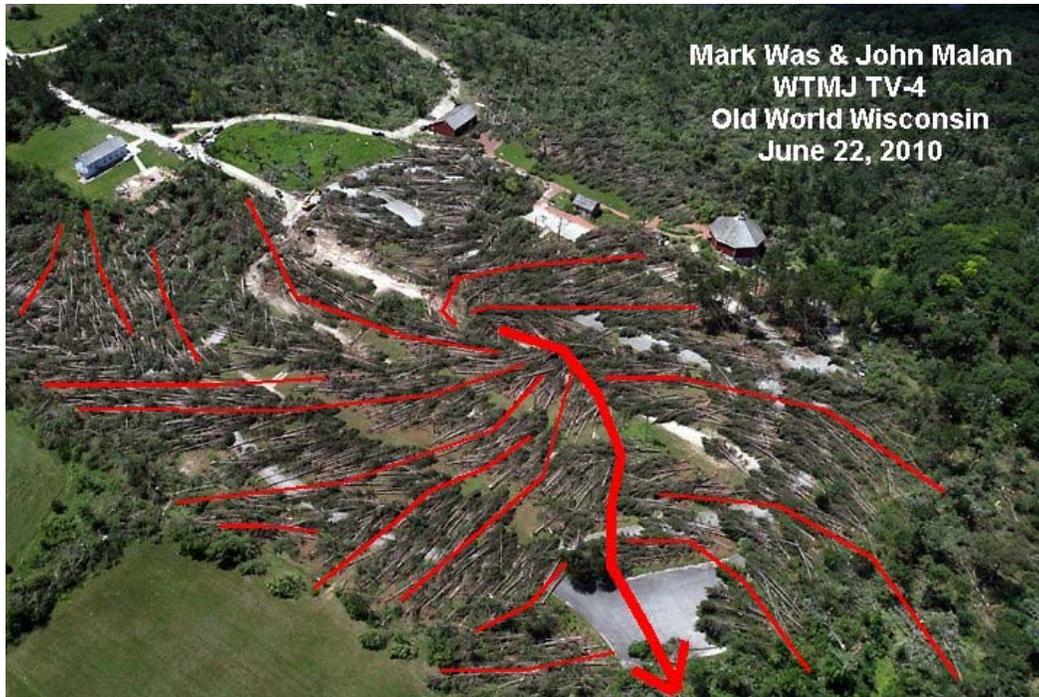
On June 21st, a vigorous upper level disturbance helped to support deep vertical motions in the atmosphere in southern Wisconsin, along with strong deep layer wind shear. This lift acted on a warm and very moist atmosphere, carried into the region on a 40 to 50 knot low-level jet. The result was powerful rotating thunderstorms, with damaging straight line winds, large hail, and in this case, 5 tornadoes that touched down in the late evening. Most of these tornadoes were classified as EF0 or EF1, but it did produce one EF2 in Eagle, Waukesha County.



12.) The Eagle Tornado

An EF2 tornado formed just 2 miles away from the city of Eagle (Waukesha County) on June 21st. 5 tornadoes formed that day, but the Eagle tornado was easily the strongest. It was ½ mile wide, with a path of 4.8 miles in length. It lasted for roughly 7 minutes, producing 125-130 mph winds. 8 homes were completely destroyed, 67 were reported to have major damage and 100 were reported to have minor damage. Thousands of trees were uprooted as well as power poles, leaving over 48,000 people without power. The total amount of property damage weighed in at over a whopping \$20 million.





13.) The Million Dollar Lightning Strike

On June 23rd in Mequon, a single lightning strike totaled to over a million dollars in damage. A bolt struck the East Towne Square Shopping Center, starting a fire that eventually consumed 9 businesses. The storm system was also associated with strong wind gusts ranging from 60 to 70 mph.

14.) Floods in Southwest Wisconsin

The thunderstorms that moved through the SW portion of the state, including Vernon, Jefferson, Richland, Crawford, Buffalo, and La Crosse Counties on June 23rd dropped major amounts of rain over the course of three days. Streams, ponds and rivers overflowed, even producing a mudslide in the city of Alma. Most areas reported around 8 inches of total rainfall.

15.) Fetid Flood in Rhinelander

Thunderstorms produced heavy rain in the city of Rhinelander in Oneida County on June 25th. Airport totals were only .84 inches of rain, but an observer 3 miles northeast measured 3.79 inches, with radar estimates of 5.64 inches. This caused sewers to back up in about 98 different homes, with the hardest hit areas reporting about 5 feet of sewage backup. There was an estimated \$200,000 in damage.

16.) July 14th Heavy Rain/Severe Weather/Tornadoes

Thunderstorms tracked through much of central and east-central Wisconsin, with areas of heavy rain moving through the southern portion of the state. Some locations saw close to 3 inches of rain, with a few locations exceeding 4 inches. This would set the stage for the extreme flooding a week later. In addition, the storms that produced the heavy rain and flash flooding also brought strong winds and hail, with numerous funnel clouds and several tornadoes reported in central Wisconsin. Several homes were reported with minor damage, and some with major damage. The strongest tornado to form was an EF2 that spun up in Pierce County. Some peak thunderstorm wind gusts reached as high as 95 mph in western Shawano County, and about 22,000 people were without power for a portion of the evening of the occurrence.

The tornado with the longest track in Wisconsin for 2010 occurred on July 14th in Jackson and Clark Counties – about 31 miles in length! Luckily it was only an EF1 tornado. Its life-span was about 57 minutes! Below is a map showing the path.



Below is a picture of some of the damage associated with the Jackson-Clark County tornado.



17. July 20th Thunderstorm Winds Sweep Northern Wisconsin

Thunderstorms developed in northern Wisconsin from a weak surface boundary, producing strong, damaging winds over the course of the afternoon and evening. Storms passed through Barron, Rusk, Taylor, Marathon, Shawano, Portage, Waupaca, Outagamie, and Calumet Counties. Wind gusts were estimated at 90 mph during their peak in Shawano County, and several estimated reports have them passing 100 mph. Several structures were damaged, including a turkey barn, a cattle barn, a metal shed, and numerous homes. Well over \$200,000 in damage was estimated in both property and damage to corn crops in Marathon County alone, with over a million dollars from the entire event overall. Only one person was injured when a falling tree struck a woman, but thousands were left without power for some time, and there were some cattle that died when a barn collapsed. Large hail that fell also damaged over 200 homes and 1,000 cars in Outagamie County.

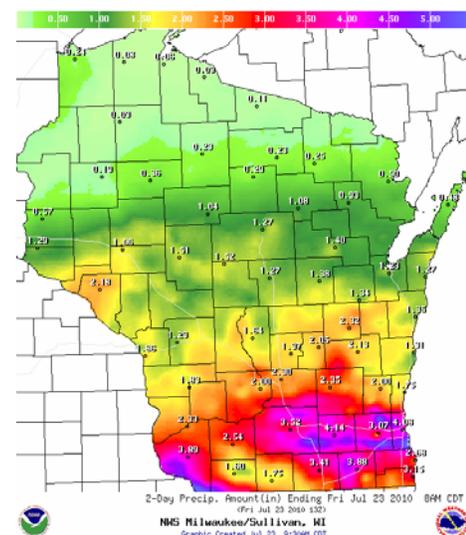
18. July 22nd Tornado Outbreak and Flash Flooding

On July 22nd, the atmosphere became very favorable for severe weather, supporting strong instability and low level wind shear as a warm front lifted into southern Wisconsin. Severe thunderstorms developed, and some produced weak tornadoes.

Even more significant was the heavy rain. Not only were some thunderstorms producing very large amounts of rain, but a training effect occurred, and the resulting line of storms did not move over southern Wisconsin for most of the night.

Rainfall totals were extremely variable, but much of Milwaukee saw 5-8 inches of rain, with some areas reporting over 7 inches in just two hours' time. This caused massive flooding. Two *billion* gallons of sewer outflow had to be dumped into Lake Michigan, and thousands of calls were made to the Sewage District about sewer backups. One flood-fatality in Milwaukee County was reported, and several people were injured, one of which involved a sinkhole swallowing a car on Milwaukee's Eastside.

The event left a total of 32,000 power outages in southeast Wisconsin, mostly due to flooding issues, but several outages and injuries were attributed to lightning. The rain would continue to produce flooding into the 24th, most notably in Grant County where flood damage was estimated to well over a million dollars. Total flood losses for south-central



and southeast Wisconsin totaled about \$27.7 M, with \$24.1M in Milwaukee County alone.

Ten tornadoes spun up in south-central and southeast Wisconsin on July 22nd. One tornado in Waukesha County was rated EF2, where there was garage and pole shed damage. Otherwise tree and power line damage was noted with most of the weak tornadoes. Collectively, the tornadoes resulted in about \$110,000 in damage.



19. Severe Weather/Three Tornadoes in Late July for NW Wisconsin

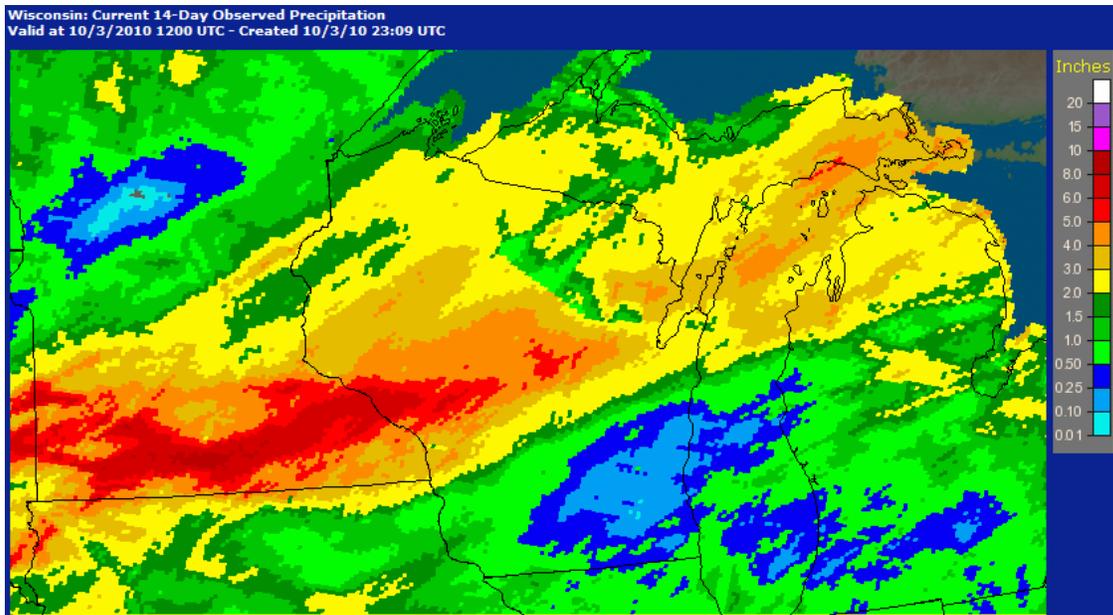
Three tornadoes moved through northern Wisconsin in Ashland and Iron Counties on July 27th. A squall line with embedded supercells developed, producing strong winds and hail as well as the tornadoes. Several injuries were reported in Iron County at a campsite one of the tornadoes moved through, with damage done to hundreds of trees and several structures. This squall line pushed through much of NW and NC Wisconsin, gradually dissipating as it moved southeast. Straight line winds also contributed to much of the damage by knocking over power poles and trees, some of which landed on houses and cabins. Thousands of residences were without power.

20. A Wet Summer for Wisconsin

Thanks to the extremely rainy summer months, June/July/August 2010 ranks #2 for the wettest on record in Milwaukee of all time, with Madison ranked #4. Milwaukee's summer total for rain was 19.38 inches, just .1 inch shy of the 1986 record.

21. Record September Floods

Buffalo, Trempealeau, Jackson, Wood, and Portage Counties experienced the worst of two days worth of heavy rain on September 22nd through the 24th that fell across much of central and western Wisconsin. Rain totals ranged from 4-8 inches. Roads were closed, mudslides were reported along with basements being flooded, and in some instances, people needed to be evacuated.

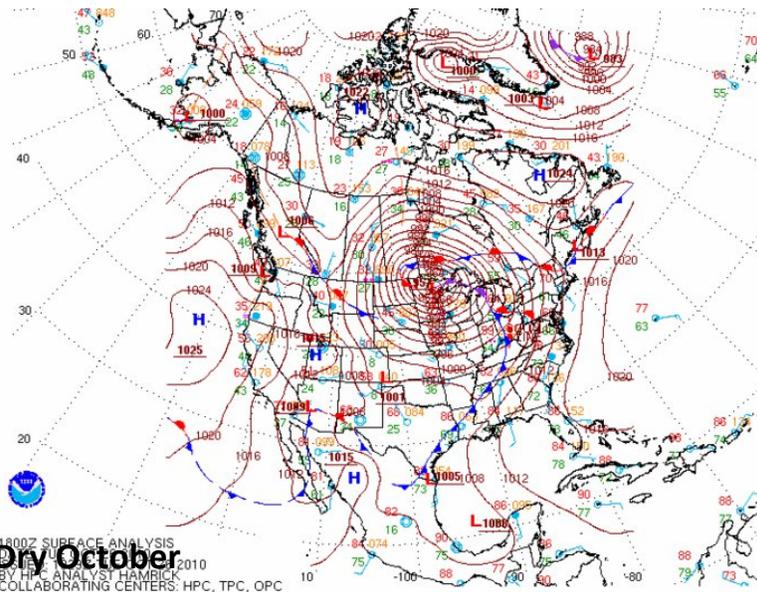


The Black, Chippewa, Trempealeau, Kickapoo, Yellow, Wisconsin, and Mississippi Rivers all crested above flood stage, with four of the rivers reaching all-time record high crests. Several new rainfall records were set as well, with the storms outputting around 300-700% above normal for the amount of rain in September.



22. Record-Setting Low Pressure at the End of October

On October 26th an extreme low pressure system developed over the Central Plains, and then stalled out over the Great Lakes region. The cold front it pulled through Wisconsin produced a round of thunderstorms and dropped an EF1 tornado in Racine County on the morning of the 26th that destroyed a barn and damaged several other buildings. The next 48 hours yielded strong sustained winds across much of the region with peak non-thunderstorm wind gusts between 50-60 mph, with isolated gusts stronger still. The drop in pressure even set a new record in Superior, measuring 961.3 mb (the old record was 963.4 mb in Green Bay)



23. A Dry October

A very persistent case of high pressure kept Wisconsin very dry for nearly all of October in addition to mild temperatures. The first half of the month only saw a total of .04 inches of rain in Milwaukee, and .02 inches in Madison. Most of the rain that did fall fell within the last week between the 23rd and 26th from some weak thunderstorms and the strong low pressure system that passed through. The total rainfall for the entire month sits at 1.66 inches, -.83 inches from normal in Milwaukee, and 2.30 inches in Madison, .12 inches from normal. Green Bay saw 2.12 inches (-.05 from average), La Crosse saw 2.08 inches (-.08 from average).

24. October & November Tornadoes

An out-of-season EF1 (weak) tornado occurred on October 26th in Racine County. However, the last two tornadoes occurred on November 22nd – with one in Walworth County and another one in both Kenosha and Racine Counties (the so-called Union Grove tornado). Both were rated as EF1 with winds up around 105 mph. The last time Wisconsin had an

October tornado was in 2007, while the last time a November tornado occurred was back in 1971. The last time Wisconsin had a December tornado was also in 1971.

25. First Winter Storm of 2010-11 Winter Season

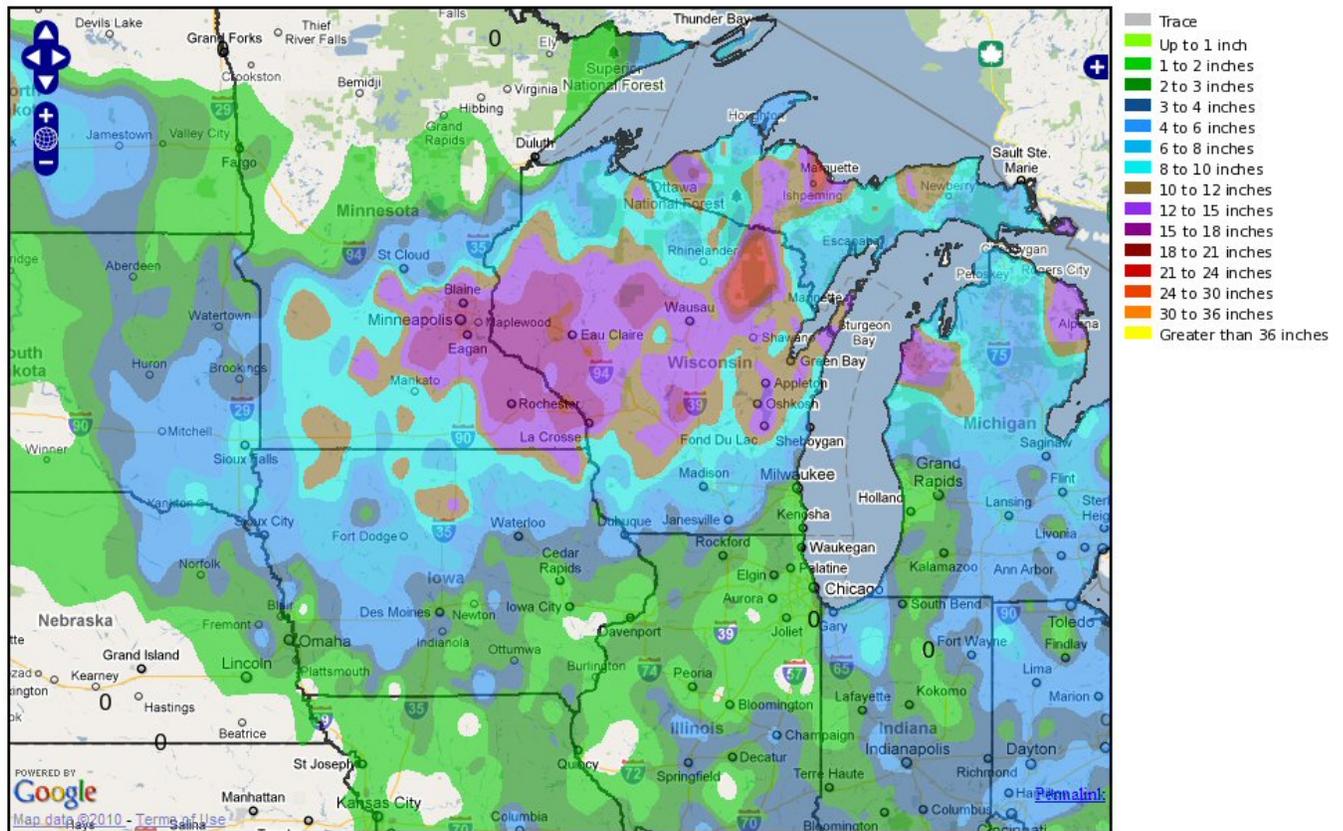
The first, significant, Wisconsin winter storm of the 2010-11 winter season occurred on November 13th across the northwestern counties. Accumulations of 6 inches or more were reported northwest of a line from River Falls to Rice Lake to Clam Lake, with up to 10 to 11 inches in the snow-belt and higher terrain of Douglas County south of Lake Superior. Hawthorne had the 11 inches.

26. Dec 10-12, 2010 Blizzard-Winter Storm

A powerful blizzard/winter storm struck much of Wisconsin from late on a Friday night through Sunday afternoon. A large swath through the central part of the state had more than 10 inches of snow, and maximum amounts ranged up to 18 to 23 inches in the west-central and central counties! An observer 5 miles southeast of Osceola, Polk County, measured 23 inches. North winds gusted to at least 35 to 45 mph over all of Wisconsin, and gusts of 50 to 70 mph were reported near Lake Michigan. The 70 mph wind gust occurred at Washington Island at the tip of Door County. Visibilities were reduced to ¼ mile or less during the blizzard, and whiteout conditions were noted in open, exposed areas. Interstate-94 was impassible from Hudson to Tomah Saturday evening into early Sunday morning. Several other highways and country roads were closed for varying times due to drifts of 4 to 6 feet.

There were at least 2 directly-related fatalities – one due to exposure and the other due to a barn roof collapsing onto to a person. Airplane flight delays and cancellations were reported at airports. Thousands of vehicle accidents or run-offs were reported, resulting in at least 1 fatality and probably a dozen or two injuries. Westbound Interstate-94 near Johnson Creek, Jefferson County was closed for much of Sunday afternoon due to a 7-vehicle accident. Many civic functions were cancelled ahead of time.

The storm started off as rain southeast of a line from Monroe to Port Washington, thus limiting snow amounts over the southeast corner. In fact, parts of the Milwaukee to Kenosha area had less than 1 inch of snow. Snow amounts were less than 4 inches over much of Douglas and Bayfield County as well. Dangerous wind chill values of -20 to -40 developed at the tail end of the storm Sunday into Sunday night. Maximum temperatures on Sunday were only in the single digits to the teens and lows Sunday night dropped to the single digits above zero across southern Wisconsin to 10 below to 20 below across northern Wisconsin.



Snowfall map for Dec 10-12th Blizzard-Winter Storm

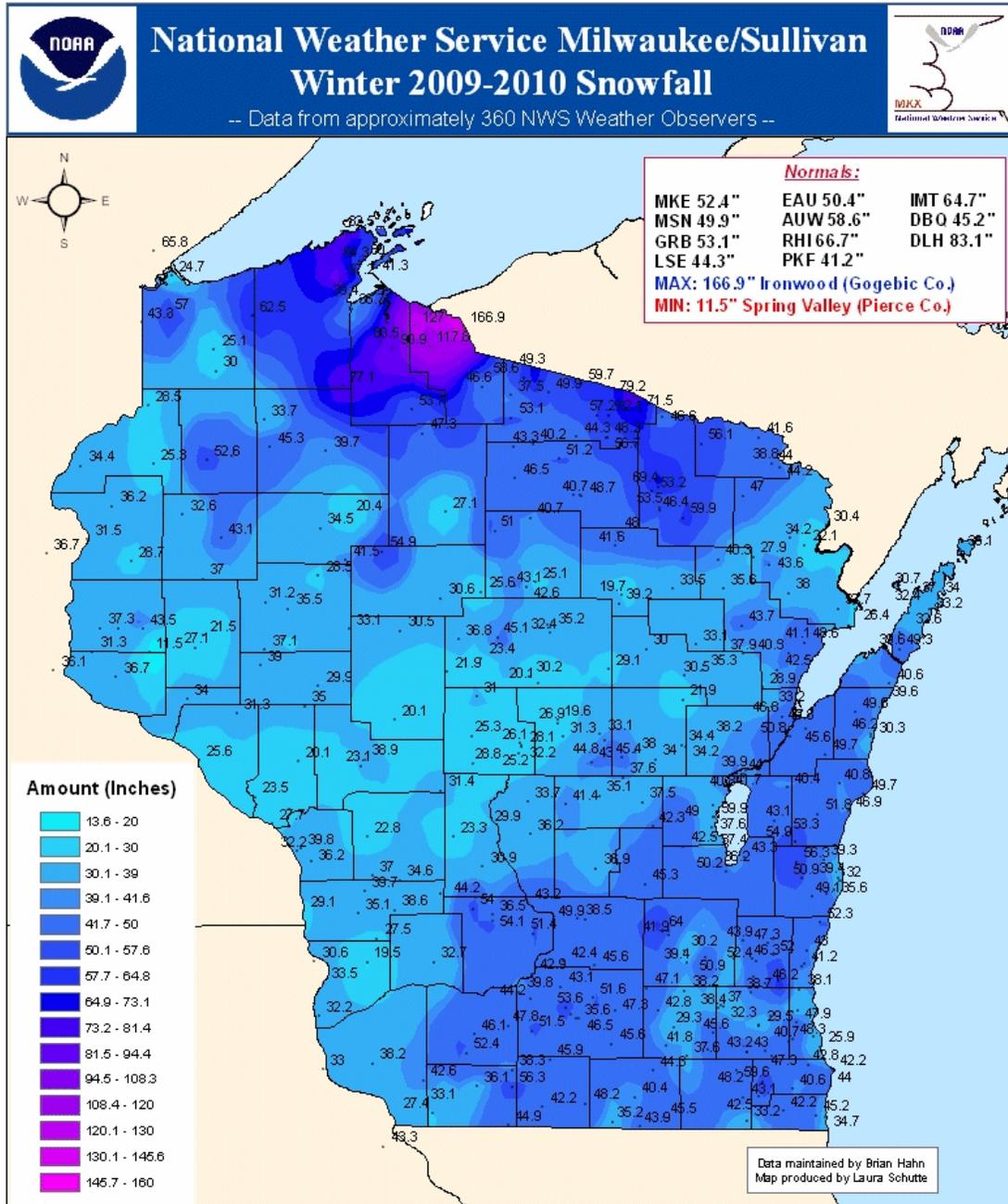
27. Dec 14th Bitter Cold Temperatures

In the wake of the Dec 10-12 blizzard-winter storm, bitter cold air settled in over the western and northern counties of Wisconsin. During the early morning hours of December 14th, clear skies, light winds, and a fresh snow cover allowed temperatures to tumble generally to 10 below to 20 below across much of western and northern Wisconsin. In fact, the lowest reading was 30 below zero at a Wisconsin DNR fire observation site about 6 miles southeast of Nekoosa.

Other Miscellaneous Information

(Not in order of occurrence or importance)

1.) 2009-2010 Snowfall



2.) Summer Precipitation Averages

Statewide (June, July, August)

Year	Ave (inches)
2010	18.65
1980	16.24
1993	15.92
1978	15.90
1905	15.80
1924	15.39
1940	15.29
1952	15.29
1999	15.29
1990	15.17

With the exception of the northwest part of the state, all parts of Wisconsin ranked #1 or #2 for wettest summer on record since 1895. NW Wisconsin ranked #4. East Central Wisconsin received the least overall rainfall, with an average of 17.01 inches, and Southwest Wisconsin saw the most with an average of 22.79 inches.

3.) 2010 Temperature Extremes

Low: -31 F on February 2nd, 7W Couderay, Sawyer County

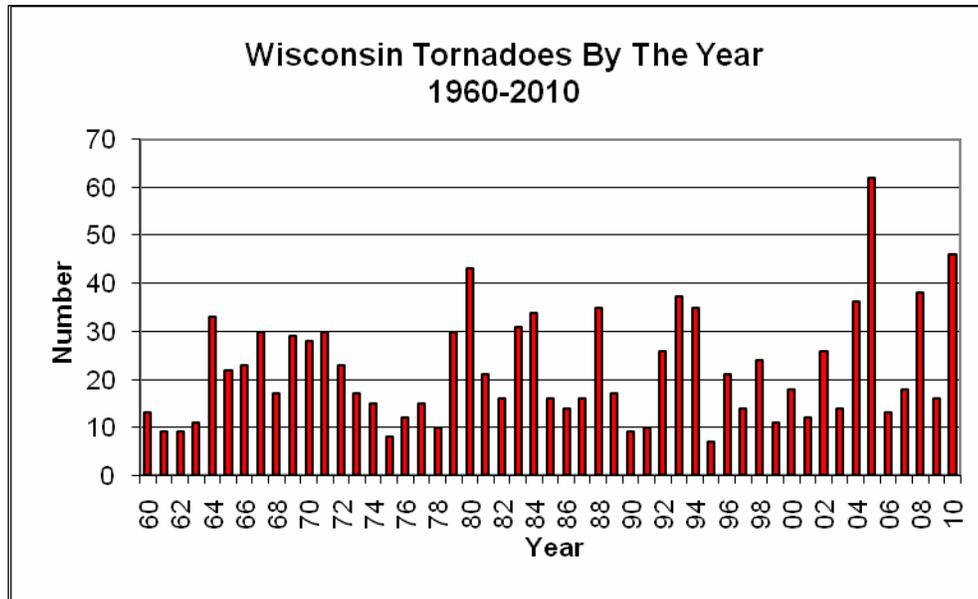
High: 97 F on August 30th, Crivitz High Falls, Marinette County

4.) A Muggy Summer in Southern Wisconsin

Compared to the summer of 2009, 2010 had high dewpoints. While not record setting, it was an abrupt change from the very dry 2009. Over the last 63 years, Milwaukee 2010 ranked #4 for highest average dewpoints in July, with Madison coming in #3. 2009 went without a single day of 70+ degree dewpoints for southern Wisconsin in July, but over half of July in 2010 had 70+ degree dewpoints.

5.) 2010 Takes 2nd Place for Most Tornadoes in Wisconsin

Back in 1980, 43 tornadoes were reported in Wisconsin, holding the 2nd place position for most tornadoes in Wisconsin for a number of years. However, 2010 took over 2nd place with a reported 46. This is still 16 less than the all-time record of 62 set in 2005. In 2010, five tornadoes were classified as EF2, 24 were classified EF1, and 17 were classified as EF0. While there were multiple tornado caused injuries, no human fatalities were reported (though one donkey was killed during the June 21st Eagle tornado).



6.) Continuing Drought Over Northern Wisconsin First-Half 2010

Very dry conditions continued across the northwestern counties of Wisconsin, including Bayfield, Burnett, Washburn, Ashland, Douglas, Iron, Florence, Forest, Oneida, Langlade, Marinette, Oconto, Marathon, Menominee, Sawyer, and Price. Below average rainfall and above average temperatures created D2 drought conditions. These conditions would linger through the month of July.

Generated by Mike Hansen, Student Volunteer, and Rusty Kapela, WCM, WFO Milwaukee, with input from the other four NWS offices that service Wisconsin.