

# National Weather Service Weather Forecast Office Milwaukee/Sullivan, WI

## Overview and Historical Comparisons

The 2008 tornado season was very active in Wisconsin, with 38 tornadoes in total. This makes 2008 the 3rd most active year for tornadoes in Wisconsin in the record books. First place was 2005 with an astounding 62 tornadoes statewide. Second place was 1980 with 43 tornadoes statewide. Wisconsin averages 21 tornadoes per year, which makes 2008 well above normal in terms of number of tornadoes.

The powerful EF-3 tornado that struck in Western Kenosha County on January 7th became the earliest tornado in any given year in Wisconsin. This is based on a calendar year running from January 1st to December 31st. Besides that, the tornado was also the first tornado in Kenosha County since 2001, and the first strong tornado (EF-2 or stronger) in that county since reliable records have been kept.

Twenty-two (22) tornadoes occurred in June in Wisconsin. This is the 3rd most active June for tornadoes in Wisconsin in the record books. First place was again 2005 with 30 tornadoes in June of that year. Second place was June of 1993 with 28 tornadoes in the Badgerland.

Thirteen (13) tornadoes occurred on June 7th in the state. This is the 6th most active tornado day in Wisconsin ever. It also makes June 7, 2008 the 4th most active tornado day in the past two decades in Wisconsin. Ten (10) of the 13 tornadoes occurred in the Milwaukee/Sullivan County Warning Area. This is tied for 3rd place all time for those twenty counties in Southern Wisconsin served by the National Weather Service office in Sullivan.

In all, it was a very active tornado season for the state of Wisconsin in 2008, with some parts of the record books being re-written. Below is a graphic showing the distribution of tornadoes across Wisconsin in 2008:

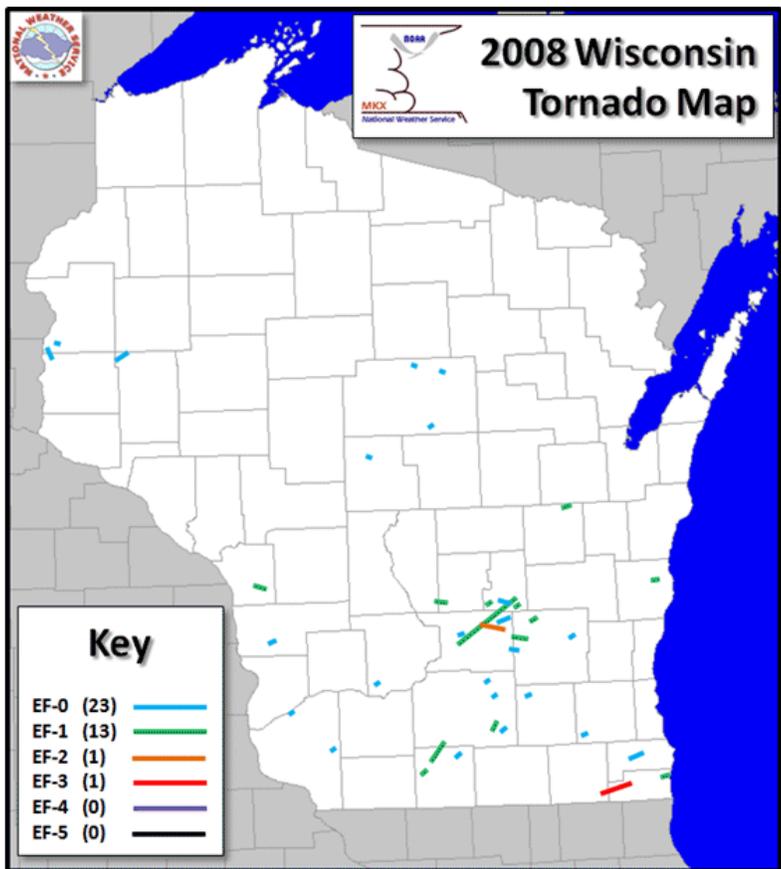


Table of 2008 Wisconsin Tornadoes

#	County(s)	Date	Time (CDT)	Location	EF	Length (0.1 mi)	Width (yds)	Death	Injury	CWA	Begin Lat/Lon	End Lat/Lon
1	Walworth, Kenosha	Jan 7	4:02PM-4:17PM	2.3 NE Pell Lake – 1.6 NNW Paddock Lake	EF-3	10.8	200	0	15	MKX	42.54884 -88.33343	42.60061 -88.13524
2	Kenosha	Jan 7	4:39PM-4:43PM	2.5 SE Somers – 3.6 N Kenosha	EF-1	2.5	100	0	0	MKX	42.62399 -87.86591	42.63127 -87.81820
3	Columbia, Green Lake	Apr 25	5:18PM-5:54PM	2.8 ESE Dekorra – 1.9 SE Markesan	EF-1	28.2	75	0	0	MKX	43.46179 -89.41637	43.69813 -88.95858
4	Columbia	Apr 25	5:20PM-5:21PM	3.9 WSW Wycocena – 3.6 WSW Wycocena	EF-0	0.2	25	0	0	MKX	43.47857 -89.37096	43.48060 -89.36700
5	St. Croix, Polk	May 25	5:16PM-5:18PM	7.0 NNW Somerset – 3.5 SW East Farmington	EF-0	1.1	50	0	0	MPX	45.20970 -92.74730	45.21080 -92.74500
6	Dunn	May 25	5:55PM-6:03PM	1.1 SSE Graytown – 3.4 E Graytown	EF-0	3.5	50	0	0	MPX	45.18500 -92.12500	45.20770 -92.0640
7	Marathon	May 25	9:00PM-9:00PM	5.0 SE Mosinee	EF-0	0.1	10	0	0	GRB	44.73900 89.62600	44.73900 89.62500
8	Racine	Jun 6	2:58PM-3:02PM	3.2 NNW Kansasville – 2.0 SSW North Cape	EF-0	3.3	50	0	0	MKX	42.72433 -88.13499	42.75298 -88.08131
9	Grant	Jun 7	1:52PM-1:53PM	2.6 NE Millville – 2.9 NE Millville	EF-0	0.1	30	0	0	ARX	43.06741 -90.89623	43.06741 -90.89623
10	Adams, Marquette	Jun 7	1:57PM-2:05PM	2.4 NE Big Spring – 1.7 NE Briggsville	EF-1	2.9	50	0	0	ARX MKX	43.69050 -89.60518	43.66950 -89.56055
11	Columbia	Jun 7	2:32PM-2:50PM	0.9 ENE Pardeeville – 3.8 S Cambria	EF-2	8.0	3520	0	5	MKX	43.53333 -89.26306	43.49556 -89.09878
12	Columbia, Dodge	Jun 7	3:05PM-3:09PM	2.9 NE Fall River – 3.5 SSE Lost Lake	EF-0	2.0	25	0	0	MKX	43.41413 -89.01782	43.40230 -89.97749
13	Columbia, Dodge	Jun 7	3:08PM-3:14PM	5.8 SE Cambria – 2.0 ENE S. Beaver Dam	EF-1	3.1	75	0	0	MKX	43.49298 -89.01509	43.50617 -88.96057
14	Sauk	Jun 7	3:16PM-3:17PM	1.8 SW Plain – 1.5 SW Plain	EF-0	0.1	25	0	0	MKX	43.26431 -90.07778	43.26410 -90.07033
15	Dane	Jun 7	3:25PM-3:26PM	1.3 ESE Cottage Grove – 1.6 ESE Cottage Grove	EF-0	0.1	25	0	0	MKX	43.00901 -89.15824	43.09347 -89.15053
16	Dane	Jun 7	3:38PM-3:39PM	1.5 NE Token Creek – 1.6 NE Token Creek	EF-0	0.2	25	0	0	MKX	43.21357 -89.25815	43.21372 -89.25403
17	Jefferson	Jun 7	3:49PM-3:50PM	0.6 ENE Aztalan – 0.8 ENE Aztalan	EF-0	0.2	50	0	0	MKX	43.08227 -88.83839	43.08277 -88.83564
18	Dane	Jun 7	4:42PM-4:44PM	1.4 N Stoughton – 3.2 NNE Stoughton	EF-1	1.9	75	0	0	MKX	42.93779 -89.22912	42.96135 -89.20469

19	Waukesha	Jun 7	5:37PM-5:38PM	1.5 S Eagle – 1.4 S Eagle	EF-0	0.1	25	0	0	MKX	42.85852 -88.47545	42.85973 -88.47364
20	La Crosse	Jun 7	5:45PM-5:55PM	2.4 ENE Barre Mills – 2.3 N Middle Ridge	EF-1	6.0	200	0	0	ARX	43.83694 -91.07274	43.83272 -90.95247
21	Vernon	Jun 7	5:48PM-5:50PM	0.4 WNW Liberty Pole – 0.2 N Liberty Pole	EF-0	0.4	50	0	0	ARX	43.48142 -90.90777	43.48142 -90.90777
22	Grant	Jun 12	2:29PM-2:30PM	0.6 NE Union	EF-0	0.3	50	0	0	ARX	42.84000 -90.51000	42.84000 -90.51000
23	Columbia	Jun 12	4:34PM-4:43PM	1.4 NW Cambria – 2.9 ESE Friesland	EF-0	5.3	50	0	0	MKX	43.56074 -89.12348	43.56435 -89.01686
24	Green Lake	Jun 12	4:42PM-4:43PM	0.7 SSW Manchester – 3.9 SE Manchester	EF-0	0.2	20	0	0	MKX	43.67052 -89.03653	43.67038 -89.03166
25	Green	Jun 12	5:01PM-5:03PM	3.8 NNW Jordan Center – 5.1 N Jordan Center	EF-1	1.6	50	0	0	MKX	42.70442 -89.79324	42.72338 -89.77464
26	Green, Dane	Jun 12	5:15PM-5:35PM	2.8 E Postville – 1.7 SE Basco	EF-1	12.3	100	0	0	MKX	42.80215 -89.69455	42.90230 -89.49764
27	Green	Jun 12	5:30PM-5:32PM	1.3 WNW Attica – 0.8 N Attica	EF-0	1.3	50	0	0	MKX	42.77474 -89.50520	42.78138 -89.48163
28	Dane	Jun 12	6:19PM-6:22PM	3.1 SSW Utica – 1.2 SE Utica	EF-0	2.6	50	0	0	MKX	42.92758 -89.14221	42.95491 -89.10805
29	Dodge	Jun 12	6:25PM-6:26PM	2.4 SSE Mayville – 2.4 SSE Mayville	EF-0	0.1	20	0	0	MKX	43.46927 -88.52612	43.47016 -88.52494
30	Green Lake	Jul 7	7:04PM-7:06PM	3.6 SE Manchester – 4.3 SSE Markesan	EF-1	1.0	75	0	0	MKX	43.63654 -88.98887	43.64454 -88.96897
31	Green Lake	Jul 10	5:33PM-5:35PM	0.9 W Dalton – 0.4 NE Dalton	EF-1	1.1	50	0	0	MKX	43.65243 -89.21794	43.65347 -89.19503
32	Dodge	Jul 10	6:00PM-6:02PM	2.8 WSW Waupun Arpt – 1.8 WSW Waupun Arpt	EF-1	1.0	50	0	0	MKX	43.60684 -88.82342	43.61147 -88.80410
33	Polk	Jul 11	8:51PM	2.3 E East Farmington – 2.4 E East Farmington	EF-0	0.1	25	0	0	MPX	45.25398 -92.65397	45.25423 -92.65054
34	Sheboygan	Jul 16	3:37PM-3:40PM	0.5 SE Sheboygan Arpt – 1.7 N Sheboygan Falls	EF-1	1.5	75	0	0	MKX	43.76517 -87.84273	43.75375 -87.81711
35	Winnebago	Jul 19	10:44PM-10:45PM	3.9 WNW Menasha – 3.5 WNW Menasha	EF-1	0.5	25	0	0	GRB	44.22290 -88.51930	44.22380 -88.50950
36	Marathon	Jul 29	4:27PM	10.3 NNW Wausau	EF-0	0.1	15	0	0	GRB	45.10000 -89.69000	45.10000 -89.69000
37	Marathon	Jul 29	4:59PM-5:00PM	14.6 NE Wausau	EF-0	0.1	30	0	0	GRB	45.11600 -89.43100	45.11600 -89.43100
38	Wood	Jul 29	6:44PM-6:49PM	8.6 NNW Pittsville – 7.2 NNW Pittsville	EF-0	1.6	25	0	0	GRB	44.55000 -90.20100	44.53800 -90.17400

**January 7, 2008**

Experiencing a tornado in Wisconsin in January is extremely rare. In fact, it had only happened once between 1950 and 2007, when an F3 tornado affected parts of Green and Rock Counties on January 24, 1967. That tornado in South-central Wisconsin was part of a much larger outbreak of 30 tornadoes across mostly Iowa, Illinois and Missouri. Wisconsin ended up with 30 tornadoes in 1967. The 30-year average annual number of tornadoes in Wisconsin is 21.

However, on the afternoon of January 7, 2008 a warm, moist, and unstable air-mass, with temperatures rising into the lower 60s, moved into Southeast Wisconsin - setting the stage for a rare January severe weather event. Thunderstorms formed just ahead of a stationary front and produced hail, damaging winds, and a few tornadoes.

One of the thunderstorms tracked from just north of Rockford, Illinois into far Southeast Wisconsin. This supercell thunderstorm produced an EF-3 tornado in Northern Illinois. The same storm also produced two tornadoes in Wisconsin. The first tornado spun up in Southeast Walworth County and then tracked through the Wheatland and Brighton areas of Western Kenosha County. The second tornado occurred in the town of Somers and on the north side of the city of Kenosha. Below is a graphic showing the locations of these two tornadoes.

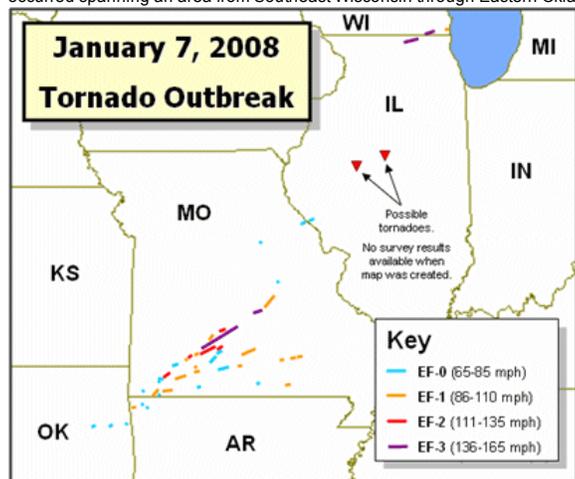


In Walworth County, five structures sustained damage - three had minor damage and two had moderate damage. In Kenosha County, with both tornadoes combined, 105 homes sustained damage. 46 homes had minor damage, 32 had major damage and 27 were destroyed.

The tornado in the Wheatland area also marked the first confirmed tornado in Kenosha County since 2001 - a span of nearly 7 years! Also, Kenosha County had only seen 4 tornadoes between 1950 and 2007. The last tornado observed in Walworth County was in 2004. Below is a cell phone image of the rain-wrapped Wheatland tornado, taken by Jacque Jacque:



The three tornadoes in Southeast Wisconsin and Northern Illinois were also part of a larger tornado outbreak on January 7th. The majority of the tornadoes occurred in Missouri, where 33 have been confirmed. In all, 48 tornadoes occurred spanning an area from Southeast Wisconsin through Eastern Oklahoma (see graphic below).



**The Wheatland Tornado**

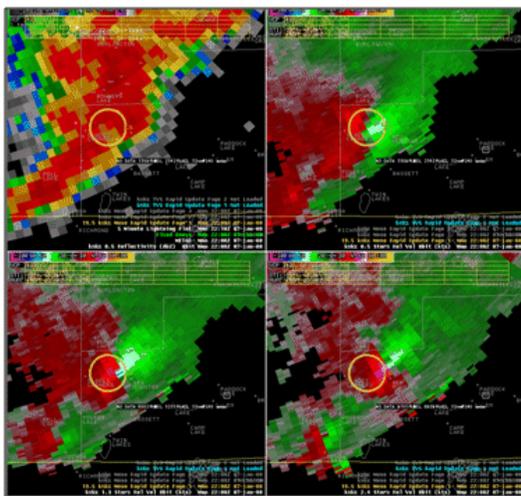
The tornado that went through the Wheatland/New Munster area in Western Kenosha County has been given a rating of EF-3, with estimated top winds between 150-160 mph, by the National Weather Service. This places the tornadic winds at the higher portion of the EF-3 scale, which ranges from 136 mph to 165 mph.

The 15 injuries that occurred were all minor injuries. This was the first strong tornado (EF-2 or stronger) in Kenosha County since Fujita Scale ratings began. This was the first strong tornado in Walworth County since 1980.

The initial spin-up point of the tornado appears to be approximately 1.5 miles northeast of Pell Lake, just northeast of US Highway 12 and west of County Highway U near West Court. The tornado spun up at about 4:02 PM.

The tornado damage path was continuous generally to the east northeast for approximately 10.8 miles. The last damage observed was about 2.4 miles northwest of Paddock Lake along 41st Street – west of State Highway 75 and north of County Highway NN. The tornado ended at about 4:17 PM.

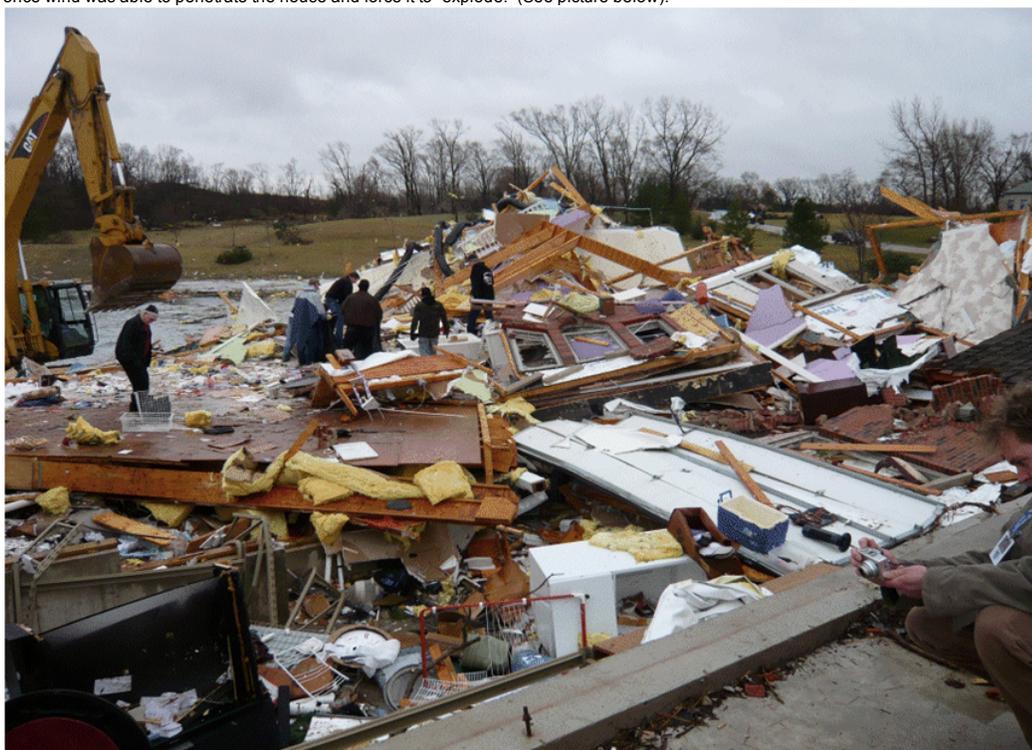
Below is an image show WSR-88D Doppler radar imagery from the Milwaukee/Sullivan NWS office. In the upper-left reflectivity picture, the yellow circle indicates rotation within the thunderstorm cloud, and you see a rough-looking hook echo. The other three pictures show doppler-derived, storm-relative velocities of targets within the thunderstorm cloud. The bright reds next to the bright greens indicate rotation - or what meteorologists refer to as "velocity couplets." Red colors depict targets moving away from the radar site, and green colors indicate targets moving toward the radar site.



The worst damage observed began in the vicinity of the intersection of County Highway O (368th Avenue) and Highway 50 and continued through the Wheatland area. It was right around Highway 50 that the tornado reached its widest point, a path width of approximately 200 yards, as it tore through a subdivision just south of the highway. The tornado continued to move to the northeast, crossing Highway 50, and impacting a small neighborhood shortly thereafter. This neighborhood was along County Highway KD just north of Munster Creek.

After that, the tornado began to turn more to an easterly direction as it approached the Fox River near 45th Street. There was some damage to homes near the Fox River and to some trees and homes further east.

The tornado continued to move to the east, eventually cutting through another small neighborhood near 301st Avenue and 49th Street and severely damaging several homes. The tornado damage path was extremely narrow here, but the damage was quite intense. Despite the narrow tornado path, it managed to strike one house squarely, and leveled it once wind was able to penetrate the house and force it to "explode." (See picture below).



After clearing this small neighborhood, the tornado began to turn back to the east-northeast, causing some sporadic damage along the remainder of its path. The last significant damage was to a barn just to the southeast of the intersection of 41st Street and County Highway B.

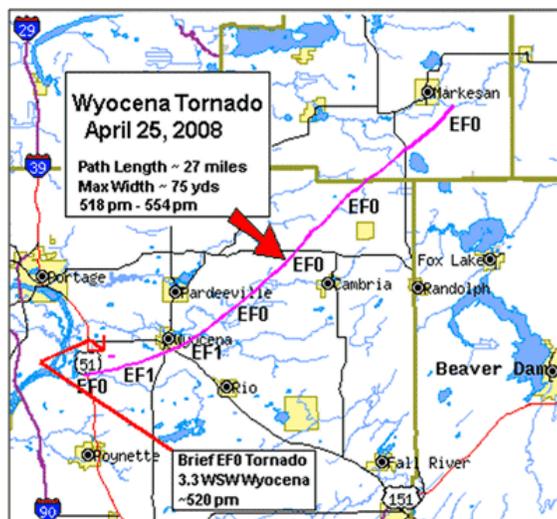
Below is a picture showing debris, from the leveled house shown in the previous picture, that was spread out downwind over a frozen pond (only in Wisconsin!):



### April 25, 2008

On Friday, April 25, 2008, several clusters of severe storms moved northeast through south-central and southeast Wisconsin. Two tornadoes spun up in Columbia County during the late afternoon hours. One was a fairly long tracked tornado that moved northeast for over 28 miles.

This partially rain-wrapped tornado traveled through mostly rural areas of Columbia County and affected only a small portion of one village; otherwise property damage would have been more extensive. This tornado spun up about 2.75 miles east of Dekorra, just northwest of the intersection of STH 51 and CTH VJ, near Columbia Lake. It then tracked east-northeast through the far southeast reaches of the village of Wyocena, and crossed STH 22 just north of Patchin Road. It then moved through the intersection of CTH G and W. Hill Road, where the last structural damage to a couple barns and home occurred. Thereafter, this tornado tracked more northeast through rural areas (crossing STH 33 midway between Cunningham Road and Englehart Road), and eventually exited Columbia County just east of North County Line Road and Sterk Road. It continued for a few more miles through southeastern Green Lake County. The map below shows the path of this long-lived tornado. Based on ground damage evidence, this tornado briefly "lifted" a couple times when it was north of STH 33. Most of the structural damage occurred south and southeast of Wyocena. Otherwise the rural damage consisted of uprooted trees or broken branches. At least two trained spotters video-taped the tornado.



The Columbia County Emergency Management situation report indicated that 4 residential homes sustained minor damage, and 1 home suffered major damage. Additionally, 2 farm buildings had minor damage, 2 suffered major damage, and 3 were destroyed.

### June 7, 2008

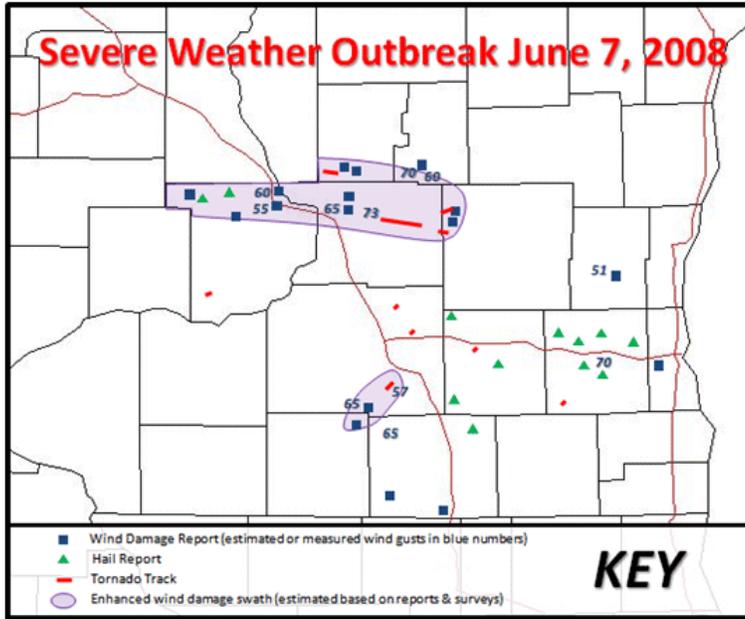
After a late spring dominated by cooler weather, a major pattern shift in the upper level flow allowed a warm, humid air mass to push northward through the Central United States as early as three days in advance of the severe weather event on June 7th. The pattern was dominated by a trough in the Western U.S. and a ridge in the Eastern U.S. The contrast set up by this pattern was pretty stark. A heat wave developed along the East Coast, while snow was reported in higher elevations of the Northern Rocky Mountains. The high temperature in Burlington, Vermont was 92 degrees on Saturday, June 7th! Central Park on Manhattan Island, New York recorded a high of 94 that day, and Washington National Airport recorded a record high of 98 degrees.

By the early afternoon that day, the surface dewpoints across Southern Wisconsin had risen into the low to mid 70s. When combined with warm temperatures on the order of 80 to 85 degrees, the atmosphere became very unstable - a key ingredient for severe thunderstorms. The vertical wind shear, an increase in wind speed with height, was also impressive across the region.

Thunderstorms were ongoing at daybreak in Southern Minnesota on the northern periphery of the extremely moist air mass. These thunderstorms weakened during the late morning hours as they pushed through Southern Minnesota, but then rapidly re-intensified in the noon hour as they pushed into Southern Wisconsin.

One of the thunderstorms intensified into a high-precipitation (HP) supercell just to the east of La Crosse, and eventually tracked through portions of Sauk, Columbia, Marquette, Green Lake, and Dodge Counties. An HP supercell is one that has a large amount of rain and hail that usually partially obscures, or totally obscures, the area of rotation. As this supercell tracked across parts of Southern Wisconsin, it produced tornadoes, destructive straight-line winds to nearly 100 mph and hail. As the afternoon progressed, numerous supercell thunderstorms developed over Southern Wisconsin, and produced a fairly widespread severe weather outbreak. In fact, the tornado outbreak in terms of number of tornadoes, was the 6th most active tornado day in Wisconsin history. In addition to the tornado rated an EF-2 in Columbia County, 8 other tornadoes occurred on June 7th across the NWS Sullivan County Warning Area. Below is a

map showing locations of the tornadoes, wind damage, and hail reports.

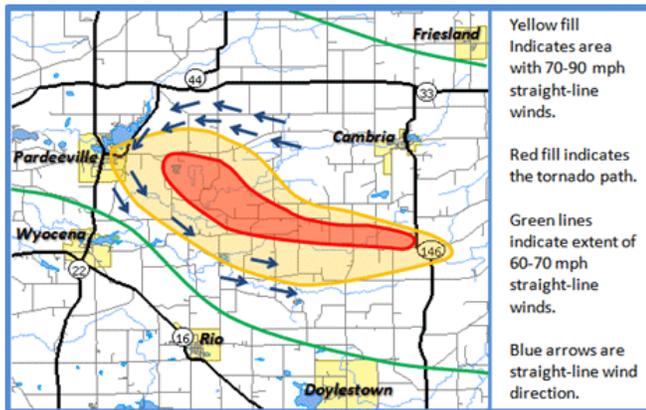


### Pardeeville Tornado – June 7th

The following description is the results of the damage survey as conveyed in a Public Information Statement (PNS), with a few minor additions. The NWS survey of the storm damage from Saturday Afternoon, June 7th, revealed that a strong tornado, rated EF-2 on the Enhanced Fujita Scale, touched down in Columbia County. The storm damage was extremely complex and was associated with a large HP supercell.

Downburst straight-line wind damage, consisting of numerous trees damaged or downed, extended from the Wisconsin Dells, through Portage and into the western part of Pardeeville. This damage was consistent with wind gusts around 60 mph. This damage was also found along and north of Highway 16 all the way to the Dodge County line. The damage then became more severe in the central and eastern portions of Pardeeville, where wind speeds were likely around, or greater than, 70 MPH. The RAWS Fire Weather Observation near Pardeeville measured a gust to 73 mph around this time, just before 2:30 pm CDT.

Just north of this developing downburst, which contained west to northwest winds, a tornado formed around 2:32 pm CDT one mile east-southeast of Pardeeville - just south of the intersection of Highway P and Pardeeville Road. The tornado was on the ground for about 18 minutes along a path 8 miles long, and apparently lifted about 3 miles south of Cambria around 2:50 pm CDT. The tornado tracked slightly south of east during its lifespan. Below is a map showing the path of the Pardeeville tornado.



What was unusual about this storm is the width of the wind damage. Minor tree damage was observed in a 10-mile wide path over Northeast Columbia County in this area, consistent with wind gusts in excess of 60 mph. Trees to the north of the tornado track were blown down facing west, while those south of the track were blown down facing east. A two mile wide swath of more significant damage was embedded, where winds were estimated in the 70 to 90 mph range, or EF-0 to EF-1 damage. Thousands of trees were uprooted or snapped in the first four miles of the tornado track from one mile east-southeast of Pardeeville, to 4 miles east-southeast of Pardeeville.

Within this area, at times separated by one mile or more, were areas of even stronger damage with estimated peak wind speeds of 100 to 120 mph, into the lower end of the EF-2 range. Evidence strongly suggests brief multiple vortices were located within the main tornado. Small swaths of damage were found where nearly all trees were snapped or uprooted (see picture below). Other damage in these swaths included barns destroyed, well built houses with roof damage and windows blown out, and a couple dozen large power poles snapped. These swaths were often just 100 to 200 yards wide and long and did not seem to follow any logical progression.

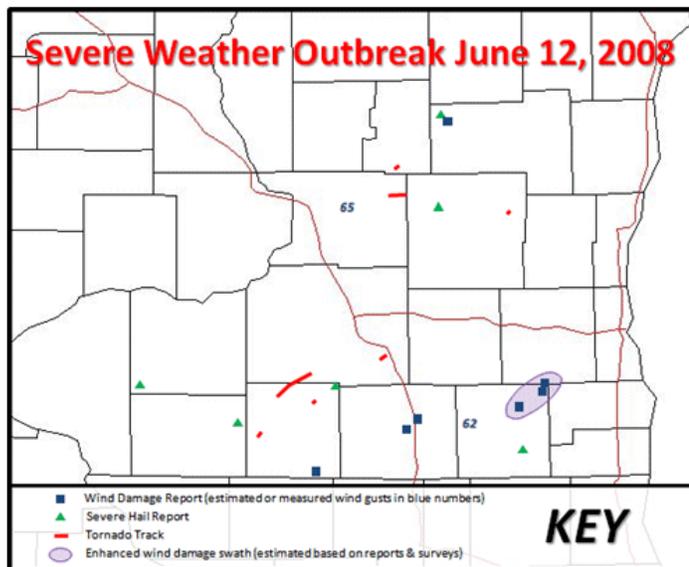


One of these swaths destroyed just about every white pine tree in a grove of 4000 to 6000 trees on one citizen's property three miles east-southeast of Pardeeville near the intersection of Pardeeville Road and Highway SS. Most of these pine trees were snapped right near the ground level, which is not necessarily visible in the damage survey photos below. Near the end of the tornado track, a barn was destroyed and a grain silo sheared in half three miles south of Cambria. Beyond this location, only straight-line wind damage of about 60 mph was evident to the Dodge County line.

Broad rotation was indicated by the Doppler radar several miles across, with an embedded intense circulation. Thus, a term sometimes referred to as a "mesocyclone on the ground" probably occurred. The multiple smaller vortices were embedded within this larger circulation.

### June 12, 2008

On June 12th, another round of severe weather impacted primarily Southern Wisconsin. 8 tornadoes impacted the southern part of the state. All of these were of the EF-0 or EF-1 variety, with the strongest tornado being an EF-1 tornado that tracked from Green County into Dane County. This tornado spun up in the rural area roughly mid-way between New Glarus and Postville, just northeast of Zentner Road about 0.8 miles north-northwest of the intersection of CTH H and Zentner Road. It moved northeast, clipping the northwest part of the city of New Glarus, and exited Green County going through the western edge of the city of Belleville. Luckily only uprooted trees or snapped-off tree damage was noted. This tornado finally dissipated about 2 miles south-southeast of the village of Paoli in south-central Dane County near CTH A. The path length was about 7.84 miles in Green County and 4.41 miles in Dane County, for a total path length of about 12.25 miles.



### Summary of 2008 Wisconsin Tornado Season

There were a few other minor tornado events during the remainder of the year, mostly in the month of July. However there weren't more than a few tornadoes per day for any of the other events. Overall, 2008 was a very active year for tornadoes in Wisconsin. While most of the tornadoes were weak, there were a few high-impact tornado events – the EF-3 Wheatland tornado, the long tracked tornado that hit Wycocena, and the large EF-2 tornado that struck Columbia County.

Data compiled by Alex Lamers, SCEP WFO MKX, and Rusty Kapela, WCM WFO MKX

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