SEVERE STORMS (THUNDERSTORMS, HAIL, LIGHTNING, & HEAVY RAIN)

IDENTIFYING THE HAZARD

What is the definition of a severe storm?

The National Weather Service (NWS) defines a "severe storm" as any thunderstorm that produces one or more of the following elements:

- winds with gust of 50 knots (58 mph) or greater;
- hail that is at least 1 inch in diameter (quarter size) or larger; and/or
- a tornado.

While severe storms are capable of producing deadly lightning and excessive rainfall that may lead to flash flooding, the NWS does not use either to define a severe storm. For the purposes of this report, tornadoes and flooding are categorized as separate hazards and are not discussed under severe storms.

The NWS measures a storm's wind speed in nautical miles or knots. A wind speed of one knot is equal to approximately 1.15 miles per hour. **Figure __** shows conversions from knots to miles per hour for various wind speeds.

Figure __
Wind Speed Conversions

Knots (kts)	Miles Per Hour (mph)	Knots (kts)	Miles Per Hour (mph)
50 kts	58 mph	60 kts	69 mph
52 kts	60 mph	65 kts	75 mph
55 kts	63 mph	70 kts	81 mph
58 kts	67 mph	80 kts	92 mph

Hail size can vary widely. Hailstones may be as small as ¼ inch in diameter (pea-sized) or, under extreme circumstances, as large as 4 ½ inches in diameter (softball-sized). Its size is estimated by comparing it to known objects. **Figure __** provides descriptions for various hail sizes. Typically hail that is 1 inch in diameter (quarter-sized) or larger is considered severe.

Figure __
Hail Size Descriptions

Hail Diameter (inches)	Description	Hail Diameter (inches)	Description
0.25 in.	pea	1.75 in.	golf ball
0.50 in.	marble	2.50 in.	tennis ball
0.75 in.	penny	2.75 in.	baseball
0.88 in.	nickel	3.00 in.	tea cup
1.00 in.	quarter	4.00 in.	grapefruit
1.50 in.	ping pong ball	4.50 in.	softball

Source: NOAA, Storm Prediction Center, Converting Traditional Hail Size Descriptions Table.

Table 1
Thunderstorm & High Wind Events Reported in Lee County
1956 through October 31, 2009

Date	Time	Location	Magnitude (Knots)	Injuries	Death	Property Damage	Crop Damage
5/29/1956	3:15 p.m.	Steward	0 kts	0	0	$0	$0
3/14/1957	3:05 p.m.	Harmon	63 kts	0	0	$0	$0
6/8/1958	6:30 p.m.	Nelson	0 kts	0	0	$0	$0
9/21/1961	6:15 p.m.	Steward	0 kts	0	0	$0	$0
3/11/1962	11:46 a.m.	Steward	50 kts	0	0	$0	$0
8/8/1962	6:15 p.m.	Harmon	0 kts	0	0	$0	$0
4/11/1965	3:08 p.m.	Dixon	70 kts	0	0	$0	$0
6/22/1965	6:43 p.m.	Steward	50 kts	0	0	$0	$0
7/6/1965	8:12 p.m.	Franklin Grove	0 kts	0	0	$0	$0
8/26/1965	9:35 p.m.	Steward	0 kts	0	0	$0	$0
5/23/1966	6:00 p.m.	Steward	0 kts	0	0	$0	$0
8/16/1968	3:00 p.m.	Dixon	0 kts	0	0	$0	$0
6/12/1970	12:10 p.m.	Dixon	56 kts	0	0	$0	$0
6/17/1970	1:05 p.m.	Dixon	57 kts	0	0	$0	$0
4/6/1972	6:45 p.m.	Dixon	0 kts	0	0	$0	$0
4/6/1972	7:00 p.m.	Franklin Grove	0 kts	0	0	$0	$0
3/4/1974	4:10 a.m.	Amboy	0 kts	0	0	$0	$0
4/13/1974	8:30 p.m.	Dixon	0 kts	0	0	$0	$0
6/20/1974	5:40 p.m.	Harmon	0 kts	0	0	$0	$0
6/20/1974	6:00 p.m.	Compton	0 kts	0	0	$0	$0
6/22/1974	9:15 a.m.	Ashton	0 kts	0	0	$0	$0
3/4/1976	6:38 p.m.	Amboy	0 kts	0	0	$0	$0
3/12/1976	12:00 p.m.	Amboy	0 kts	0	0	$0	$0
5/21/1977	2:00 p.m.	Dixon	55 kts	0	0	$0	$0
7/2/1983	6:50 p.m.	Amboy	0 kts	0	0	$0	$0
8/10/1983	6:30 p.m.	Dixon	0 kts	0	0	$0	$0
5/17/1986	12:45 a.m.	Dixon	0 kts	0	0	$0	$0
5/11/1987	5:00 p.m.	Amboy	61 kts	0	0	$0	$0
5/21/1987	8:45 p.m.	Harmon	60 kts	0	0	$0	$0
6/2/1987	1:10 a.m.	Dixon	0 kts	0	0	$0	$0
8/16/1987	7:10 p.m.	Amboy	68 kts	0	0	$0	$0
5/8/1988	4:20 p.m.	Ashton	0 kts	0	0	$0	$0
5/24/1989	11:00 p.m.	Dixon	0 kts	0	0	$0	$0
6/17/1990	3:31 a.m.	Dixon	0 kts	0	0	$0	$0

Table 1
Thunderstorm & High Wind Events Reported in Lee County
1956 through October 31, 2009

Date	Time	Location	Magnitude (Knots)	Injuries	Death	Property Damage	Crop Damage
6/29/1990	1:45 a.m.	Dixon	0 kts	0	0	$0	$0
7/2/1992	11:37 a.m.	Dixon	0 kts	0	0	$0	$0
4/18/1995	9:40 a.m.	Dixon	52 kts	0	0	$0	$0
10/24/1995	12:00 p.m.	countywide	44 kts*	0	0	$0	$0
3/25/1996	12:00 a.m.	countywide	48 kts*	0	0	$0	$0
6/23/1996	8:25 p.m.	Ashton	0 kts	0	0	$0	$0
10/29/1996	4:30 p.m.	countywide	0 kts	0	0	$0	$0
4/5/1997	3:45 p.m.	countywide	55 kts	0	0	$0	$0
9/29/1997	12:00 p.m.	countywide	56 kts*	0	0	$0	$0
5/28/1998	8:10 p.m.	countywide	50 kts	0	0	$0	$0
6/18/1998	5:55 p.m.	Dixon	50 kts	0	0	$0	$0
6/28/1998	1:50 a.m.	Dixon	50 kts	0	0	$0	$0
8/24/1998	11:35 a.m.	countywide	50 kts	0	0	$0	$0
11/10/1998	7:30 a.m.	countywide	56 kts*	0	0	$0	$0
2/11/1999	2:00 p.m.	Dixon	52 kts	0	0	$0	$0
5/16/1999	11:30 p.m.	Amboy Harmon	50 kts	0	0	$0	$0
6/1/1999	5:45 p.m.	Dixon Amboy Paw Paw	61 kts	0	0	$0	$0
5/18/2000	3:00 p.m.	Dixon	50 kts	0	0	$0	$0
8/6/2000	3:35 p.m.	Amboy	50 kts	0	0	$0	$0
2/25/2001	4:00 a.m.	countywide	44 kts*	0	0	$0	$0
6/12/2001	11:12 a.m.	countywide	65 kts	1	0	$55,000	$0
6/14/2001	6:16 p.m.	Dixon	50 kts	0	0	$0	$0
10/25/2001	6:00 a.m.	countywide	51 kts*	0	0	$75,000†	$0
3/9/2002	11:52 a.m.	countywide	51 kts*	0	0	$0	$0
6/3/2002	6:40 p.m.	countywide	50 kts	0	0	$0	$0
7/7/2003	6:40 a.m.	Ashton	50 kts	0	0	$0	$0
7/7/2003	8:04 p.m.	Paw Paw Steward	52 kts	0	0	$	$0
7/21/2003	12:22 a.m.	Ashton Steward	65 kts	0	0	$0	$0

* Denotes High Wind Event.

† The property damage total of $75,000 for the high winds on October 25, 2001 represents losses sustained in 8 counties (including Lee County). A breakdown by county was not available.

Table 1
Thunderstorm & High Wind Events Reported in Lee County
1956 through October 31, 2009

Date	Time	Location	Magnitude (Knots)	Injuries	Death	Property Damage	Crop Damage
7/27/2003	11:00 a.m.	Amboy	57 kts	0	0	$0	$0
7/27/2003	11:15 a.m.	West Brooklyn	57 kts	0	0	$0	$0
11/13/2003	2:00 p.m.	countywide	51 kts*	0	0	$0	$0
5/10/2004	3:22 p.m.	Amboy	55 kts	0	0	$0	$0
5/31/2004	3:45 p.m.	Amboy	60 kts	0	0	$0	$0
7/13/2004	11:20 a.m.	Amboy	52 kts	0	0	$0	$0
7/13/2004	11:35 a.m.	Amboy	60 kts	0	0	$20,000	$0
5/11/2005	4:00 a.m.	Harmon	52 kts	0	0	$0	$0
9/13/2005	4:40 p.m.	Dixon	50 kts	0	0	$0	$0
5/24/2006	6:45 p.m.	Dixon	50 kts	0	0	$0	$0
5/24/2006	7:10 p.m.	Amboy	50 kts	0	0	$0	$0
5/24/2006	7:15 p.m.	Amboy	50 kts	0	0	$0	$0
5/27/2006	3:15 p.m.	Dixon	50 kts	0	0	$1,000	$0
5/27/2006	4:20 p.m.	Sublette	61 kts	0	0	$0	$0
5/29/2006	6:55 p.m.	Sublette	50 kts	0	0	$0	$0
8/3/2006	3:05 a.m.	Compton	50 kts	0	0	$0	$0
8/10/2006	7:09 a.m.	Amboy	61 kts	0	0	$5,000	$0
8/10/2006	7:09 a.m.	Compton	52 kts	0	0	$0	$0
9/4/2006	3:05 p.m.	Paw Paw	50 kts	0	0	$0	$0
9/22/2006	3:33 p.m.	Amboy	62 kts	0	0	$0	$0
10/2/2006	8:47 p.m.	Dixon Sublette	56 kts	0	0	$0	$0
3/31/2007	7:40 p.m.	Compton	56 kts	0	0	$0	$0
3/31/2007	7:46 p.m.	Paw Paw	61 kst	0	0	$0	$0
6/1/2007	2:50 p.m.	Dixon	50 kts	0	0	$1,000	$0
6/7/2007	8:55 p.m.	Dixon	50 kts	0	0	$2,000	$0
6/7/2007	10:00 p.m.	Dixon	50 kts	0	0	$0	$0
7/17/2007	11:17 p.m.	Dixon	50 kts	0	0	$0	$0
7/18/2007	8:23 p.m.	Amboy	50 kts	0	0	$0	$0
7/18/2007	8:45 p.m.	West Brooklyn	50 kts	0	0	$0	$0
8/14/2007	4:09 a.m.	Steward	50 kts	0	0	$0	$0
8/23/2007	12:45 p.m.	Franklin Grove	55 kts	0	0	$5,000	$0
5/25/2008	11:30 p.m.	Amboy	55 kts	0	0	$0	$0

* Denotes High Wind Event.

Table 1
Thunderstorm & High Wind Events Reported in Lee County
1956 through October 31, 2009

Date	Time	Location	Magnitude (Knots)	Injuries	Death	Property Damage	Crop Damage
6/12/2008	10:45 p.m.	Harmon	55 kts	0	0	$0	$0
6/12/2008	10:47 p.m.	Dixon	55 kts	0	0	$0	$0
6/28/2008	2:00 p.m.	Amboy	60 kts	0	0	$0	$0
7/10/2008	12:40 p.m.	Amboy	52 kts	0	0	$0	$0
8/4/2008	5:48 p.m.	Dixon	56 kts	0	0	$0	$0
8/4/2008	6:17 p.m.	Compton	70 kts	0	0	$5,000	$0
3/24/2009	8:35 p.m.	Dixon	65 kts	0	0	$30,000	$0
5/13/2009	7:50 p.m.	Amboy	60 kts	0	0	$0	$0
6/19/2009	4:40 p.m.	Dixon	52 kts	0	0	$1,000	$0
6/19/2009	5:15 p.m.	Amboy	61 kts	0	0	$20,000	$0
6/19/2009	5:20 p.m.	Amboy	56 kts	0	0	$0	$0
6/19/2009	5:33 p.m.	Steward	55 kts	0	0	$0	$0
6/27/2009	5:10 p.m.	Franklin Grove	61 kts	0	0	$0	$0
Totals:				**1**	**0**	**$220,000**†	**$0**

† The property damage total of $75,000 for the high winds on October 25, 2001 represents losses sustained in 8 counties (including Lee County). A breakdown by county was not available.

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

Table 2
Hail Events Reported in Lee County
1958 through October 31, 2009

Date	Time	Location	Magnitude (Diameter)	Injuries	Death	Property Damage	Crop Damage
6/8/1958	6:30 p.m.	Nelson	2.50 in.	0	0	$0	$0
4/22/1970	9:00 a.m.	Dixon	1.00 in.	0	0	$0	$0
4/22/1970	9:20 a.m.	Steward	1.00 in.	0	0	$0	$0
5/1/1973	5:30 p.m.	Dixon	1.00 in.	0	0	$0	$0
4/18/1975	10:20 a.m.	Dixon	2.50 in.	0	0	$0	$0
5/11/1987	4:25 p.m.	Dixon	1.00 in.	0	0	$0	$0
6/19/1990	9:20 p.m.	Harmon	1.75 in.	0	0	$0	$0
3/27/1991	1:46 p.m.	Dixon	1.50 in.	0	0	$0	$0
9/9/1991	6:45 p.m.	Harmon	1.50 in.	0	0	$0	$0
5/9/1995	5:54 p.m.	Dixon	1.75 in.	0	0	$0	$0
4/18/1996	6:34 p.m.	Amboy	1.75 in.	0	0	$0	$0
5/18/1997	6:15 p.m.	Paw Paw	1.75 in.	0	0	$0	$0
5/12/1998	9:30 p.m.	Amboy	1.00 in.	0	0	$0	$0
5/18/2000	11:10 a.m.	Dixon	1.75 in.	0	0	$0	$0
6/14/2001	6:30 p.m.	Franklin Grove	1.00 in.	0	0	$0	$0
5/10/2003	12:05 a.m.	Paw Paw	1.00 in.	0	0	$0	$0
7/11/2003	4:10 p.m.	Ashton West Brooklyn	1.00 in.	0	0	$0	$0
7/11/2003	5:41 p.m.	Nelson Harmon	1.00 in.	0	0	$0	$0
5/21/2004	6:47 p.m.	Dixon	1.00 in.	0	0	$0	$0
7/13/2004	10:40 a.m.	Amboy	2.75 in.	0	0	$0	$0
7/13/2004	10:40 a.m.	Sublette	4.00 in.	0	0	$0	$0
3/30/2005	6:30 p.m.	Paw Paw	1.25 in.	0	0	$0	$0
5/11/2005	4:00 a.m.	Harmon	1.00 in.	0	0	$0	$0
4/13/2006	8:10 p.m.	Dixon	2.75 in.	0	0	$0	$0
9/4/2006	2:20 p.m.	West Brooklyn	1.00 in.	0	0	$0	$0
9/22/2006	3:06 p.m.	Dixon	1.00 in.	0	0	$0	$0
9/22/2006	3:12 p.m.	Dixon	1.00 in.	0	0	$0	$0
9/22/2006	3:21 p.m.	Dixon	1.75 in.	0	0	$0	$0
5/25/2008	11:19 a.m.	Paw Paw	1.00 in.	0	0	$0	$0
7/10/2008	12:19 p.m.	Amboy	1.75 in.	0	0	$0	$0
Totals:				**0**	**0**	**$0**	**$0**

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

Table 3
Lightning Events Reported in Lee County
2003 through October 31, 2009

Date	Time	Location	Injuries	Death	Property Damage	Crop Damage
5/1/2003	12:30 a.m.	Dixon	0	0	$0	$0
8/10/2006	6:53 a.m.	Dixon	0	0	$5,000	$0
Totals:			**0**	**0**	**$5,000**	**$0**

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

Table 4
Heavy Rain Events Reported in Lee County
January 1, 2009 through October 31, 2009

Date	Time	Location	Magnitude (inches)	Injuries	Death	Property Damage	Crop Damage
8/26/2009	4:30 a.m.	Dixon	2”	0	0	$0	$0
Totals:				**0**	**0**	**$0**	**$0**

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

SEVERE WINTER STORMS (SNOW & ICE)

IDENTIFYING THE HAZARD

What is the definition of a severe winter storm?

A severe winter storm can range from moderate snow over a few hours to blizzard conditions with blinding wind-driven snow, sleet and/or ice and extreme cold that lasts several days. The amount and extent of snow or ice, air temperature, wind speed and event duration all influence the severity and type of severe winter storm that results. In general there are three types of severe winter storms. The following provides a brief description of each type.

- **Blizzards.** Blizzards are characterized by low temperatures and strong winds of at least 35 miles per hour. In addition to extreme temperatures and life-threatening wind chills, a blizzard is also characterized by falling or blowing snow that reduces visibility to ¼ mile or less for at least three hours. They are by far the most dangerous of all winter storms.
- **Heavy Snow Storms.** A heavy snow storm is any winter storm that produces six inches or more of snow within a 48 hour period or less.
- **Ice Storms.** Ice storms occur when precipitation (i.e., freezing rain, sleet, etc.) falls to the ground and freezes immediately on impact. Generally in Illinois an ice storm is considered severe if there is an accumulation of ¼ inch or more of freezing rain or ½ inch or more of sleet.

What is the Wind Chill Index?

The Wind Chill Index is a measure of the rate of heat loss from exposed skin caused by the combined effects of wind and cold. As the wind increases, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature. Exposures to extreme wind chills can be life threatening. **Figure __** shows the Wind Chill Index as it corresponds to various temperatures and wind speeds. As an example, if the air temperature is 5°F and the wind speed is 10 miles per hour, then the wind chill would be -10°F. As wind chills edge toward -19°F and below, there is an increased likelihood that continued exposure will lead to individuals developing cold-related illnesses.

Figure __
Wind Chill Index Chart

Temperature (°F)

Wind (mph)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81

Frostbite Times

30 minutes | 10 minutes | 5 minutes

Wind Chill (°F) = $35.74 + 0.615T - 35.75(V^{0.16}) + 0.4275(V^{0.16})$
Where, T = Air Temperature (°F) and V = Wind Speed (mph)

Source: National Weather Service

Table 5
Severe Winter Storm & Extreme Cold Events Reported in Lee County
1967 through October 31, 2009

Date	Time	Event (Magnitude)	Injuries	Death	Property Damage
1/25/1967 thru 1/26/1967	NA	Heavy Snow 23" snow	0	0	$0
12/6/1994	11:00 p.m.	Winter Storm 6" – 10" snow	0	0	$0
1/18/1995 thru 1/19/1995	6:00 p.m.	Heavy Snow ≤ 8" snow; blowing & drifting snow	0	0	$0
12/8/1995 thru 12/9/1995	12:00 p.m.	Winter Storm 2" – 4" snow; strong winds; blowing & drifting snow; low temperatures & very low wind chills	0	0	$0
2/2/1996 thru 2/4/1996	12:00 a.m.	Extreme Cold record low temperatures (-2°F to -33°F)	0	0	$0
1/15/1997 thru 1/18/1997	6:00 a.m.	Winter Storm 4" – 6" snow; low temperatures & very low wind chills; blowing & drifting snow	0	0	$0
1/8/1998	6:00 a.m.	Heavy Snow 4" – 8" snow	0	0	$0
1/1/1999 thru 1/2/1999	7:00 p.m.	Heavy Snow 10" – 17" snow; blowing & drifting snow	0	1*	$0
3/5/1999 thru 3/6/1999	5:00 p.m.	Heavy Snow 3" – 6" snow	0	0	$0
3/8/1999 thru 3/9/1999	5:00 p.m.	Heavy Snow 5" – 8" snow; blowing & drifting snow	0	0	$0
1/19/2000 thru 1/20/2000	12:00 p.m.	Heavy Snow 4" – 9" snow	0	0	$0
2/18/2000	3:00 a.m.	Heavy Snow 12" snow; blowing & drifting snow	0	0	$0

* Information was not available on the location of the severe winter storm- related fatality. The data provided for this event covered 18 counties including Lee County.

Table 5
Severe Winter Storm & Extreme Cold Events Reported in Lee County
1967 through October 31, 2009

Date	Time	Event (Magnitude)	Injuries	Death	Property Damage
12/11/2000	3:00 a.m.	Heavy Snow 9" – 12" snow; blowing & drifting snow; very low wind chills	0	0	$0
1/30/2002 thru 1/31/2002	7:00 p.m.	Winter Storm 6" – 10" snow	0	0	$0
3/2/2002 thru 3/3/2002	9:00 a.m.	Winter Storm 6" – 11" snow	0	0	$0
1/23/2003	1:00 a.m.	Extreme Cold/Wind Chill low temperatures (0°F to -5°F) & very low wind chills (-20°F to -25°F)	0	0	$0
3/4/2003 thru 3/5/2003	10:00 p.m.	Winter Storm 5" – 7" snow	0	0	$0
1/4/2004 thru 1/5/2004	7:00 a.m.	Heavy Snow 5" – 7" snow	0	0	$0
1/29/2004 thru 1/30/2004	6:00 p.m.	Extreme Cold/Wind Chill low temperatures (-5°F to -10°F) & very low wind chills (-20°F to -34°F)	0	0	$0
1/4/2005 thru 1/6/2005	7:00 p.m.	Heavy Snow 6" – 12" snow	0	0	$0
1/20/2006 thru 1/21/2006	8:00 p.m.	Winter Storm 6" – 9" snow	0	0	$0
2/18/2006	12:00 a.m.	Extreme Cold/Wind Chill low temperatures (3°F to -11°F) & very low wind chills (-30°F to -35°F)	0	0	$0
11/30/2006 thru 12/1/2006	8:00 p.m.	Winter Storm 10" – 15" snow	0	0	$0
2/3/2007 thru 2/6/2007	6:00 p.m.	Extreme Cold/Wind Chill low temperatures (5°F to -10°F) & very low wind chills (-20°F to -30°F)	0	0	$0

Table 5
Severe Winter Storm & Extreme Cold Events Reported in Lee County
1967 through October 31, 2009

Date	Time	Event (Magnitude)	Injuries	Death	Property Damage
2/25/2007 thru 2/26/2007	4:00 p.m.	Winter Storm ½" sleet & ice accumulation; 3" – 5" snow; gusting winds caused blizzard conditions	0	0	$0
12/1/2007	10:30 a.m.	Ice Storm accumulations of 1" sleet and ¾" ice	0	0	$0
12/11/2007	2:00 a.m.	Ice Storm ¼" ice accumulations	0	0	$0
12/28/2007	8:00 a.m.	Heavy Snow 5" – 7" snow	0	0	$0
1/21/2008 thru 1/22/2008	2:00 p.m.	Winter Storm 6" snow	0	0	$0
2/5/2008 thru 2/6/2008	3:00 p.m.	Winter Storm 9" snow	0	0	$0
2/10/2008	3:00 a.m.	Extreme Cold/Wind Chill low temperatures (-5°F to -10°F) & very low wind chills (-25°F to -35°F)	0	0	$0
12/18/2008 thru 12/19/2008	10:00 p.m.	Ice Storm/Winter Storm ½" sleet accumulation; 2" – 6" snow	0	0	$0
12/21/2008	7:00 a.m.	Extreme Cold/Wind Chill low temperatures (-5°F to -10°F) & very low wind chills (-35°F)	0	0	$0
1/13/2009 thru 1/14/2009	10:00 p.m.	Winter Storm 7" snow	0	0	$0
1/15/2009 thru 1/16/2009	1:00 a.m.	Extreme Cold/Wind Chill low temperatures (-15°F to -20°F) & very low wind chills (-30°F to -45°F)	0	0	$0
Totals:			**0**	**1***	**$0**

* Information was not available on the location of the severe winter storm- related fatality. The data provided for this event covered 18 counties including Lee County.

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

TORNADOES

IDENTIFYING THE HAZARD

What is the definition of a tornado?

A tornado is a violently rotating column of air, usually characterized by a twisting, funnel-shaped cloud, that extends from the cloud formation of a thunderstorm to the ground. The strongest tornadoes have rotating wind speeds of more than 250 miles per hour and can create damage paths in excess of one mile wide and 50 miles long.

Not all tornadoes have a visible funnel cloud. Some may appear nearly transparent until dust and debris are picked up or a cloud forms within the funnel. Generally, tornadoes move from southwest to northeast, but they have been known to travel in any direction, even backtracking. The average forward speed of a tornado is 30 mile per hour, but this may vary from nearly stationary to 70 miles per hour.

The destruction caused by a tornado may range from light to catastrophic depending on the intensity, size and duration of the storm. Tornado damage may include crop and property damage, power outages, environmental degredation, injury and death. Torndoes are known to blow off roofs, move cars and tractor trailers and demolish homes. Typically tornadoes cause the greatest damage to structures of light construction, such as residential homes.

How are tornadoes rated?

Tornadoes are rated using the Fujita Scale, which measures the intensity of a tornado based on its wind speed and the damage sustained by structures and vegetation. The Fujita Scale identifies six different categories of tornadoes, F0 through F5. **Figure __** gives a brief description of each category.

Figure __
Fujita Tornado Measurement Scale

Category (F-Scale #)	Intensity Phase / Wind Speed	Description
F0	Gale Tornado 40 – 72 mph	Light damage – some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; damage to sign boards
F1	Moderate Tornado 73 – 112 mph	Moderate damage – peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads
F2	Significant Tornado 113 – 157 mph	Considerable damage – roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated
F3	Severe Tornado 158 – 206 mph	Severe damage – roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown
F4	Devastating Tornado 207 – 260 mph	Devastating damage – well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated
F5	Incredible Tornado 261 – 318 mph	Incredible damage – strong frame houses lifted off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 yards; trees debarked; incredible phenomena will occur

Source: FEMA "State and Local Mitigation Planning How-To Guide: Understanding Your Risks", August 2001.

On February 1, 2007 use of the original Fujita Scale was discontinued in favor of the Enhanced Fujita Scale. The Enhanced Fujita Scale continues to use the F0 through F5 categories, but is based on additional damage indicators and revised wind speeds. **Figure __** depicts the Enhanced Fujita Scale. While the Enhanced Fujita Scale is currently in use, the historical data presented in this report is based on the original Fujita Scale.

Figure __
Enhanced Fujita Tornado Measurement Scale

Category (EF Scale #)	Wind Speed
EF0	65 – 85 mph
EF1	86 – 110 mph
EF2	111 – 135 mph
EF3	136 – 165 mph
EF4	166 – 200 mph
EF5	Over 200 mph

Source: NOAA, Storm Prediction Center, Online Tornado FAQ: Frequently Asked Questions about Tornadoes.

Table 6
Tornadoes Reported in Lee County
1956 through October 31, 2009

Date	Time	Location	Magnitude (Fujita Scale)	Injuries	Deaths	Property Damage
8/30/1956	11:00 p.m.	Dixon*	F2	0	0	$2,500
8/15/1958	2:00 a.m.	Dixon* Compton*	F2	0	0	$250,000
9/26/1959	4:30 p.m.	Dixon*	F1	0	0	$25,000
4/21/1967	4:02 p.m.	Harmon* Amboy*	F2	0	0	$25,000
4/21/1967	4:15 p.m.	Amboy* West Brooklyn*	F1	0	0	$250,000
4/6/1972	7:05 p.m.	Dixon* Amboy*	F2	6	0	$250,000
5/14/1972	11:45 a.m.	Compton*	F0	0	0	$0
6/20/1974	5:45 p.m.	Dixon*	---	0	0	$0
6/20/1975	12:06 p.m.	Compton*	F0	0	0	$0
6/20/1975	12:30 p.m.	Ashton*	F1	0	0	$2,500
6/20/1975	1:15 p.m.	Steward*	F0	0	0	$300
5/14/1985	6:45p.m.	West Brooklyn*	F1	0	0	$2,500
5/15/1986	2:30 p.m.	Dixon	F1	1	0	$25,000
4/2/1988	4:50 p.m.	Harmon	F0	0	0	$0
5/8/1988	4:20 p.m.	Dixon	F0	0	0	$25,000
4/29/1991	6:30 p.m.	Paw Paw*	F1	0	0	$25,000
5/9/1995	5:25 p.m.	Harmon	F0	0	0	$0
7/27/1995	6:20 p.m.	Dixon*	F0	0	0	$0
6/18/1998	5:55 p.m.	Nelson	F0	0	0	$0
5/30/2003	5:36 p.m.	Franklin Grove* Ashton*	F0	0	0	$0
5/10/2004	4:05 p.m.	Lee*	F0	0	0	$0
Totals:				**7**	**0**	**$882,800**

* Tornado touchdown verified in the vicinity of this location(s).

Sources: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

FLOOD

IDENTIFYING THE HAZARD

What is the definition of a flood?

The Federal Emergency Management Agency defines a "flood" as a general or temporary condition where two or more acres of normally dry land or two or more properties are inundated by:

- overflow of inland or tidal waters;
- unusual and rapid accumulation or runoff of surface waters from any source;
- mudflows; or
- a sudden collapse of shoreline land.

The severity of a flooding event is determined by a combination of topography and physiography, ground cover, precipitation and weather patterns and recent soil moisture conditions.

What types of floods occur in Lee County?

Floods can be classified under two categories: flash floods and general floods. Flash floods are generally produced when heavy localized precipitation falls over an area in a short amount of time. There is no time for the excess water to soak into the ground nor are the storm sewers able to handle the shear volume of water. There is generally very little, if any, warning associated with flash floods.

In Lee County, general flooding can fall into two subcategories: river floods and area or overland floods. River floods are generally caused by a gradual increase in the water levels of a river or creek. These floods occur when winter or spring rains, coupled with melting snow, fill river basins with too much water too quickly or when torrential rains associated with a storm system enter the area. Low lying areas near rivers, streams, lakes and reservoirs are susceptible to this type of flooding. Area or overland floods occur outside a defined stream or river and are generally the result of previous precipitation events that have left the ground saturated. Additional rainfall leads to surface runoff which causes ponding to occur in low-lying areas such as open fields.

On average, flooding causes more than $2 billion in property damage each year in the United States. Floods cause utility damage and outages, infrastructure damage (both to transportation and communication systems), structural damage to buildings, crop loss, decreased land values and impede travel.

Table 7
Flooding & Flash Flooding Events Reported in Lee County
1996 through October 31, 2009

Date	Time	Location	Type	Magnitude (inches)	Injuries	Death	Property Damage
2/20/1997	6:00 p.m.	countywide	Flood	3" – 4"	0	0	$0
10/17/1998	2:00 p.m.	countywide	Urban / Stream Flood	3" – 5"	0	0	$0
6/12/2000	3:00 p.m.	countywide	Flood	3" – 6"	0	0	$0
6/4/2002	2:00 a.m.	countywide	Flash Flood	6.5" – 5"	0	0	$0
6/4/2002	7:00 a.m.	countywide	Flood	no additional rainfall – flooding caused by runoff from early morning rain event	0	0	$0
9/4/2006	2:43 p.m.	Compton	Flash Flood	2"	0	0	$0
7/18/2007	12:30 a.m.	Amboy	Flash Flood	3.25"	0	0	$0
7/18/2007	12:30 a.m.	Dixon	Flood	4.36"	0	0	$0
8/23/2007	7:57 p.m.	Amboy Compton	Flash Flood	NA	0	0	$0
7/10/2008	2:30 p.m.	Amboy Sublette	Flood	4.75" – 6"	0	0	$0
9/13/2008	9:50 a.m.	Amboy	Flash Flood	6.5"	0	0	$0
12/27/2008	1:12 p.m.	Dixon Paw Paw	Flash Flood	1.44" – 1.88"	0	0	$0
Totals					**0**	**0**	**$0**

Source: NOAA, National Environmental Satellite, Data & Information Service, National Climatic Data Center, Storm Events Database, Illinois, Lee County, 2010.

DROUGHT

IDENTIFYING THE HAZARD

What is the definition of a drought?

While there is no universally accepted definition of drought, it can generally be defined as a period of unusually persistent dry weather that continues long enough to cause serious problems such as crop damage and/or water supply shortages. A drought may also be defined as the cumulative deficit of precipitation relative to what is normal for a region over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group or environmental sector.

There are four types of drought. They are differentiated based on the use and need for water. The following provides a brief description of each type.

- **Meteorological Drought.** Meteorological drought is a period of well-below-average precipitation that spans a few months to a few years. It can be identified by a shortfall in precipitation. Due to climate differences, what might be considered a drought in one location of the country may not be in another location.
- **Agricultural Drought.** An agricultural drought is a period when soil moisture no longer meets the needs of a particular crop to germinate and grow. It can be identified by a deficit in soil moisture.
- **Hydrological Drought.** Hydrological drought is a period when surface and subsurface water supplies (i.e., streams, lakes, aquifers, etc.) drop below normal levels. It can be identified by a deficit in surface and groundwater.
- **Socioeconomic Drought.** Socioeconomic drought is a period when water shortages begin to affect people. In this case, there is not enough water to meet human and environmental needs.

The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. It is generally difficult to pinpoint the beginning and the end of a drought. Because the impacts of a drought accumulate slowly at first, a drought may not be recognized until it has become well established. Even during a drought there may be one or two months with above average precipitation totals. These wet months do not necessarily signal the end of a drought and generally do not have a major impact on moisture deficits. Droughts can be short, lasting just a few months, or they can persist for several years before regional climate conditions return to normal. While drought conditions can occur at any time throughout the year, the most apparent time is during the summer months. Nationally, drought impacts often exceed $1 billion due in part to the sheer size of the areas affected.

Previous Occurrence of Drought

- In 1983, all 102 Illinois counties were proclaimed state disaster areas because of high temperatures and insufficient precipitation beginning in mid-June.
- In 1988, approximately half of the counties in Illinois (including Lee County) were impacted by drought conditions, although none of the counties were proclaimed state

disaster areas. Disaster relief payments exceeding $382 million were paid to landowners and farmers as a result of this drought.

- In 2005, drought conditions impacted much of the state, including Lee County. Dry conditions reached a historic level of severity in some parts of Illinois and ranked as one of the three most severe droughts in Illinois based on 112 years of data.

EXTREME HEAT

IDENTIFYING THE HAZARD

What is the definition of extreme heat?

Extreme heat is characterized by temperatures that hover 10 degrees or more above the average high temperature of a region for several days to several weeks. In comparison, a heat wave is generally defined as a period of at least three consecutive days above 90°F.

Extreme heat events are usually a result of both high temperatures and high relative humidity. (Relative humidity refers to the amount of moisture in the air.) The higher the relative humidity or the more moisture in the air, the less likely that evaporation will take place. This becomes significant when high relative humidity is coupled with soaring temperatures. On hot days the human body relies on the evaporation of perspiration or sweat to cool and regulate the body's internal temperature. Sweating does nothing to cool the body unless the water is removed by evaporation. When the relative humidity is high, then the evaporation process is hindered, robbing the body of its ability to cool itself.

On average, more than 1,500 people die in the United States each year from extreme heat. This number is greater than the 30-year mean annual number of deaths due to tornadoes, hurricanes, floods and lightning combined. In an effort to raise the public's awareness of the hazards of extreme heat, the National Weather Service has devised the "Heat Index".

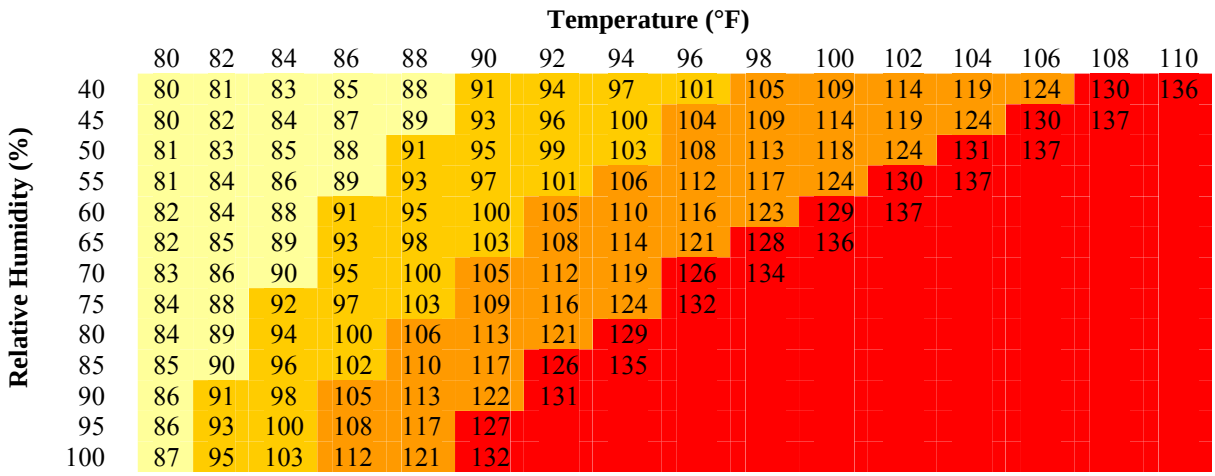
What is the Heat Index?

The Heat Index, sometimes referred to as the "apparent temperature", is a measure of how hot it feels when relative humidity is added to the actual air temperature. **Figure __** shows the Heat Index as it corresponds to various air temperatures and relative humidity. As an example, if the air temperature is 96°F and the relative humidity is 65%, then the Heat Index would be 121°F. It should be noted that the Heat Index values were devised for shady, light wind conditions. Exposure to full sunshine can increase Heat Index values by up to 15°F. Also strong winds, particularly with very hot, very dry air, can be extremely hazardous. When the Heat Index reaches 105°F or greater, there is an increased likelihood that continued exposure and/or physical activity will lead to individuals developing severe heat disorders.

Previous Occurrence of Extreme Heat In Lee County

The only extreme heat event recorded by the National Oceanic and Atmospheric Administration's Storm Events Database for Lee County occurred between July 12, 1995 and July 16, 1995. This extreme heat event affected all of northern Illinois. The temperatures for this time period soared into the middle to upper 90s and the heat index reached a high of 125°F. The impacts included road buckling and power outages. While this event caused approximately 583 heat-related deaths, none were reported in Lee County.

Figure __
Heat Index Chart



Source: National Weather Service

EARTHQUAKE

IDENTIFYING THE HAZARD

What is the definition of an earthquake?

An earthquake is a sudden shaking of the ground caused when rocks forming the earth's crust slip or move past each other along a fault (a fracture in the rocks). Most earthquakes occur along the boundaries of the earth's tectonic plates. These slow-moving plates are being pulled and dragged in different directions, sliding over, under and past each other. Occasionally, as the plates move past each other, their jagged edges will catch or stick causing a gradual buildup of pressure (energy). Eventually, the force exerted by the moving plates overcomes the resistance at the edges and the plates snap into a new position. This abrupt shift releases the pent-up energy, producing vibrations or seismic waves that travel outward from the earthquake's point of origin. The location below the earth's surface where the earthquake starts is known as the hypocenter or focus. The point on the earth's surface directly above the focus is the epicenter.

The destruction caused by an earthquake may range from light to catastrophic depending on a number of factors including the magnitude of the earthquake, the distance from the epicenter, the local geologic conditions as well as construction standards and time of day (i.e., rush hour). Earthquake damage may include power outages, general property damage, road and bridge failure, collapsed buildings and utility damage (ruptured gas lines, broken water mains, etc.). Most of the damage done by an earthquake is caused by its secondary or indirect effects. These secondary effects result from the seismic waves released by the earthquake and include ground shaking, surface faulting, liquefaction, landslides and, in rare cases, tsunamis.

Previous Earthquake Occurrence

According to the Illinois State Geological Survey's *Northern Illinois Earthquakes* fact sheet and the *Earthquakes of Illinois: 1795 – 2008* map, one minor earthquake and one light earthquake have originated in Lee County during the last 200 years. The minor earthquake took place in 1999 and the light earthquake took place in 1972. In addition, there have been at least a dozen earthquakes that have occurred in northern Illinois in the last century, though none of them were greater than a magnitude 5.1. These earthquakes generally caused minor damage within 10 to 20 miles of the epicenter and were felt over several counties. Earthquakes greater than a magnitude 5 are generally not expected in this region.

The most recent earthquake to take place in northern Illinois occurred on February 10, 2010. This magnitude 3.8 earthquake was located approximately two miles northeast of Virgil in Kane County and was felt over much of Illinois, Indiana and central and southern Wisconsin. Some minor structural damage was reported as a result of this earthquake; however none was reported in Lee County.

On June 28, 2004, a magnitude 4.2 earthquake was reported in northern Illinois approximately eight miles northwest of Ottawa in La Salle County. Ground shaking was felt over six states. There were no reports of significant damage and no damages were reported in Lee County.

On September 2, 1999, a magnitude 3.5 earthquake was reported in northern Illinois near Dixon in Lee County. This earthquake was not directly linked to any known fault in Northern Illinois. Ground shaking was felt over several counties, but there were no reports of damage. The September 2, 1999 earthquake occurred in roughly the same vicinity as the September 15, 1972 earthquake. On September 15, 1972, a magnitude 4.5 earthquake was reported near Amboy in Lee County. Minor structural damage, such as cracks in chimneys and plaster, was reported in Lee County. Ground shaking was felt over most of northern Illinois.

The largest earthquake to take place in northern Illinois in the past several hundred years occurred on May 26, 1909. The exact location of this magnitude 5.1 earthquake isn't known, but the greatest damage occurred in and near Aurora where many chimneys fell and gas lines were ruptured. Minor structural damage was reported across northern and central Illinois and southern Wisconsin. Ground shaking was felt over seven states.

Lee County has also felt ground shaking caused by several earthquakes that have originated in southeastern Illinois. On April 18, 2008, a magnitude 5.2 earthquake was reported in southeastern Illinois near Bellmont in Wabash County. The earthquake was located along the Wabash Valley seismic zone. Minor structural damage was reported in several towns in Illinois and Kentucky. Ground shaking was felt over all or parts of 18 states in the central United States and southern Ontario, Canada. No damages were reported in Lee County.

On June 10, 1987 another magnitude 5.2 earthquake was reported in southeastern Illinois near Olney in Richland County. This earthquake was also located along the Wabash Valley seismic zone. Only minor structural damage was reported in several towns in Illinois and Indiana. Ground shaking was felt over all or parts of 17 states in the central and eastern United States and southern Ontario, Canada. No damages were reported in Lee County.

The strongest earthquake in the central United States during the 20th century occurred along the Wabash Valley seismic zone in southeastern Illinois near Dale in Hamilton County. This magnitude 5.3 earthquake occurred on November 9, 1968 with an intensity estimated at VII for the area surrounding the epicenter. Moderate structural damage was reported in several towns in south-central Illinois, southwest Indiana and northwest Kentucky. Ground shaking was felt over all or parts of 23 states in the central and eastern United States and southern Ontario, Canada. As with the previous earthquakes, no damages were reported in Lee County.

Two of the three largest earthquakes ever recorded within the continental United States took place along the New Madrid seismic zone in 1811 and 1812 with magnitudes of 8.1 and 8.0 respectively. These great earthquakes, centered near the town of New Madrid, Missouri, devastated the surrounding region and rang church bells 1,000 miles away in Boston. The quakes locally changed the course of the Mississippi River and created Reelfoot Lake, which covers an area of more than 10 square miles in northwestern Tennessee. If another earthquake the magnitude of those recorded 1811 and 1812 occurs again along the New Madrid seismic zone, the damage that will be experienced in northern Illinois and Lee County is not expected to be substantial.