2010 KANSAS

SEVERE WEATHER AWARENESS WEEK

MARCH 8-12, 2010

TORNADO SAFETY DRILL TUESDAY, MARCH 9th

1:30 PM CST

INFORMATION PACKET

National Weather Service

Dear Emergency Management and Media Partners,

The National Weather Service, the Kansas Emergency Management Association, and the Kansas Division of Emergency Management request your participation in "**Kansas Severe Weather Awareness Week**" activities from March 8 – 12, 2010. The annual statewide tornado drill will take place on Tuesday, March 9th at 1:30 pm CST, with a backup date of Thursday, March 11th. Test tornado warnings will be issued via NOAA Weather Radio and the EAS system for distribution statewide.

Enclosed is tornado and severe weather information that can be used for preparedness activities in your local jurisdiction. Feel free to duplicate and distribute this information as necessary.

While 2009 was not a record breaking year for tornadoes in the state of Kansas, numerous other High Impact Weather Events did occur causing millions of dollars in damage to homes, property and infrastructure. Those High Impact Events include, a Blizzard, a Derecho, numerous Severe Thunderstorms flooding and flash flooding.

Kansans live with the threat of severe weather year round. Kansas Severe Weather Awareness Week is the ideal time to prepare for severe weather. Families should practice their severe weather safety plan at home, work, school or other public locations that they frequent. They should develop a safety plan for times when they are participating in outdoor recreation activities, sporting events, or working outdoors. Each Kansan should know where to go should severe weather strike their location.

All Hazards NOAA Weather Radio is like having your personal tornado siren in your home or vehicle. We encourage Kansans to purchase a weather radio and have it programmed to their county and/or surrounding counties to receive severe weather warnings and information directly from the National Weather Service. Now is a great time to replace the back-up battery in your NOAA All Hazards Weather Radio so that you get severe weather information even if the power goes out.

As always, the National Weather Service offices that serve the state of Kansas look forward to partnering with you to help Kansans prepare for severe weather. Please contact the Warning Coordination Meteorologist at your local office if you have any questions or comments regarding this packet. Visit our webpages for the latest forecasts and severe weather information.

www.weather.gov/topeka
www.weather.gov/wichita
www.weather.gov/dodgecity
www.weather.gov/goodland
www.weather.gov/kansascity
www.weather.gov/springfield
www.weather.gov/hastings

2009 Kansas Tornado Facts

Tornadoes: **103** (**43** above the 1950-2009 average of 60)
(**28** above the past 30 year average of 75)
(**7** above the past 20 year average of 96)

Fatalities: **0** **Injuries:** **6**

Longest Track: **12.6 miles** (Bourbon County, May 13, EF1)

Strongest: **EF2** (Finney County, April 18 and Stafford County, June 15)

Most in a county: **11** (Butler)

Days of occurrence: **24** (also called Tornado Days)

Most in one day: **21** (June 15)

Supercell packing baseball hail and 80 mph winds.
Photo courtesy Doug Whitson, Sherman County law enforcement.

Most in one month: **46** (June. This was the 4th highest total for any June)

First tornado of the year: **March 7** (Reno County, 4:13 pm CST, EF0, 1.32 mile length, 75 yard width)

Last tornado of the year: **August 2** (Haskell-Seward County, 8:50 pm CDT, EF1, 3.5 mile length, 75 yard width)

2009 Monthly Tornado Totals

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Total	0	0	13	18	10	46	14	2	0	0	0	0	103	100%
Percent	0	0	13	18	10	45	14	2	0	0	0	0		
EF5	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
EF4	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
EF3	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
EF2	0	0	0	1	0	1	0	0	0	0	0	0	2	2%
EF1	0	0	1	7	1	11	0	1	0	0	0	0	21	20%
EF0	0	0	12	10	9	34	14	1	0	0	0	0	80	78%

Weak (EF0, EF1) tornadoes in green, strong (EF2, EF3) in yellow, violent (EF4, EF5) in red, month totals in blue.
Percent values may not add to 100% due to rounding.

Yearly Summary: The Kansas 2009 tornado year did not stand out in the historical database in terms of extremes. The 103 tornadoes reported remained above the 60-year average, but was close to the most recent 20-year average, and fell far short of last year's record of 187 tornadoes. There were no violent (EF4-EF5) tornadoes in the state in 2009, and only two strong (EF2-EF3) tornadoes. Fortunately, there was no loss of life directly attributable to Kansas tornadoes in 2009, and only 6 injuries were reported.

The Kansas tornado season ended early in 2009. No tornadoes were reported during the last four months of the year. In the past 60 years, only 11 other years have not had a tornado report after September 1st. August 2, 2009 was the last day with a tornado report when two tornadoes developed during the evening hours in southwest Kansas.

KANSAS TORNADO STATISTICS

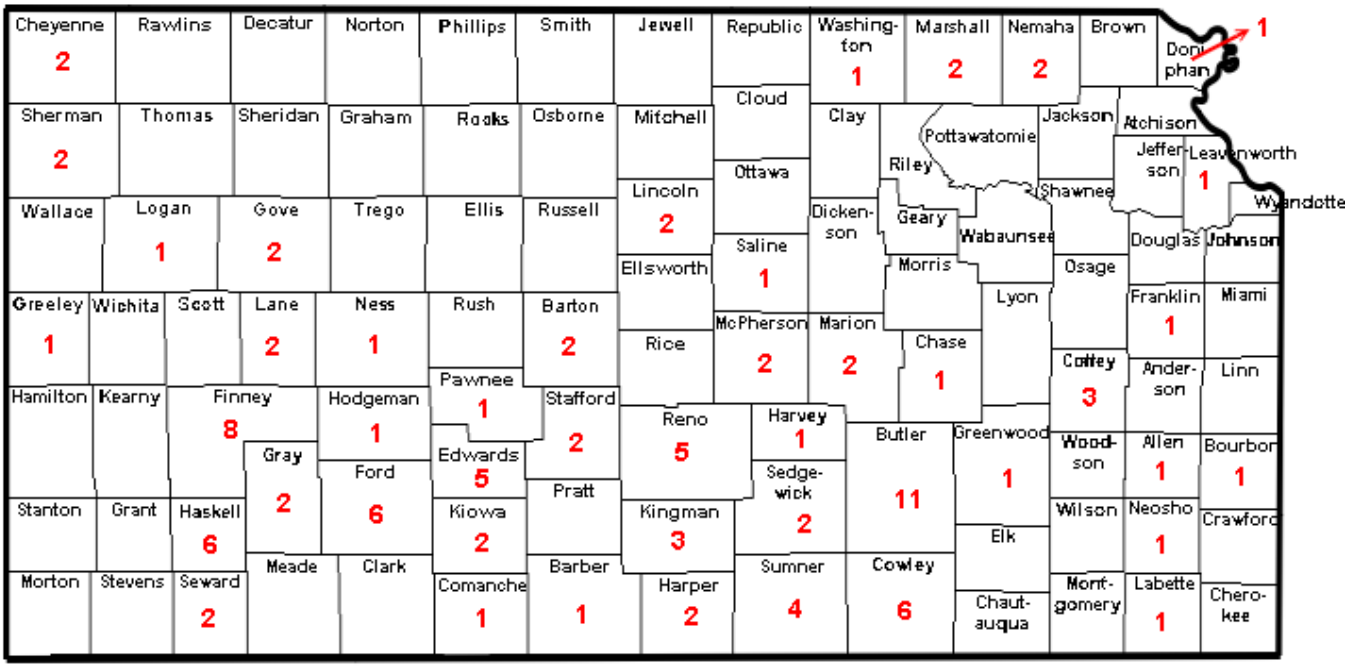
by County

1950 - 2009

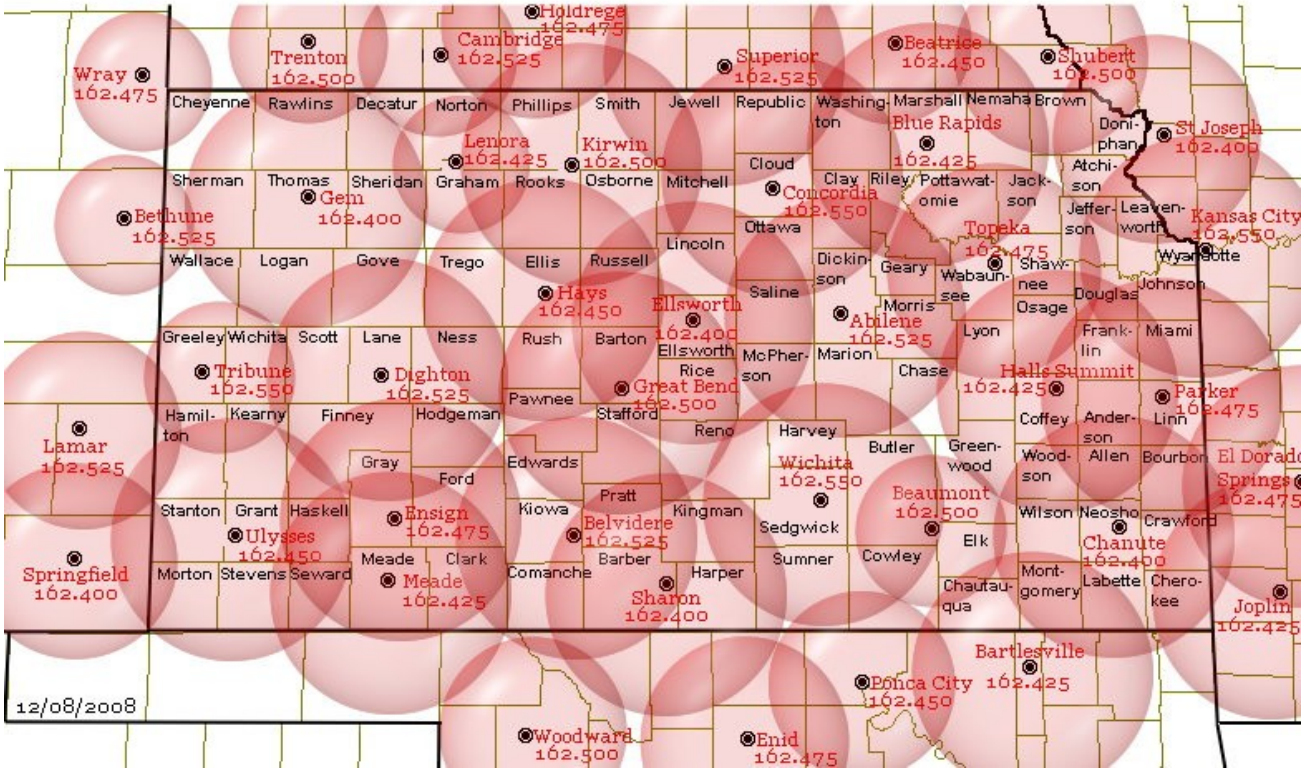
TORNADOES, FATALITIES, AND INJURIES

County	Tor	Fat	Inj
Allen	27	0	4
Anderson	14	3	12
Atchison	15	0	11
Barber	32	0	2
Barton	86	2	37
Bourbon	17	0	7
Brown	43	0	5
Butler	72	28	225
Chase	38	0	2
Chautauqua	15	0	0
Cherokee	34	4	41
Cheyenne	39	0	0
Clark	37	0	0
Clay	36	1	31
Cloud	45	1	8
Coffey	22	0	5
Comanche	35	0	2
Cowley	57	77	293
Crawford	33	4	43
Decatur	43	0	5
Dickinson	34	1	12
Doniphan	18	0	2
Douglas	37	1	48
Edwards	43	0	7
Elk	23	2	8
Ellis	51	0	6
Ellsworth	46	0	0
Finney	84	1	41
Ford	79	0	0
Franklin	26	3	34
Geary	17	0	3
Gove	38	0	3
Graham	34	0	0
Grant	24	0	9
Gray	32	0	3
Greeley	31	0	0
Greenwood	36	0	10
Hamilton	21	0	1
Harper	57	0	1
Harvey	47	1	63
Haskell	27	0	10
Hodgeman	43	0	4
Jackson	29	4	17
Jefferson	39	0	101
Jewell	33	0	1
Johnson	35	4	12
Kearny	30	0	0
Kingman	47	0	1
Kiowa	51	11	74
Labette	34	1	29
Lane	30	0	2
Leavenworth	30	2	30
Lincoln	29	0	2
Linn	13	0	3
Logan	21	0	0
Lyon	40	6	217
McPherson	43	1	16
Marion	45	1	2
Marshall	31	0	1
Meade	44	0	0
Miami	18	0	9
Mitchell	46	0	5
Montgomery	31	1	1
Morris	28	0	7
Morton	18	1	2
Nemaha	33	0	1
Neosho	31	0	4
Ness	41	0	4
Norton	19	0	0
Osage	37	17	6
Osborne	40	0	13
Ottawa	24	2	9
Pawnee	43	0	1
Phillips	37	0	1
Pottawatomie	31	0	5
Pratt	65	3	10
Rawlins	46	0	4
Reno	73	0	22
Republic	49	0	1
Rice	39	0	6
Riley	27	0	51
Rooks	48	0	6
Rush	33	0	8
Russell	63	1	7
Saline	31	0	66
Scott	36	1	1
Sedgwick	78	13	321
Seward	34	0	15
Shawnee	45	18	528
Sheridan	32	0	0
Sherman	95	0	0
Smith	40	0	1
Stafford	63	1	4
Stanton	19	0	0
Stevens	24	1	5
Sumner	76	5	14
Thomas	40	0	1
Trego	57	5	101
Wabaunsee	31	0	14
Wallace	35	0	4
Washington	33	2	12
Wichita	23	3	4
Wilson	15	0	0
Woodson	12	0	8
Wyandotte	10	2	36
Total	**3961**	**235**	**2824**

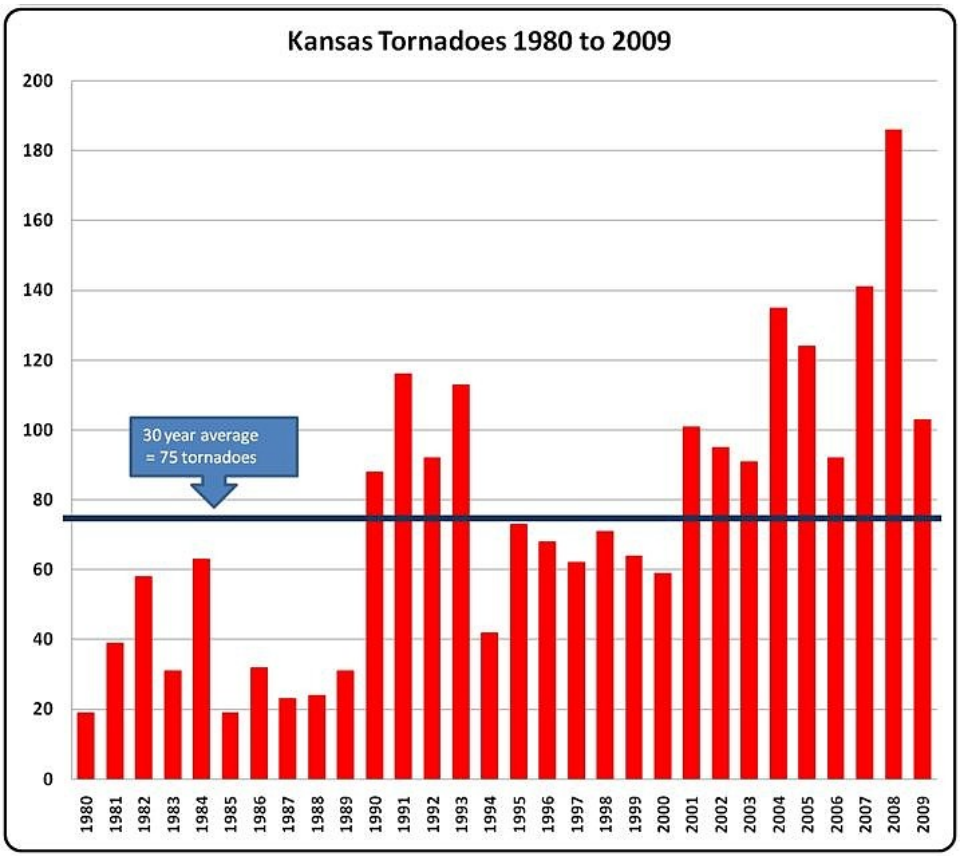
Kansas Tornadoes 2009

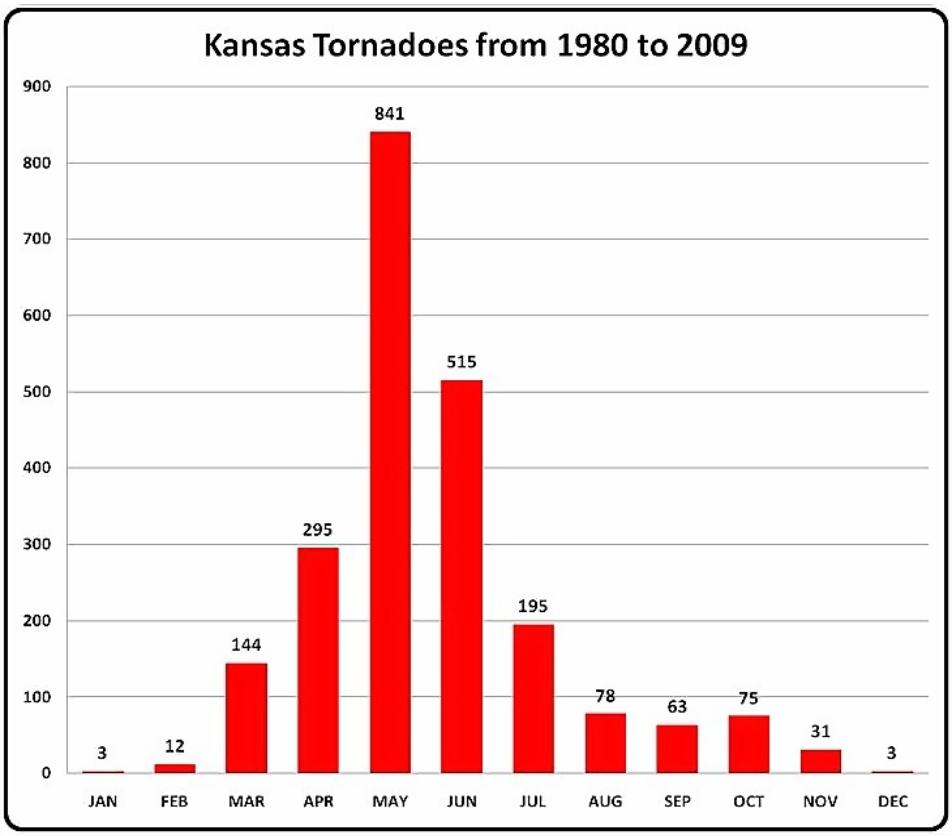


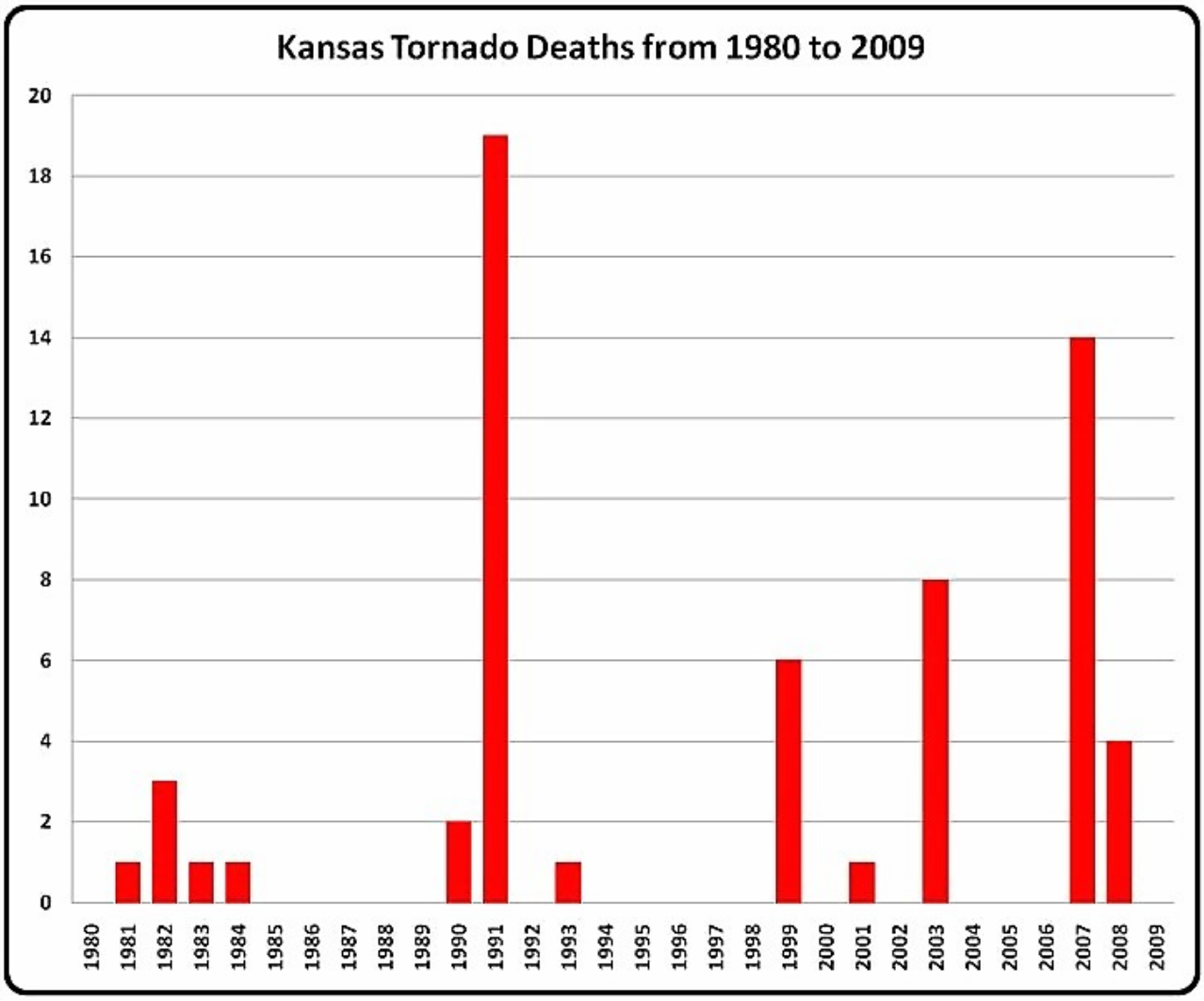
Kansas Area NOAA All-Hazards Weather Radio Stations



KANSAS SEVERE WEATHER AWARENESS WEEK
MARCH 8 - 12, 2010


Kansas Tornadoes 1980 to 2009
200
180
160
140
120
100
80
60
40
20
0
30 year average
= 75 tornadoes
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009


Kansas Tornadoes from 1980 to 2009
900
800
700
600
500
400
300
200
100
0
3
12
144
295
841
515
195
78
63
75
31
3
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC



Did you know that there are seven National Weather Service offices that serve portions of Kansas?

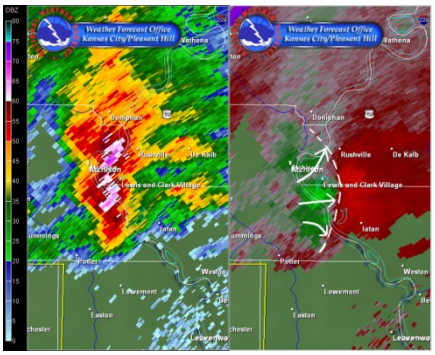
The NWS offices are located in Goodland, Dodge City, Wichita, Topeka, Hastings, Nebraska, Pleasant Hill, Missouri and Springfield, Missouri. Each office is staffed by a team of highly trained meteorologists, technicians, electronics technicians, information technology specialists, hydrologists and administrative assistants. The NWS offices are staffed 24 hours a day, seven days a week, 365 days a year.

Contact the NWS office in your area to learn more about weather, weather safety, NOAA Weather Radio, for office tours or to learn more about careers in meteorology, in the NWS or in NOAA. We are here to serve you!

2009 Severe Weather Summary
Extreme East Central and Northeast Kansas
National Weather Service Pleasant Hill, MO

The 2009 severe weather season was quieter than normal across extreme east central and northeast Kansas, with a few notable exceptions which brought hail, high winds, and a few tornadoes.

After a few rounds of early season marginal severe weather, the 2009 severe weather season really revved up during NASCAR weekend. On April 25 one tornado, accompanied by hail and high winds, touched down in southern Leavenworth County and tracked to the northeast, paralleling the Kansas Turnpike for a few miles. This EF-1 tornado remained mostly in rural areas, but did manage to hit several farmsteads, causing significant structural damage to outbuildings and a few homes. The region dodged a bullet however, as this tornado lifted several miles west of the Kansas Speedway where races were in full gear. The storm also produced a flash flood that required a swift water rescue.

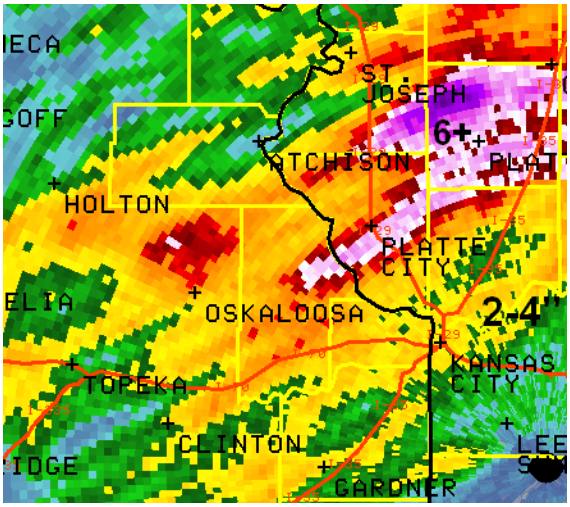


After a few rounds of severe storms in May which brought large hail, severe weather picked up again in June when two very strong bow echos developed, bringing damaging winds to a few locations. On June 10th, the first bow echo developed over western Atchison County producing winds of 70-80 mph which damaged numerous trees in the town of Atchison, as well reports of overturned tractor trailers and train cars.

Just five days later on June 15th, another bow echo formed and moved through Linn, Miami, and Johnson Counties producing winds of 60 to 70 mph. These winds produced the most intense damage in Linn and Miami Counties, where major tree damage occurred. Sporadic severe weather which occurred during the rest of June produced only minor impacts.

On July 12th, a severe thunderstorm hit Leavenworth and Wyandotte Counties, snapping tree limbs up to 12 inches in diameter. Later that month a flash flood hit Wyandotte County, causing people to be rescued from their cars with several cars nearly submerged.

In August, a few isolated, yet powerful severe thunderstorms produced microbursts in Doniphan County on August 9th , and Linn County on August 10th. Both storms blew down several power lines and a roof was ripped from a home in Doniphan County. Finally, heavy rain produced flash flooding in portions of Leavenworth, Wyandotte, and Johnson Counties August 16-17th , resulting in several submerged cars and a few swift water rescues.



The remainder of the severe weather season was quite quiet.

2009 Severe Weather Summary

Far Southeast Kansas

National Weather Service Springfield, MO

2009 was a relatively quiet year when it came to severe weather across far southeast Kansas.

The most significant event by far was the continuation of the Derecho that formed near Wichita and then moved into southeast Kansas during the early morning of May 8th. This squall line produced winds to 90 mph across Bourbon, Crawford and Cherokee counties causing an estimated $8M in damages to schools, homes, outbuildings, power poles and lines, and another $1M in crops. Perhaps the most memorable damage was the toppling of the 1000 foot communication tower in Columbus, though damage to 130 structures in Cherokee and 63 more in McCune was also a noteworthy impact in these small communities.

The lack of tornadoes was noted, with the only recorded 2009 twister being an EF-1 tornado that struck between Bronson and Redfield in Bourbon County on May 13th.

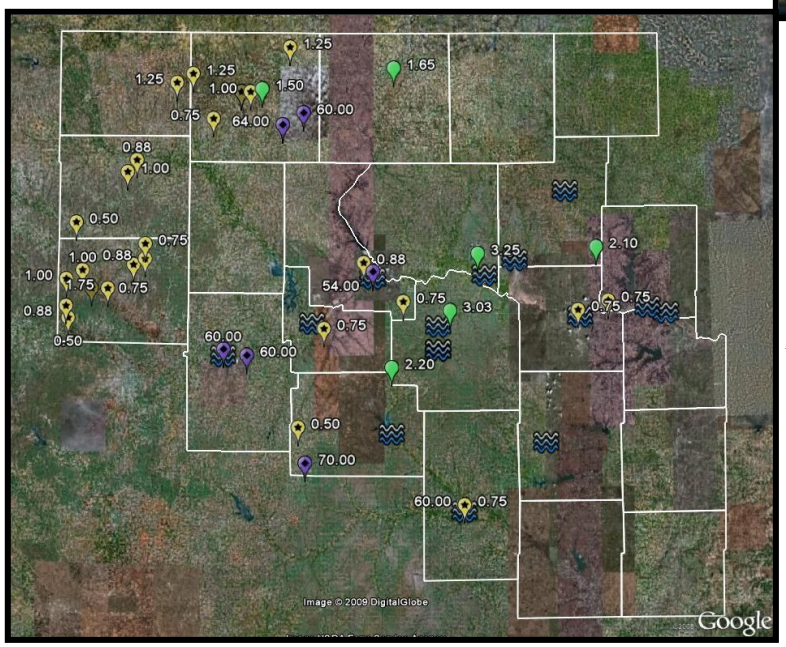
Fifteen flash flood events occurred throughout the year. As has become very common, many of these events lead to water rescues as motorists attempted to drive through flooded areas. Fortunately, there were no fatalities.

2009 Severe Weather Summary
Northeast and North Central Kansas
National Weather Service-Topeka, KS

The 2009 severe weather season for northeast Kansas was unusually quiet, with only 8 tornadoes reported in 6 counties. The average number of tornadoes the previous 10 years (1999-2008) in the NWS-Topeka county warning area was 15. The 8 tornadoes were rated either EF-0 or EF-1. Severe weather events otherwise ran the gamut across northeast Kansas, with large hail, strong winds, and flash flooding all reported at some point during the traditional severe weather season from March to June. July, August, and September had their share of severe weather as well, most notable across east central Kansas where up 90-100mph were reported on August 10th. A sample of the more significant severe weather impacts that affected the NWS-Topeka county warning area follows.

March 23rd: Severe thunderstorms developed ahead of a dry line and cold front during the afternoon hours. Discrete thunderstorms merged into a squall line that barreled through northeast Kansas. Hail from the size of quarters to golf balls blanketed portions of the region, while downburst winds up to 70mph were recorded. Several tornado reports were received from storm spotters in Nemaha County. A NWS storm survey team traveled to an area 3 miles west of Oneida, KS, where it was determined that a tornado caused minor damage to several homes and other buildings along an 8.5 mile path.

The roof was torn from a metal building in Nemaha County by an EF-1 tornado on March 23rd.



Hail, labeled by size are in yellow, wind reports, labeled by magnitude are in purple, and green and blue icons are rainfall and flooding reports from April 26th.

April 26th: Discrete supercell thunderstorms embedded within a multi-cellular line of convection moved across northeast Kansas during the late morning and early afternoon. Large hail up to the size of golf balls pummeled much of north central, and portions of northeast Kansas. Thunderstorm winds of 60mph to 70mph were also reported, which blew down power lines and forced power outages in Morris County. Also notable was a supercell thunderstorm that lifted through Doug-

las County. Tornado warnings were issued for Lawrence and surrounding locales, based upon a strong tornadic signature on the radar, and several storm spotter reports of a rotating wall cloud. The KMBC (Kansas City) news chopper was also able to film and broadcast the base of the thunderstorm in real-time, which was displayed on the NWS-Topeka situational awareness display. A tornado did eventually develop once the supercell moved out of Douglas County, which impacted portions of Interstate 70 and surrounding homes and buildings. Beyond the large hail and strong winds, heavy rainfall dropped 2 to 4 inches of rain across portions of the area. Roadways and intersections in the city of Topeka, and along portions of Hwy 99 through Wabaunsee and Jefferson counties were the most adversely impacted. Rescue teams were dispatched to the intersection of 29th and Kansas in Topeka where a car was reported to be floating in the roadway. Two feet of water inundated other city streets. A second water rescue was necessary northwest of Paxico just east of Hwy 99. Flood waters two feet deep have the ability to float and move a car, and 6 inches of fast moving water can knock a person off their feet!

May 15th-16th: Thunderstorms developed along a northward lifting warm front. Large hail was the primary threat with these thunderstorms. Baseball size hail was reported in Pottawatomie County. Copious available atmospheric moisture made the thunderstorms efficient rain producers. Add in the fact that the storms persisted for much of the day—having been initiated by the warm front and reinforced in the afternoon as a piece of upper level energy moved through the area—and flash flooding because an issue. Storm spotters and cooperative observers across the area reported a storm total 3 to 5 inches of rain. The ground had been moist thanks to two rounds of wet weather already during the month. Several roads were closed in response to water flowing over the roadway.

Rotating wall cloud and inflow tail (off to the right) of a supercell thunderstorm May 15th.

Tree branches down in Nemaha County on June 17th after a weak tornado moved through.

June 15th and June 17th: Strong thunderstorms developed near a stationary boundary parked along the southern edge of the NWS-Topeka county warning area. This cluster of storms produced large hail to the size of baseballs and winds gusts to nearly 70mph. The wind driven hail smashed through the bay window of at least one home, and knocked down several 2-4" diameter branches. One large tree was reported to have fallen onto a house on the northeast side of Manhattan. The storms congealed into a mesoscale convective system, and raced through the east central portion of the state. Widespread wind damage im-

pacted much of Lyon, Coffey, Osage, Franklin, and Anderson counties, but sites as far north as Brown County also reported strong winds with the thunderstorm line as it moved through. The most common damage reported was to tree branches. Several power outages resulted, namely in Hartford, Burlington, and Westphalia. The largest tree reported down was 24" in diameter, located just west of Greeley. Thunderstorms along the line and those trailing produced a swath of 2-4" of rainfall, which lead to some flood and flash flooding concerns. Several intersections were closed throughout Morris County due to running water over the roadways. The northern half of the county warning area was pummeled by hail up to 3 inches in diameter just 2 days later on the 17th. Supercell thunderstorms tracked along the Kansas/Nebraska border. Two tornadoes were reported—one that crossed the Washington/Marshall County border from north of Hanover to northeast of Bremen, and a second brief tornado north of Beattie in Marshall County were confirmed by a National Weather Service storm survey.

A large tree down in Manhattan July 12th.

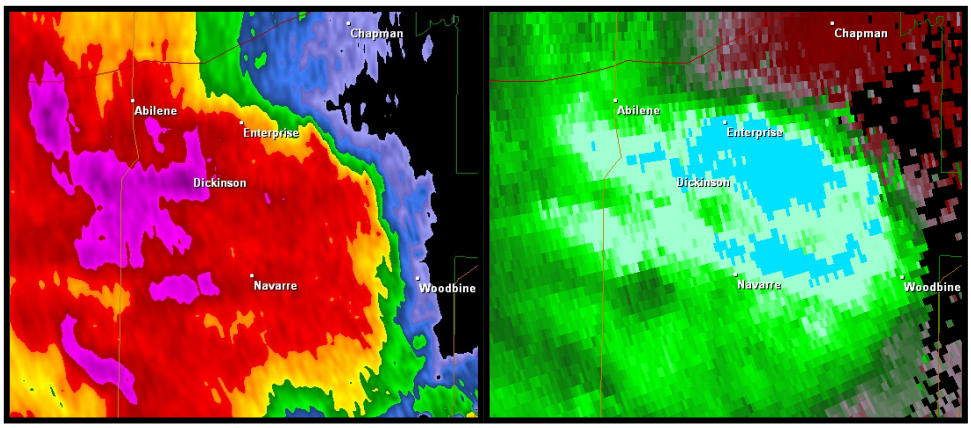
July 12th: Widespread severe weather didn't occur across the forecast area, but the city of Manhattan and portions of Topeka were hit by 60 -70 mph winds during the morning hours of the 12th. A mesoscale convective complex that had developed over the high plains states moved across north central and northeast Kansas. The storms persisted for much of the early morning, but little more than a handful of non-severe wind reports were received at the National Weather Service in Topeka. Once the storms hit Manhattan though, it's theorized that the morning inversion had mixed just enough to allow for the 60 to 70 mph winds associated with the convection to translate down to the surface. Several large trees were blown down, and roofs were torn off of several buildings!

August 10th: A bowing line segment of a severe thunderstorm cluster picked up speed as it raced through Dickinson, Geary, and Morris counties. Small trees snapped at their bases, and in one instance south of Junction City, bark was peeled off a tree trunk by the wind. Wind driven quarter size hail was also responsible for blowing the windows out of a handful of homes southeast in Abilene. Several power powers poles were knocked down. A trained storm spotter in Enterprise estimated wind speeds of 90 to 100mph. Numerous trees were down in and around his property in Enterprise, and metal buildings were demolished, their pieces thrown and wrapped around tree trunks. The powerful storm then drove 70 to 90mph through portions of Osage, Lyon, Franklin, and Anderson counties. Large oak trees were snapped at their bases northeast of Reading and in Allen, a two foot diameter oak tree was snapped at it's base.

The last two significant severe weather events across the area on August 19th and September 3rd didn't bring much in the way of damage to the region. But, a supercell thunderstorm on August 19th at the southern end of a convective line tracked along the northern tier of counties in northeast Kansas. This monster rotating storm produced baseball to grapefruit size hail. Trained storm spotters reported one and a half to two inch hail that fell for 20 continuous minutes! Sep-

tember 3rd, Residents of north central Kansas were hit by one last severe weather event the first week in September. Hail to the size of golfballs and 60 to 70mph winds pushed through Republic, Cloud, and Ottawa counties.

A statistic of note as well for the National Weather Service-Topeka is that no severe weather events in the local county warning area resulted in direct injuries or deaths in 2009.



Bowing line segment. At top, KTWX WSR-88d 0.5° reflectivity. At bottom, KTWX WSR-88d 0.5° base velocity. 90 to 100 mph winds were reported in Enterprise (white dot) just before this radar image was taken.

Severe Weather Terminology

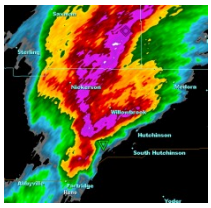
- Severe Thunderstorm – The National Weather Service issues severe thunderstorm warnings for thunderstorms that are currently producing or are capable of producing winds of 60 mph or stronger and/or hail one inch in diameter or larger. Oftentimes, severe thunderstorms may be much stronger than this minimum criteria, so it is a good idea to take severe thunderstorm warnings seriously.
- Tornado – A tornado is a rotating column of air that descends from the base of a thunderstorm and is in contact with the ground. A funnel cloud may or may not be attached to the base of a thunderstorm and it does not come in contact with the ground.
- Flash Flood – A flash flood is flooding that occurs very rapidly, usually within 6 hours of heavy rainfall. Flash flooding may occur along creeks, rivers or streams. It can also occur in low lying or urban areas where drainage is poor. With flash flooding, water levels can rise very quickly, even at locations that did not receive the heavy rainfall but are located downstream from areas that received an extreme amount of rainfall. Flash flooding can occur in the winter months, when rain falls on existing snowpack and causes it to melt rapidly. Flooding is the number one severe weather killer in the U.S.

2009 Severe Weather Summary

Portions of Central, South Central and Southeast Kansas

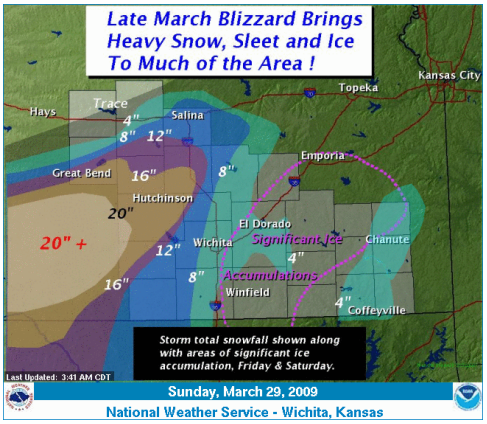
National Weather Service - Wichita, KS

First Tornadoes of the 2009 Season 3/7/09:



A few of the storms on the evening of March 7th were strong and produced a few weak tornadoes. The first severe storm developed in western Reno county producing large amounts of ¼ inch to ½ inch hail. The storm quickly developed mid-level rotation and a tornado touched down around 4:15pm near Abbyville and Partridge, KS. The tornado touched down a few times in Reno County and passed just south of the Hutchinson airport at 4:36pm. Later Wednesday evening a couple tornadoes were reported in Barber and Harper counties. Preliminary Tornado ratings for all of the tornadoes on March 7th in Reno and Harper counties are EF0. Fortunately no damage was reported with these twisters.

Late March Blizzard:



A very significant late season winter storm dumped one to two feet of snow across parts of Central, South Central and Southwest Kansas. The heavy snow and strong winds resulted in blizzard conditions in some of these areas from Friday March 27th into early Saturday March 28th. Meanwhile, significant accumulations of ice from freezing rain and sleet also affected the Flint Hills and Southeast Kansas, with some snow accumulations before the wintry precipitation ended Saturday evening. Several areas reported power outages due to the snow, ice and wind.

4/26/09 Tornadoes and Straight Line Wind Damage:

Courtesy Eric Johnson

Widespread severe storms affected the region on Sunday April 26th. Storms developed early in the afternoon along a dryline in Western Kansas and Western Oklahoma. These storms quickly became severe as they raced northeast. The first damaging storm developed around 330 pm along the Sedgwick-Butler County line. This storm produced a swatch of damage as it tracked northeast through Northern Butler and Southeast Marion Counties.

Front view of the home damaged by the EF1 tornado

Shortly before 6 pm a small supercell thunderstorm moved into Western Sedgwick County. This storm dropped a brief

tornado near Lake Afton which caused damage and injuries. This tornado was rated an EF1 by the National Weather Service.

Storms then organized into a line and raced northeast producing straight-line winds at speeds between 70 and 90 mph. These severe winds caused damage across Harvey and Marion Counties.

Wichita Records 2nd Wettest April on Record!

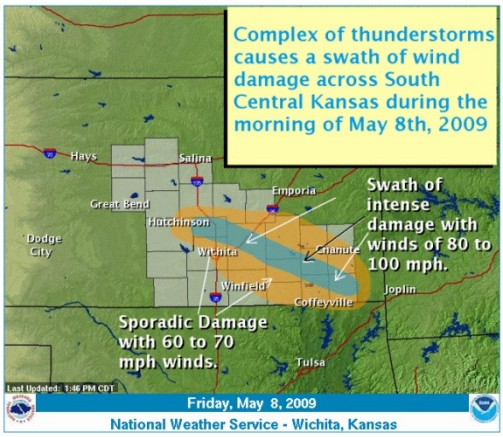
Total rainfall for the month of April at Wichita's Mid-Continent airport was 9.94 inches, making 2009 the 2nd wettest April on record. The all-time April record-holder is 1944, during which 12.42 inches swamped the air capital. The top 10 wettest Aprils on record for Wichita appear below:

1) 1944: 12.42 inches
2) 2009: 9.94 inches*
3) 1942: 7.08 inches
4) 1945: 6.79 inches
5) 1951: 6.33 inches
6) 1940: 6.15 inches
7) 1922: 6.12 inches
8) 1999: 6.02 inches
9) 1901: 5.83 inches
10) 1976: 5.57 inches

An even more amazing rainfall statistic pertains to the 5.10 inches that swamped Wichita on the 26th which is 54% of the monthly total. This not only set a new calendar day record for the date, overwhelming the previous record of 1.88 inches set in 1969 by a staggering 3.22 inches...it is also the 2nd greatest rainfall total for any date in April, being surpassed only by April 22nd 1944, on which 6.03 inches swamped Wichita. The top 5 wettest dates in April appear below:

1) April 22nd, 1944: 6.03 inches
2) April 26th, 2009: 5.10 inches
3) April 29th, 1924: 2.69 inches
4) April 5th, 1928: 2.45 inches
5) April 30th, 1951: 2.26 inches

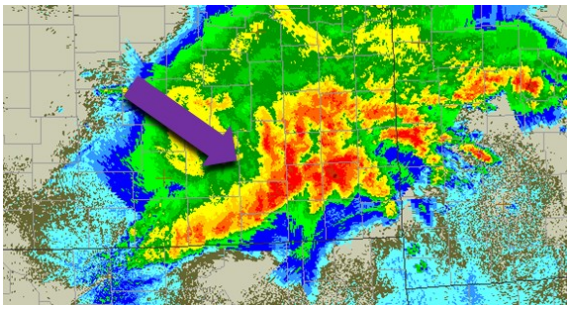
Derecho causes significant wind damage across Southern Kansas 5/8/09!!



Destructive straight line winds from a rare derecho blasts through South Central and Southeast Kansas during the early morning hours on May 8th 2009.

Warm and muggy conditions late Thursday night set the stage for severe thunderstorms as rich gulf moisture pooled across southern Kansas. A complex of thunderstorms developed over northwest Kansas Thursday night and inten-

sified once it reached the juicy gulf moisture residing over southern Kansas. The stronger winds aloft, combined with very unstable air, created a rare bow echo type thunderstorm complex that caused a derecho. A derecho (from the Spanish word meaning "straight") is a widespread, long-lived and violent convectively induced straight-line windstorm that is associated with a fast-moving band of severe thunderstorms in the form of a squall line usually taking the form of a bow echo. The derecho caused a swath of destructive straight-line winds which began near Harvey county and tracked southeast across the state and eventually across Missouri, Kentucky, Tennessee and even through to the east coast. In addition to the wind damage the thunderstorms also produced large hail and flooding across the region and portions of the country overnight.

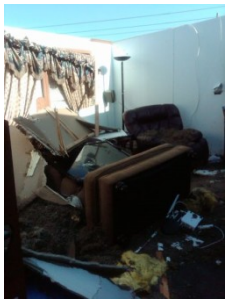


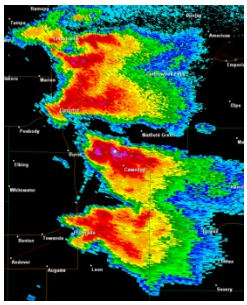
6/7-8/09 Large Hail and Damaging Winds:

Storms first developed during the late afternoon hours on Sunday June 7th over Northern Oklahoma where a dryline and cold front intersected. As the storms tracked northeast, they encountered richer moisture and higher instability which allowed them to increase in intensity. The first round of storms around 7pm produced a swatch of severe winds. Around midnight a large storm developed over Reno County that produced significant wind damage in Hutchinson along with Golf ball size hail. After surveying the damage it was determined that microburst winds between 100-120 mph caused the damage across South Hutchinson.

6/15/09 - Widespread Severe Storms!

An extremely moist air mass was in place across all of Kansas on Monday June 15th along with unseasonably strong mid and upper level winds. A weak surface boundary combined with an approaching upper disturbance to ignite severe storms across much of Kansas.



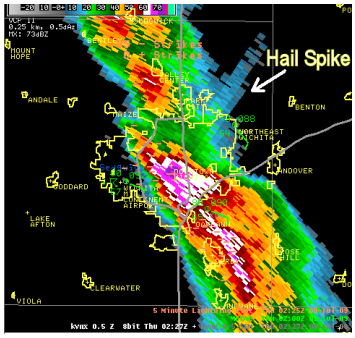


Supercell thunderstorms first erupted over Western Kansas and as these storms progressed east the threat transitioned from tornadoes to severe straight line winds. These winds caused damage and power outages across much of Reno, Harvey, Marion, McPherson

and Butler Counties. Supercells also developed during the late afternoon hours just east of Wichita in Western Butler County. These storms produced several weak tornadoes along with large hail.

Baseball Hail at the Baseball Stadium in Wichita on 7/8/09:

Spectators of the Wichita Wingnuts Baseball game got more than they bargained for when Baseball sized hail fell for about 30 minutes in downtown Wichita on the evening of July 8th. Very large hail, from quarter to baseball sized, fell across the city and impacted many residents, damaging cars and homes.



A line of severe thunderstorms quickly developed over far western Wichita around 8:45pm on Wednesday evening, and slowly moved eastward. Hail up to the size of baseballs was reported in downtown Wichita at 9:30pm. Among other places, large hail fell at the Lawrence-Dumont Stadium and in the College Hill neighborhood. At the stadium, the slow-moving storms caused the baseball size hail to fall for about 30 minutes, covering the field by the time the storm ended. Numerous vehicles were severely damaged in the stadium parking lots, and damage to the stadium itself was also reported.

Courtesy KSNW

Golf ball to baseball sized hail was also reported in Augusta and near Rose Hill later that night and large hail continued to fall as these storms continued on eastward overnight. Many locations reported hail falling for 20 to 30 minutes before ending.

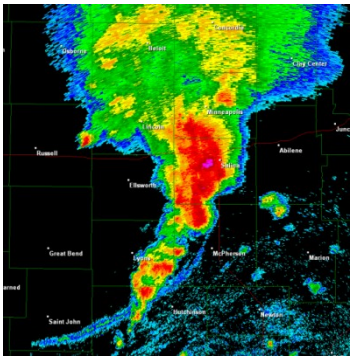
The Full Gamut of Severe Weather on 7/20/09:

Courtesy BU County EM

Courtesy Jon Finch

On Monday Evening July 20th, a complex of severe storms developed over Central and Southern Kansas. A cold front draped southeast across Nebraska and Northwestern Kansas slowly moved southeast while a warm front bisected the Wichita county warning area. As early morning storms moved eastward the clouds cleared out and surface temperatures increased over Central and South Central Kansas. Also as the warm front pushed northward, dew points surged into the low 70s increasing the instability with already great wind shear for severe storms. Storms developed around 6pm along the warm front in South Central Kansas. These storms quickly intensified and dropped Baseball sized Hail, Winds up to 60 to 70 mph and even a few Tornadoes.

Morning Severe Storms Blow Through Central Kansas 8/10/09:

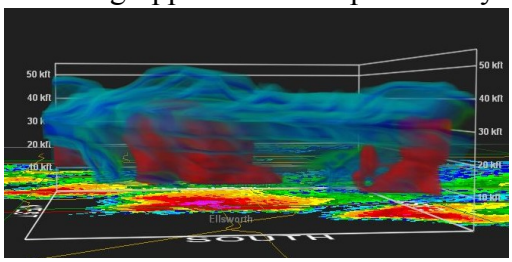


Monday morning, August 10, brought a wet and windy start to the work week as a cluster of storms moved over Central Kansas. Strong winds were the main threat from this system. These storms originated from the outflow of Colorado storms that occurred Sunday evening and had an eastward propagation across the state of Kansas. They were able to maintain their structure due to an upper level disturbance aloft, as well as a good amount of shear, instability, and moisture in the area.

Courtesy KSNW

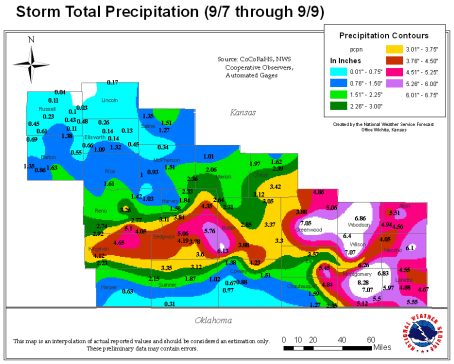
Evening Supercells Lay a Swath of Large Hail Across Central Kansas 9/3/09!

A strong upper level low pressure system tracked out of Eastern Nebraska and in to Northeast Kansas during the evening of September 3rd. Storms first developed during the early evening hours over extreme North-Central Kansas and tracked South in to Central Kansas as the overnight hours progressed. With plenty of wind spear, especially in the mid levels, these storms quickly became supercell thunderstorms producing a large swath of severe hail across Central Kansas.



9/8-9/09 Heavy Rainfall:

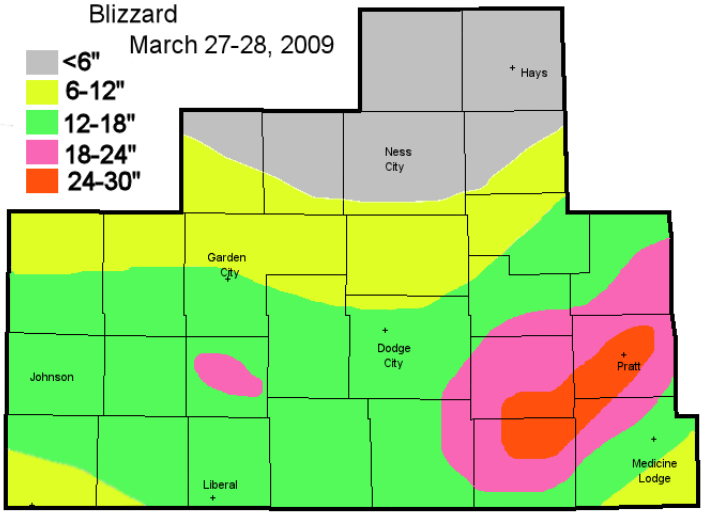
Strong, slow moving thunderstorms first developed over West-Central Kansas during the evening of September 7th. With light upper level winds in place this cluster of storms tracked slowly east across South Central and Southeast Kansas on Tuesday September 8th. Another round of storms moved through South Central and Southeastern Kansas overnight Tuesday through Wednesday morning September 9th. The slow movement of the storms, coupled with a tropical-like atmosphere in place, allowed these storms to produce heavy rainfall across South Central and Southeast Kansas.



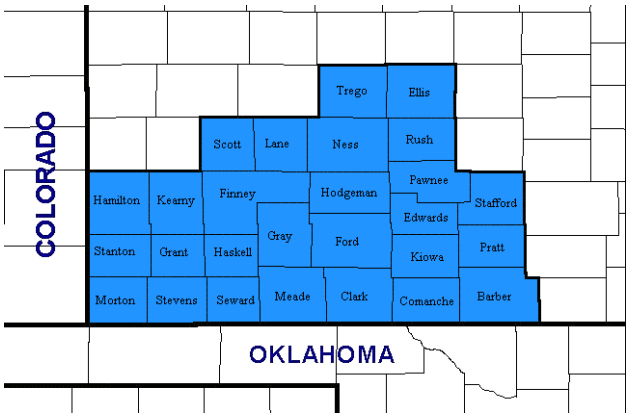
2009 Severe Weather Summary
Southwest Kansas
National Weather Service - Dodge City

The new year of 2009 began without any winter storms at all and with significantly above normal temperatures. But then "we" paid the price with a historic March blizzard across much of the area south of Interstate 70. A major winter storm began on the 27th of March and ended by the 28th. More than a foot of snow accumulated across a large part of southwest and south central Kansas with heaviest snowfall in south central Kansas. Nearly all roads were closed for an extended period due to zero visibilities and widespread 10 to 20 foot snow drifts!

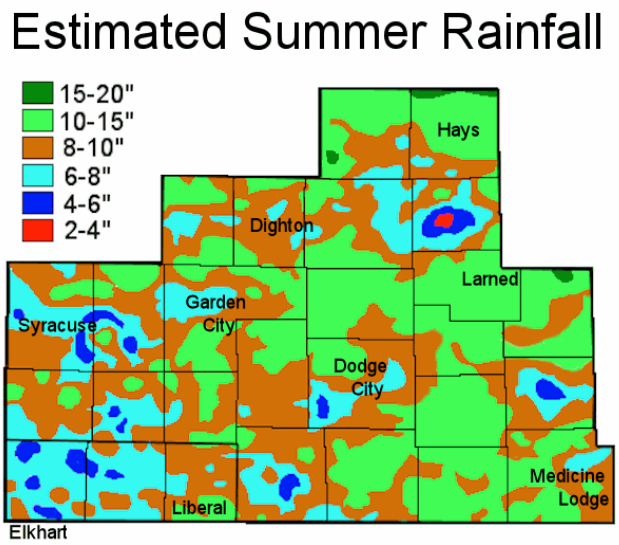
Snowfall from the event was heaviest from southeast Clark to Pratt Counties where 28 to 30 inches fell in a 24 hour period. The cooperative observer in Pratt reported 30 inches of snow in 24 hours! The 30 inch snowfall report in Pratt establishes a new 24 hour record for snowfall in Kansas. The previous record was 24 inches that fell at Norcatur on 26 October, 1996. Other unofficial observations included 28 inches 1.3 miles northwest of Pratt and 30 inches west-northwest of Preston. The cooperative observer in Coldwater reported 27 inches of snowfall in the 24 hour period from 7 AM on 27 March to 7 AM on 28 March but with a storm total of 30.5 inches of snow!



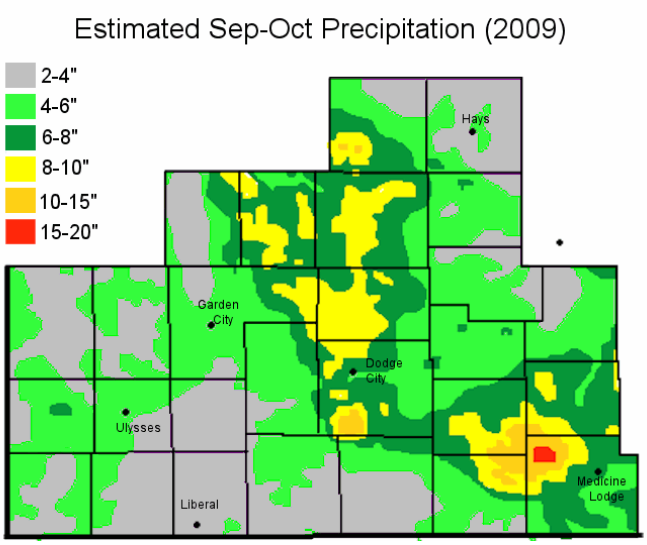
True spring-type weather arrived in mid April when several tornadoes were reported in the Kalvesta area doing some damage to a farm followed up in early May by more tornadoes south of Garden City where two persons were injured by flying debris. Additional tornadoes occurred in June, July and August. In our area (see map to the right) there were 36 tornadoes, still well above the yearly average of 15.



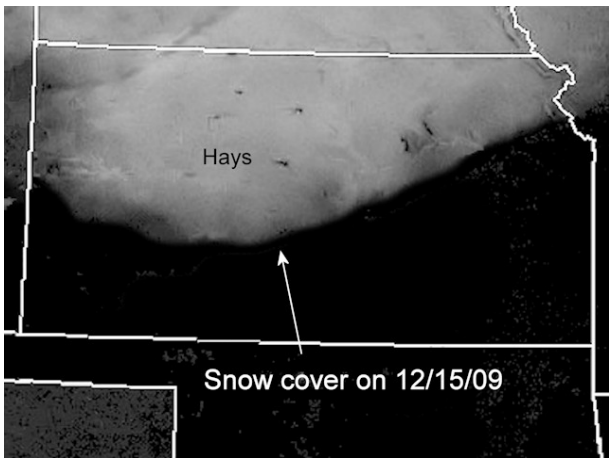
Rainfall began in earnest across a large part of the area during the summer months (June, July and August), although some locations still missed out. Temperatures were also below average even though there was an 8 day stretch of 100 degrees and above at many locations.



The fall months of September and October continued the trend of wet and cool conditions, again across the majority of the area. Throughout southwest Kansas there was huge difference in precipitation accumulations for the two months, thanks in part to some big storms in September that dropped copious amounts of rainfall. There was one area in northwest Barber county that recorded over 15 inches of rain during the two month period!



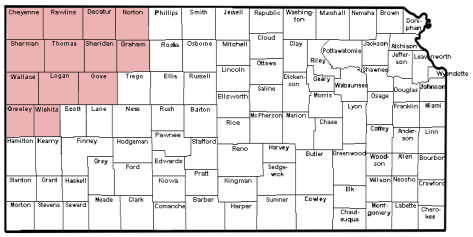
Towards the end of the year in early December, Arctic air made an intrusion into western Kansas. There was also a rather significant storm that impacted areas close to Interstate 70 with heavy snow and blizzard conditions. As of the 15th there was still a large snow field (see the satellite image). Even colder air and additional snows moved across western Kansas by end of the month.



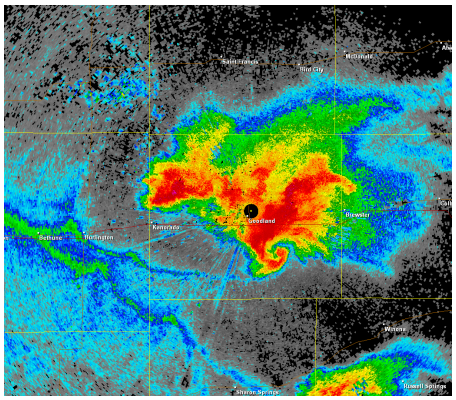
2009 Severe Weather Summary
Northwest Kansas
National Weather Service - Goodland, KS

2009 was a typical severe weather year in NW Kansas with the exception of a few noteworthy events. Eight tornadoes were reported in the 13 Kansas counties (map, right) served by the Goodland forecast office, which is slightly below average. All tornadoes were brief and rated EF0 on the Enhanced Fujita Scale. Seven of the eight tornadoes lasted one minute or less. The result was minimal damage, with no associated fatalities or injuries.

Kansas Counties Served By WFO Goodland



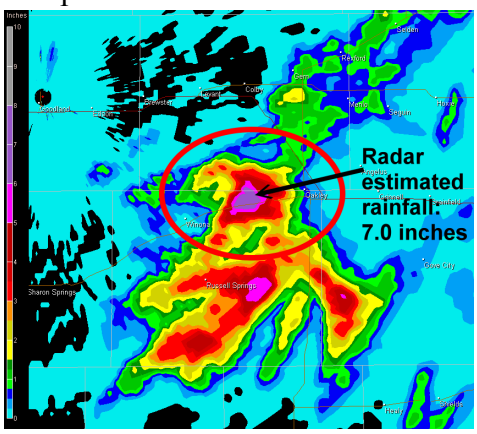
Storm spotters in northwest Kansas reported 152 severe hail events, 82 wind events, and 12 flood or flash flood events in addition to the 8 tornadoes. The first report of severe convective weather was received April 29th from Wichita County when law enforcement reported penny size hail south of Leoti. A short time later golf ball size hail was reported northeast of Selkirk.



Two significant events of the season were a pair of hail storms occurring in mid-July. On July 17th, an intense thunderstorm moved southwest across Interstate 70 near the Colorado border, resulting in broken vehicle windows and several accidents as drivers encountered golf ball to baseball size hail in addition to hail covering the road.

Three days later, a second and more intense storm blasted through Sherman County (radar image, left). That supercell raced southeast during the late afternoon packing grapefruit size hail, winds to 80 mph and several brief tornadoes. The storm rolled across the east side of Goodland affecting the airport and the National Weather Service office. Employee and station vehicles suffered broken windows and sustained thousands of dollars in damage (photo, right).

Crop losses with the Goodland storm were estimated at $13 million in Sherman County alone, while home, business and vehicle damage was estimated at $12 million, making this one of the costliest hail storms in recent history.



Flooding was also a concern during the year. Slow-moving thunderstorms dropped 4-7 inches of rain in the Oakley area late in the day on September 7. Rapid runoff continued overnight resulting in road closures on U.S. highway 40 and nearby county roads. Damage to utility poles alone was estimated at $30,000. A county bridge over the Saline River was heavily damaged, and several nearby homes were flooded.

Twenty Years after the Hesston Tornado

By
Randy Steadham
An NWS Perspective

Many people working 'weather' in the Midwest on Tuesday, March 13th, 1990 have memories of that day. That was the day over 60 tornadoes occurred from northwest Illinois to northern Texas and that was the day a very large and violent tornado ripped through Hesston, Kansas. I certainly remember that day. We, as National Weather Service (NWS) employees, battled the severe weather safely within the walls of the Wichita Weather Service Office (WSO).

Photo by Kevin Darmofal.

Three days earlier, Phil Swain, who had been in charge of the Wichita office for years, left me in charge before taking a new NWS position. I thought this temporary transfer of power meant I was going to pay the electric bill and, perhaps, negotiate a few shift changes until the new boss, Dick Elder, arrived. I did not know at the time that reporters from across the country and esteemed research meteorologists would soon focus their attention on a rare Kansas weather event. Later that week I had a greater appreciation of the NWS role to serve our local communities after a natural disaster. Over the next few days the multitude of contacts and inquiries to our office felt like a huge and unexpected responsibility.

Arguably, our most important job in the NWS is to warn people of imminent dangerous weather; in other words, to save lives. By observing our radarscope that day we were able to determine precipitation location, shape, intensity and movement. Weather radar was, and still is, our primary diagnostic tool for severe weather; spotters, ham radio operators, law enforcement officers, and all forms of the media are also vital to the NWS warning process.

The tornado that spawned near Pretty Prairie, Kansas appeared as a classic hook echo – a radar signature often associated with a tornado. As that hook echo began to take shape we began receiving a steady flow of eye-witness reports about that tornado and its location. The urgency of these personal accounts as received by phone and heard over the National Warning System loud speaker made it obvious we were dealing with a large and dangerous tornado.

The technology we used that day was sufficient to the task but was aging and frail. Over these last two decades the NWS has made vast improvements to modernize a weather office. In 1990 we were between eras. We had better communication equipment than the old teletype machines

used in earlier years; but, we had less dependable equipment than a current NWS office. We used the old Weather Surveillance Radar - 1957 (WSR-57). The WSR-57 had a cathode-ray tube. We would draw what we saw on a reflection plotter and then trace contours on a paper map overlay to locate a storm geographically. In contrast, the current weather radar, the WSR-88D, detects more specialized information about a storm and generates scores of colorful radar pictures on a variety of maps, all within a few minutes. Additionally, a wide range of users across the country can now instantly see those pictures.

I remember we did a good job warning people well ahead of the storm's destructive path, all while issuing warnings for other tornadoes and severe thunderstorms in other parts of the state. Our performance earned a Unit Citation from NWS Headquarters. On average, we sent statements every nine minutes on the status of the long-tracked Hesston tornado.

After a busy night, all thunderstorms had moved eastward beyond our warning area. The Kansas Area Manager, Jack May, arrived from Topeka early the next morning. A small contingency of NWS staff traveled west to begin performing a tornado damage survey.

As sparse as farmsteads are across rural Kansas in proportion to wide-open land, the tornado, as it seemed to me, capriciously found and leveled far too many homes and farm buildings. At times the ground in the path of the tornado had been scoured and curiously marked. Peculiar stacks of debris were interspersed. Trees in the path had the notorious shortened and defoliated appearance common with strong tornadoes. Further along the path we found the tornado had intensified where sturdy rural Kansas hedgerows appeared notched to the ground where the tornado had crossed dirt roads.

Photo by Kevin Darmofal:

We talked with people along the way. One man spoke of an eighteen wheeler that had apparently vanished from existence. That is, the engine or frame hadn't been located. One man held his arms widely up to the southwest. He, as I basically recall, said, "Coming over that hill the storm was so wide that it didn't look like a twister."

We eventually arrived at the western outskirts of Hesston. I saw the horrendous reality associated with yesterday's image of a storm on a cathode-ray tube. Looking east into the remains of Hesston, I remember thinking "the hook echo seemed so sterile and benign while all this was happening." There were few vertical obstructions down the wide swath the tornado took

through the town. Objects were often unidentifiable. The bare stump-remains of a once large old tree contained a remarkably twisted car or truck frame.

What stands out most in my memory of the Hesston tornado is the small death toll. What I dreadfully remember is two people did die. One young boy went with his family to the basement only to have the chimney fall in on him. A lady perished near Goessel. It was said she may have not been attentive to the weather. She may have been despondent after visiting her ill husband at a nearby hospital.

When you work for the NWS in Kansas, there are plenty of days when tornadoes are part of the mix. What was so memorable about the Hesston tornado? Few deaths in the midst of such massive destruction make this event worth studying. I believe when we consider the circumstances of the two casualties, we can clearly see the importance of Dick Elder's appeal to "DUCK!!" He says, "staying safe during tornado events requires all of us to remain ***aware of what is going on*** then know what to do to stay safe." We will never know if two lives might have survived by following each and every DUCK rule; however, there is a purpose for each rule. We need to be aware and do all of the DUCK rules:

D - **Down** to the lowest level like a basement or interior room on the first floor.
U - Get **Under** something sturdy.
C - **Cover** your Head.
K - **Keep** in your shelter until the storm has passed.

Even with the best technology in the world and with the timeliest of tornado warnings, the ultimate success depends upon individual actions to "**Duck**."

Randy M. Steadham served as the Acting Official in Charge at the Wichita NWS Office on March 13, 1990. He recently retired after a career that spanned over 39 years. He also served at National Weather Service Offices in Iowa, Illinois, Idaho, Colorado, and Oklahoma. His last position was at the Radar Operation Center in Norman, OK where he helped make scientific improvements to the Next Generation Weather Radar (NEXRAD) systems of 159 Doppler weather radars. Data from these radars are used to warn the public of severe weather and flash floods; support safe, efficient national airspace operations; and support water management, transportation, agriculture and forest management, and snow removal management.

The "Hesston" Tornado: Recollections from 20 years ago

By
Kevin Darmofal
A Storm Chasers Perspective

Although I have witnessed many tornadoes since March 13, 1990, the "Hesston" tornado was the first I saw, and to this day, the most memorable, in the 20 plus years of chasing storms in my spare time. I was working at WeatherData, Inc. at that time, and got off the night shift the morning of March 13th. Ken Smith was the morning TV meteorologist at KSN, and I remember we both worked a bit of severe weather that morning. We knew it was going to be a potentially volatile afternoon, and we planned to head out chasing, if possible, after I got some sleep that morning. Having only "chased" a few times since graduating a couple years before, we were relative novices back then, and had yet to witness a tornado on a chase. We had to gas up the car and get some film on the way out of town, and even then we only had 24 exposures in each 35mm camera. Little did we know of the monster tornado to come that afternoon, and to rephrase a famous quote from the movie Jaws, …"we were gonna need a bigger camera"… (ie. more exposures).

Photo by Kevin Darmofal: Initial tornado; about 8 SW of Castleton, KS (Figure 1)

We headed up K-96 toward Hutchinson, as a storm was already developing to the west of Wichita (in Kingman county). It was about 4 pm, when we arrived at a gas station in South Hutchinson, and called WeatherData to see what was going on with the storm developing to our southwest. I recall that Mike Smith was looking at the 74C radar, and relayed that the storm was quickly becoming a supercell and developing a hook. Since it was really the only storm in the area at the time, we decided to head south of town on K-17. As we approached just northeast of Castleton, we began to get into a little bit of light rain and small hail. We could see the lowering and developing wall cloud to our southwest (Figure 1), probably 8-10 miles away, and decided to pull off on the dirt road to Castleton. It was soon after we pulled off about 200 yards west of K-17, that we experienced a brief period of nickel to golf ball sized hail. After the hail ended, it was only a matter of minutes before we saw the funnel cloud and a small tornado tail touchdown (probably near Pretty Prairie). This being our first tornado, we were quite mesmerized and began snapping pictures. A woman came out the front door from the house behind us on the road, to ask if we needed to take

Photo by Kevin Darmofal: Tornado ; 4 S of Castleton, KS (Figure 2)

shelter. We declined , thinking the storm would miss us to the south, and told her to call in a report of a tornado. This was before the days of cell phones, and was really the only way of relaying what we saw. It was not much longer that a sheriff's patrol car also pulled off the road where we were along K-17. From a chase perspective, we were not in a very good location (just north of the approaching storm), and as the storm grew closer and bigger in size, we did contemplate moving from our location, but instead stayed fixed on the approaching tornado (Figure 2). In our awe and amazement of this tornado, we used up much of our 24 exposures in the first few minutes of the tornadoes life. However, the last several photos are quite impressive, as the large tornado passed just south and east of our location (Figure 3). It was approximately 430 pm when the last few pictures were snapped and the tornado moved off to our northeast. After retracing the damage path, the tornado came as close as three-quarters of a mile as it passed to our south and east (Figure 4), and we could see multiple vortices at the base of the tornado whipping along the ground. Also being this close, we could hear the low pitch groan of the tornadic winds, not really a freight train sound, but more of a waterfall of wind! As the tornado passed by, a heavy curtain of rain and strong northwest winds to around 70 mph buffeted Ken's small Honda Civic, associated with the rear-flank downdraft on the back side of the tornadic supercell. We quickly lost sight of the tornado as we proceeded just east on the dirt road, east of K-17. We came upon damaged farm equipment and fencing strewn about the fields along the dirt road, and turned around. So awestruck by what we had just witnessed, we decided to jaunt south to see what damage the tornado caused along K-17. It passed near where the Ninnescah River crosses K-17, and uprooted a row of large trees. Of course by then we were both out of film.

Photo by Kevin Darmofal: Tornado ; 1.75 SE of Castleton Rd. at K-17 (Figure 3)

Photo by Kevin Darmofal, Tornado; just E of K-17 at Castleton Rd. (Figure 4)

Looking back now as an experienced chaser, I would have done a lot of things differently on March 13th. Besides being on the wrong side of the storm, I am sure we would have tried to continue on to chase this monster tornado. Little did we know at the time, however, that this tornado would stay on the ground as long as it did, with the ferocity of an F-5, which eventually hit Hesston. After looking at a bit of the damage near K-17, we did head north and east and came to Burrton after the tornado passed through that location. I recall we stopped briefly at a house that was damaged where some rescue vehicles had converged. Someone said that they heard a person was trapped in that house. I am not sure if this was the location where the 6 year old boy was killed, but it was kind of sobering at the time. As we headed southeast toward Wichita along K-96, we could see the huge storm and a big dark blue cloud mass hugging close to the ground along the horizon. It was probably close to 530 pm by then, and little did we know at the time, that this tornado was about to become the "Hesston" tornado.

Check out a Storm Spotter and Weather Safety Training presentation near you this spring…

Each spring the National Weather Service offices that serve the state of Kansas, conduct storm spotter and weather safety training sessions in each county. The sessions are free and open to the public. You are not required to become a storm spotter, nor will you have to take a test; however the presentations provide a great deal of information on severe weather in Kansas. They cover severe weather safety, ways to get weather information from the National Weather Service and you can meet a meteorologist from your local National Weather Service office.

The schedule for storm spotter training sessions varies in each community, please check out www.weather.gov for more information on a training session in your area.

Kansas Tornado Facts

Days with more than 20 tornadoes

Date	#Tornadoes
05/23/08	70
06/15/92	39
05/05/07	36
06/04/55	33
05/29/04	28
10/26/06	28
05/25/97	25
06/09/05	25
05/15/91	24
07/07/04	23
04/26/91	21
06/15/09	21

Kansas Tornado Count By Decade

1950s: 560
1960s: 457
1970s: 303
1980s: 339
1990s: 789
2000s: 1192 (thru 2009)

Most Tornadoes in One Episode

May 23, 2008	70 Tornadoes
June 15-16, 1992	41 Tornadoes

National Weather Service

Weather Safety

Kansas

Have you ever sat down with your family to discuss and plan what you would do in case of an immediate weather threat? If you haven't, now would be an excellent time to sit down with your family and devise a plan. Finding the time to do this can be difficult, but taking the 15 minutes to develop and practice a plan could save the lives of ones you love. Please remember these tips when planning and carrying out your actions.

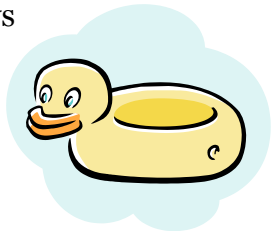
Tornado Safety Tips

Before the storm:

- Develop a plan of action
- Have frequent drills
- Have a NOAA Weather Radio with a warning alarm tone
- Listen to radio and television for information
- If planning a trip outdoors, listen to forecasts

If a warning is issued or threatening weather approaches

- Always remember **"DUCK"**
- Stay away from windows
- Get out of automobiles



"DUCK"

Down to the lowest level
Under something sturdy
Cover your head
Keep in the shelter until the storm has passed

In Homes or Small Buildings: Go to the basement or to an interior room on the lowest floor (e.g. closet or bathroom). Upper floors are unsafe. If there is no time to descend, go to a closet, a small room with strong walls or an inside hallway. Wrap yourself in overcoats or blankets to protect yourself from flying debris.

In Schools, Hospitals, Factories, or Shopping Centers: Go to interior rooms and halls on the lowest floor. Stay away from glass enclosed places or areas with wide span roofs such as auditoriums and warehouses. Crouch down and cover your head. Don't take shelter in halls that open to the south or the west. Centrally-located stairwells are good shelter.

In High-Rise Buildings: Go to interior small rooms or halls. Stay away from exterior walls or areas with glass.

In Mobile Homes:

ABANDON THEM IMMEDIATELY!!!

Many deaths occur in mobile homes. If you are in a mobile home when severe weather approaches, leave it immediately and go to a substantial structure or designated tornado shelter. Determine your shelter ahead of time so you don't have to think about it when weather strikes.

If no Suitable Structure is Nearby: Lie flat in the nearest ditch or depression and use your hands to cover your head. Be alert for flash floods.

Tornadoes and Overpass Safety

Many people mistakenly think that a highway overpass provides safety from a tornado. In reality, an overpass may be one of the worst places to seek shelter from a tornado. Seeking shelter under an overpass puts you at greater risk of being killed or seriously injured by flying debris from the powerful tornadic winds.

Tornadic winds can make the most benign item a dangerous missile. In addition to the debris that can injure you, the winds under an overpass are channeled and could easily blow you or carry you out from under the overpass and throw you 100s of yards.

As a last resort, lie flat in a ditch, ravine or below grade culvert to protect yourself from flying debris. If not ditch is available, you may remain in your vehicle, put on your seatbelt, lower yourself below window level, and cover your head with your hands or a blanket.

Lightning Safety

- Watch for developing thunderstorms and be ready to act when thunder is heard.
- Lightning can strike as far as 10 miles from an area where it is raining. That's about the distance you can hear thunder.

If you can hear thunder, you are within striking distance. Seek safe shelter IMMEDIATELY!

- Outdoor Activities: Minimize the risk of being struck by moving indoors or to vehicles at the first roar of thunder.
- Inside Activities: Things to avoid
  - Corded phones
  - Computers
  - Other electrical equipment
  - Indoor/Outdoor pools
  - Tubs and showers and other things connected to metal plumbing

  Wait 30 minutes after the last roar of thunder before going outside again.
- Help a Lightning Victim: Call 911 and get help immediately. You are in no danger when helping a lightning victim. The charge will not affect you.

When Thunder Roars, Go Indoors!

Flood Safety

- Floods, especially Flash Floods kill more people each year than any other weather phenomenon.
- As little as 6 inches of fast moving water can sweep you off of your feet.
- As little as 18-24 inches of water is enough to float a car and carry it away.
- If you see a road barrier across a flooded roadway....

TURN AROUND. DON'T DROWN!

- Tune to the NOAA Weather Radio, or your favorite news source for all flood and any other weather related information.
- Leave areas subject to flooding, such as dips, low spots and underpasses.
- Do not attempt to cross flowing streams, you don't know how deep the water could be.
- Never drive through flooded roadways.
- If your vehicle is suddenly caught in rising water, leave it immediately and seek higher ground.
- Report any flooding to your local authorities or to the National Weather Service.

Turn Around. Don't Drown!

National Weather Service
Kansas

Disaster Kit

www.weather.gov

Are you ready?

When Disaster strikes, it pays to be prepared. Having a Disaster Kit prepared will save you time and could save your life. A disaster kit should be in your *designated shelter* and it would also be helpful to have a *smaller version in a small backpack or other containers that are easily carried if you need to evacuate your home*. Disaster kits should be reviewed annually to be kept up-to-date with your family's needs. Items in your kit should include, but are not limited to:

Staple Items

- □ 3 day supply of Water (1 gallon per person per day)
- □ 3 day supply of nonperishable, ready to eat food items and manual can opener
  - □ High Energy Foods, e.g. Peanut Butter
  - □ Juices, dried Milk
  - □ Sugar, Salt, Pepper
- □ First Aid Kit (see list for individual items)
- □ Flashlight and extra batteries, or ones that generate their own energy by shaking them
- □ Battery operated or Hand Crank Radio
  - □ NOAA All-Hazard Weather Radio
- □ Clothing— Think about the climate; warm and/or cool season clothes
- □ Shoes
- □ Sanitation and Hygiene items (such as hand sanitizer, moist towelettes and toilet paper)
- □ Matches in waterproof container
- □ Whistle
- □ Blankets
- □ Other tools (e.g. hammer, pliers)
- □ Cash and coins
- □ Photocopies of important documents, personal ID's and credit cards
- □ Baby needs
- □ Special Needs
  - □ Prescription medications, eye glasses,
  - □ Contact lens solution, etc.
- □ Games to pass the time (e.g. cards)

BE PREPARED

First Aid Kit

- □ Sterile adhesive bandages in assorted sizes
- □ 2-inch and 4-inch sterile gauze pads
- □ Hypoallergenic adhesive tape
- □ Triangular bandages
- □ Scissors & Tweezers
- □ 2-inch and 3-inch sterile roll bandages
- □ Waterless alcohol-based hand sanitizer
- □ Antiseptic Wipes
- □ Petroleum Jelly or other lubricant
- □ Latex Gloves
- □ Anti-bacterial Ointment
- □ Aspirin or non-aspirin pain reliever
- □ Antacid (for upset stomach)
- □ Cold pack

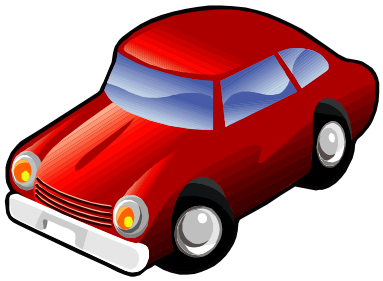
Winter Disaster Kit

Winterizing your Disaster Kit

If you live in a cold climate, you must think about warmth. It is possible that you will not have heat during or after a disaster. Think about your clothing and bedding needs. Be sure to include one set of the following for each person to add to your Disaster Kit.

- ◻ Jacket or Coat
- ◻ Long pants and long sleeve shirt
- ◻ Sturdy Shoes
- ◻ Hat, Mittens, and Scarf
- ◻ Sleeping Bag or Warm Blanket
- ◻ Extra Blankets
- ◻ Lantern or Flashlight

A Disaster Kit for your Vehicle



You may be in your vehicle when disaster strikes, or possibly stuck in your vehicle in a summer/winter environment. Below are a few items that you should keep in your car as part of your Vehicle Disaster Kit.

- ◻ Flashlight and extra batteries
- ◻ Maps
- ◻ Small First Aid Kit
- ◻ White Distress Flag
- ◻ Tire Repair kit
- ◻ Booster/Jumper cables
- ◻ Air pump
- ◻ Flares
- ◻ Bottled water
- ◻ Non-perishable foods such as granola bars

<u>Winter supplies</u>

- ◻ Blanket or Sleeping Bag
- ◻ Hat and Mittens
- ◻ Shovel
- ◻ Sand Bags
- ◻ Tire Chains
- ◻ Windshield Scraper
- ◻ Florescent Distress Flag

<u>Summer Supplies</u>

- ◻ Sunscreen
- ◻ Shade Item (umbrella or wide brimmed hat)
- ◻ Bug spray

Sirens Are An Outdoor Warning System

Every year the National Weather Service and the Emergency Management communities get together and provide severe weather information for the public. Every year we emphasize the fact that the Outdoor Sirens are just that…an Outdoor Warning System. Every year we get a multitude of calls telling us that the sirens can't be heard while in the house.

Severe weather season usually begins in the early spring in Kansas. We all need to be prepared for severe weather at any time of the day or night and at any time of year. The National Weather Service, Emergency Management, Law Enforcement, the 9-1-1 Center, and the Fire Department cannot notify every individual of the possibility of severe weather in their town. The local media outlets and All Hazards NOAA Weather Radio are your best sources for information concerning severe weather watches and warnings. Do not wait for the sirens to be your warning system at home, sirens may not be working if the power is out and oftentimes cannot be heard indoors. Sirens may not be activated for other severe threats such as damaging straight line winds in excess of 60 mph, large hail and flooding. Monitor NOAA Weather Radio and local media and then take the appropriate action for the severe weather threat. If it appears that a severe thunderstorm is approaching your location, do not wait for the outdoor sirens, take immediate action to protect your life and the lives of others in your home.

Hundreds of volunteer storm spotters, amateur radio operators, and first responders put their lives on the line every time there is severe weather in the local area. They do this because they care about the people in their communities and want to make sure those people are given the best chance at survival. The storm spotters, emergency managers, law enforcement and other volunteers immediately relay severe weather reports to the National Weather Service. The National Weather Service in turn disseminates that information to the media and public through warnings, statements and local storm reports. Getting the word out to the public in a timely manner may save lives. When severe weather threatens at night, when most people are sleeping, it can be especially dangerous. Oftentimes, in the heat of the spring and summer, we cannot hear outdoor sirens over running air conditioners. A NOAA Weather Radio with a back-up battery can make the difference for you and your family.

Take responsibility…listen to the media….take protective action….survive to enjoy the wonderful warm sunny days that also come this time of year.

Americans live in the most severe weather-prone country on Earth and the state of Kansas is no exception. Each year a startling 10,000 thunderstorms, 2,500 floods, 1,000 tornadoes, and 10 hurricanes impact the United States. Potentially deadly severe weather impacts every American. Communities can rely on the National Weather Service's StormReady program to help them guard against the ravages of Mother Nature.

What is StormReady?

Ninety percent of all presidentially declared disasters are weather related. Through the StormReady program, NOAA's National Weather Service gives communities the skills and education needed to survive severe weather – before and during the event. StormReady helps community leaders and emergency managers strengthen their local hazardous weather operations.

StormReady Does Not Mean Storm Proof

StormReady communities are better prepared to save lives from the onslaught of severe weather through better planning, education and awareness. Communities have fewer fatalities and property damage if they plan before dangerous weather arrives. No community is storm proof, but StormReady can help communities save lives.

How Can My Community Become StormReady?

The entire community – from the mayor and emergency managers, to business leaders and civic groups – can take the lead on becoming StormReady. Local National Weather Service forecast offices work with communities to complete an application and review process. To be recognized as StormReady, a community must:

- ✔ Establish a 24-hour warning point and emergency operations center.
- ✔ Have more than one way to receive severe weather warnings and forecasts and to alert the public.
- ✔ Create a system that monitors local weather conditions.
- ✔ Promote the importance of public readiness through community seminars.
- ✔ Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Go to http://www.stormready.noaa.gov for more information.