National Weather Service
Wichita, KS

Storm Fury on the Plains

Spring Spotter Newsletter

April 2010

Inside this issue:

THE "HESSTON" TORNADO:
Recollections from 20 years ago – A Storm Chaser's Perspective

By: Kevin Darmofal, Lead Forecaster

Note: Kevin Darmofal, is currently a Lead Forecaster at the National Weather Service in Wichita, KS, but this article was written from a Storm Chaser's point of view.

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).

Figure 1 Initial tornado; about 8 SW of Castleton, KS

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

Figure 2: Tornado; about 4 S of Castleton, KS

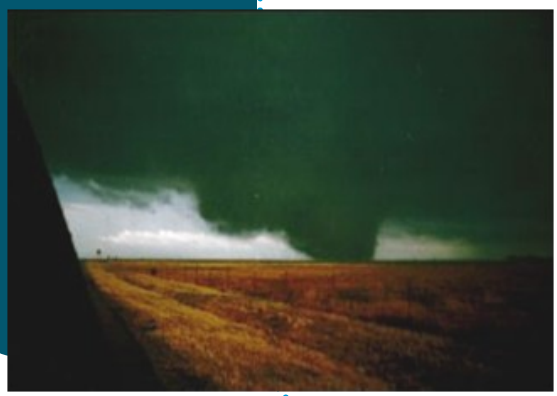
road, to ask if we needed to take shelter. We declined , thinking the storm would miss us to the south, and told her to call in a report of a tornado. This was before the days of cell phones, and was really the only way of relaying what we saw. It was not much longer that a sheriff's patrol car also 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.

...”we were gonna need a bigger camera”...

Figure 3 Tornado ; 1.75 SE of Castleton Rd.

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.

Figure 4: Tornado; just E of K-17 at Castleton Rd.



Vanessa Pearce: Wichita's Newest Forecaster

Welcome Vanessa!

Vanessa Pearce is the newest intern to arrive at the Wichita National Weather Service Office.

Vanessa is originally from Maple Grove, MN, a Northwest suburb of the Twin Cities, Minneapolis and St. Paul Minnesota. Vanessa recently graduated from the University of North Dakota with degrees in Atmospheric Sciences and Spanish. Before moving to Kansas, Vanessa was a SCEP (Student Career Experience Program) student at the Grand Forks National Weather Service Office.

Her love of weather began at a young age. According to a neighbor, Vanessa was able to name all of the local television meteorologists at the age of 18 months old. She continued her passion by trying to incorporate weather into every school project possible which included the construction of a 4 foot tall raindrop in 5th grade.

Vanessa hopes to use her two degrees in a way to help the communities of the United States understand the hazards of weather and how they could better protect their families and themselves. Her goal is to discover the ways the public responds to the current watch/warning system and find a better way to alert them by forming stronger communication between all entities.

In her free time, Vanessa enjoys sports especially hockey, being outdoors, and cooking. She is eager to be a part of the staff at the Wichita office, and looks forward to being a part of the weather operations in the Central Plains.

Community Based Spotters

Core Values

By: Chance Hayes, WCM

Your duty as a volunteer community Based Spotter is extremely important to us at the NWS. You are basically our eyes in the field. Your reports to the NWS are vital in the hierarchy of communications. It is your report that gets peoples attention, aids the warning forecaster, and helps to save lives and property. So, as we move into this severe weather season I hope that you keep these core values in mind and fulfill your role as a Community Based Spotter.

- **Aware of the Expected Weather**
- **Am Trained at Recognizing Significant Weather**
- **Am Dedicated to Reporting the Significant Weather I Observe**
- **Will Ensure that Those that I am Associated With, as well as Myself, Will Stay Safe During Significant Weather.**

"Severe Thunderstorms are viewed by too many people as run of the mill weather.... Wrong"

Inland Hurricane of the Summer of 1990

By: Dick Elder, Meteorologist in Charge

Virtually everyone respects the power of tornadoes and tornado warnings and outdoor sirens get quick attention from those in harm's way. Tornadoes are the often fatal beasts of nature and nobody has ever been able to find anything good about them.

Unfortunately, in most people's minds, Severe Thunderstorms are another matter. Although they can and do produce tornadoes, Severe Thunderstorms are viewed by too many people as run-of-the-mill weather, you just have to put up with. Watch out for hail, strong winds and heavy rains, and everything will be OK.

Wrong! Many people in Kansas Tuesday evening, June 19, 1990, learned a valuable lesson about just how wrong that supposition about severe thunderstorms can be.

Storms of varying intensity developed in the western part of south-central Kansas into the evening hours that day. Around 8:15 p.m., one storm intensified in the vicinity of Pratt and began producing wind gusts in excess of 60 mph. The storm moved to the east-northeast over the course of the next two hours, and carved out a 25-mile-wide swath of damage from Pratt through northern Sedgwick County and much of Wichita. The storm then seemed to follow the Kansas Turnpike to near Emporia.

Winds associated with this storm, which has come to be known as the "Inland Hurricane," were estimated to be in the 80-120 mph range. Thirty three people were injured; but, fortunately no one was killed. This storm caused more than $80 million dollars in damages – from straight line winds. The damage total was more than three times the damage that resulted from the violent tornado touchdowns that occurred earlier that year on March 13; the day of the Hesston Tornado.

"As the evening of June 19th, 1990, certainly proved, rotation of a tornado isn't necessary to cause damage."

Everyone associated with it in any manner remembers the devastation of the Hesston Tornado. So why isn't this June storm remembered as well?

A main reason is that the majority of the damage from this storm came not from tornadoes, but from the strong, straight line winds created by the progressive severe thunderstorms. Wind is a major factor in all thunderstorms. When gusts of 60 mph or more occur, the National Weather Service issues Severe Thunderstorm Warnings, because winds of this magnitude can cause damage. Wind speeds of 75 mph (actually hurricane strength winds) and more are as strong as a weak tornado.

As the evening of June 19, 1990, certainly proved, rotation of a tornado isn't necessary to cause damage. Straight line winds can be just as devastating. The evening thunderstorm winds carved out a 25-mile-wide damage path; typical, tornado damage paths are less than a mile wide.

Storms that produce tornadoes the size of the 1990 Hesston Tornado are very rare. Storms that produce 80-120 mph wind gusts like the severe thunderstorms of 20 years ago are much more common.

Because of the potential dangers of damage and injury, don't ignore Severe Thunderstorm Warnings. The powerful straight lines winds can over-turn mobile homes and vehicles. They can blow vehicles off the road and turn them into missiles. They can snap power poles, tear off roofs, damage buildings, and turn fairly large objects into dangerous projectiles that can injure or even kill.

As we prepare for Severe Weather Season 2010, remember that, year in and year out, straight line winds from severe thunderstorms cause more damage than tornadoes. When Severe Thun-

derstorm Warnings are issued for your location, don't ignore them. Stay tuned to NOAA Weather Radio or commercial broadcasts to keep informed of weather conditions, and be prepared to **DUCK**.

That is:

D – get **Down** to the lowest level of the building (the basement or interior first floor room)
U – get **Under** something sturdy
C – **Cover** your head
K – **Keep** in your shelter until the storm has passed

Remembering the 1990 Hesston, Kansas, Tornado

A National Weather Service Meteorologist's Perspective

By Richard Elder, Meteorologist in Charge

"...[they] had no idea they would be part of history..."

As they reported for duty monitoring severe storms in south-central Kansas the morning of March 13, 1990, the staff at the Wichita National Weather Service office had no idea they would be part of history before the day was through.

The Wichita staff, which consisted of six meteorological technicians and three entry level meteorologists were about to embark on their third day in a row of working severe weather in their area of responsibility. (They made it four days in a row March 14.)

Wichita and south-central Kansas lays in the volatile zone between the moisture laden air of eastern Kansas and the dry air of the Great American Desert that begins in the western part of the state. Forecasters and residents of the area are well aware of the frequency and speed with which calm weather can turn into a maelstrom.

This day, even to weather hardened Kansans, would defy ones wildest imagination. Before the day was through, they would see

Two of the most violent tornadoes on record (F-5 on the Fujita tornado scale)

Photo of the Hesston Tornado, courtesy of the Wichita Eagle


Photo by Herb Schroeder Jr.

The first F-5 tornado to hit the state since 1966

The earliest in the year an F-5 tornado ever occurred that far northwest in the United States

One thunderstorm that produced tornadoes for more than 3-1/2 hours over the span of nearly 120 miles

By late morning March 13, 1990, thunderstorms were producing hail and strong winds over parts of south-central Kansas. A storm formed southwest of Medicine Lodge in Barber County at about 2:30 p.m. and grew in size and intensity as it moved to the northeast. By 4:20 p.m., the storm had traveled about 45 miles and was reported to be dropping golf ball-size hail on Pretty Prairie in Reno County.

At 4:34 p.m., prompting recall of the adage that tornadoes follow large hail, a tornado touched down near Pretty Prairie, uprooting trees and damaging farm buildings. The tornado could be seen for miles as it tracked northeast. This tornado was not like the short-lived rope tornadoes common to Kansas. It stayed on the ground and intensified as it moved past the southeastern Reno County community of Haven, about 30 miles from the touchdown point.

"The tornado soon intensified to F-5 strength.... It was heading directly for Hesston,..."

The tornado entered Harvey County southwest of Burrton and quickly became a killer. A woman took shelter in the basement of her rural home southeast of the town along with her two young sons and a neighbor couple. Bricks from the collapsing chimney fell into the basement killing the woman's six-year-old son.

The tornado soon intensified to F-5 strength, capable of demolishing well-built structures, launching cars like missiles and pulling pavement from roadways. It was heading directly for Hesston, about 15 miles away in the northeastern corner of the county.

At F-5 strength, the tornado tore into Hesston at 5:37 p.m. It took only two and a half minutes for the monster tornado to rip through the town. Thanks to nearly 40 minutes of warning from the Wichita forecast office, townsfolk

had sufficient time to take shelter and nobody was killed. The tornado did cause 16 injuries and damaged or destroyed 226 homes and 21 businesses. One of the destroyed businesses was the Pizza Hut, where only the walk-in cooler remained – crammed with 15 people who rode out the tornado inside it.

The tornado weakened to F-4 intensity as it devoured Hesston, still remaining a powerful force. Another tornado touched down about a mile north of Hesston and the two tornadoes traveled parallel paths for about 7 miles until merging into a single vortex south of Goessel in Marion County. The merged tornado quickly regained F-5 strength. At about this time, it demolished another home. The body of the woman who lived there was later found in the debris of what had been her home for 30 years.

"Nineteen tornadoes were observed in Kansas on March 13th, 1990..."

Still tracking on the ground, the tornado narrowly missed the Marion County communities of Hillsboro (about 11 miles from Goessel) and Lincolnville (about 27 miles from Goessel). The twister weakened to F-2 intensity as it moved into Morris County and finally dissipated about 8 miles west of Alma in Wabaunsee County.

The thunderstorm that spawned the killer tornadoes continued to the northeast, and dropped an F-1 tornado 4 miles east of Wamego (about 13 miles from Alma) in Pottawatomie County before the storm ran out of energy.

As noted, the Hesston Tornado was truly one for the record books. Among other highly unusual weather phenomena, witnesses saw two F5 tornadoes originate from the same storm, saw tornadoes traveling in tandem and saw two tornadoes merge into one.

Nineteen tornadoes were observed in Kansas on March 13, 1990, and 59 tornadoes touched down across the central and southern plains. A total of 78 tornadoes were observed nationwide March 11-14.

Submit your Storm Reports Via Twitter!

By: Jerilyn Billings, Meteorologist Intern

Social Media is making its way into the Meteorology world. Twitter is a social media website that keeps people connected by its users sending frequent messages about what they are doing in 140 characters or less, more commonly known as tweets. This mode of quick messages, similar to text messaging, is a good way for others to find out what one person is doing and/or what is going on at their location. The National Weather Service in Wichita now has the capability to observe tweets sent with a special identifier as storm reports.

All you need is a free Twitter account, and you too can submit storm reports to the NWS. Many people tweet on their mobile phones, but many also tweet using a PC based program. If your phone has GPS it may have the ability to geo-code the tweets that you send using a 3rd party application. Geo-coding is the ability to easily add a location to your tweet automatically. If you do not have the ability to geo-code your tweet automatically, then to give a proper location, it is important to add the location to the tweet in the proper format (see below).

If you would like to send in a storm report via Twitter, just follow these simple steps.

1. Sign up at Twitter.com for an account
2. Use the special identifier #wxreport in your tweet
3. Follow the proper instructions for how to report your location
4. Send significant weather tweet.

How to Properly code a Tweet sent to the NWS

- **With** Geotagging on a 3rd party Twitter Application (i.e. not using Twitter.com, m.Twitter.com (mobile version) or via text messages):

  #wxreport <your significant weather>

- **Without** Geotagging on a 3rd party Twitter application or on Twitter.com

  #wxreport WW <*your location*> WW <your significant weather>

To see More Examples, Instructions and FAQs, please see the Last Pages of this Newsletter or see our webpage at

http://www.crh.noaa.gov/ict/?n=twitterreports

Your spotter number and what it means to the NWS

By: Chance Hayes, Warning Coordination Meteorologist

First off, I would like to thank you for volunteering your time to provide observations to us at The National Weather Service. Your observations and reports are crucial to the warning decision process. There is not a better call to action than an actual report from a trained spotter. Therefore, it is very important for you to be proactive in providing us a detailed report of what has occurred at your location. By providing us with your spotter number along with your report, we can quickly ascertain your location for accurate and timely dissemination to our media and emergency management partners. So, if you have forgotten what your spotter number is, please send an email requesting your number to vanessa.pearce@noaa.gov or to chance.hayes@noaa.gov

Getting to Know your National Weather Service Team

Bradley (Brad) Ketcham, Lead Forecaster

Having grown up in the Midwest, Brad always had an interest in the weather, even at a young age. When the weather would turn bad in Kansas City, he would go outside to watch the approaching storms instead of taking cover. One such storm produced a tornado that hit his Granddads' farm near Braymer, Missouri, back in the early 80's. Brad was fascinated by the damage that this F1 tornado caused, including knocking down a 4-foot diameter Elm tree onto the corner of his granddads' house, and wiping out a barn. Even with the barn destroyed, his red Farmall tractor was practically untouched. Thus, Brad's interest and fascination grew in severe weather and damage surveys. Brad's formal education took him to the University of Missouri, where he graduated in 1991 with a Bachelor of Science in Meteorology. Shortly after college, he was hired by the National Weather Service as an intern at Kansas City, Missouri. Brad's forecast career has taken him across the Midwest, from Kansas City to Central Illinois as a Journeyman forecaster and then eventually to Wichita, Kansas where he became a lead forecaster in 2002.

Brad Ketcham giving a Storm Fury on the Plains Spotter Talk in March 2010

Some of Brad's duties as a Lead Forecaster include being one of the operational shift supervisors, which means he is one of the forecasters that oversees the day-to-day forecast operations at the NWS Wichita. Some of Brad's most memorable weather events include, working long hours during the Great Flood of 1993 along the Missouri River in Kansas City, being the warning forecaster during the Mulvane, Kansas Tornado

"...most memorable weather events include the Great Flood of 1993..., ...the Mulvane,KS Tornado... "

(The Great White Tornado) in June, 2004, and, being on shift during the Greensburg, Kansas tornado. Brad watched the radar in awe as this devastating tornado moved through Dodge City, Kansas's area, before it moved into Central Kansas.

Some of you may recognize Brad from the yearly "Storm Fury on the Plains" spotter and weather safety presentations. Each year, Brad helps Chance Hayes (ICT-Warning Coordination Meteorologist), travel across Central and Southern Kansas giving this presentation to audiences interested in severe weather.

Brad has also co-authored a paper published in the AMS Monthly Weather Review about a tornado producing Derecho across Central Illinois in '98. He also, presented a similar paper at a couple of Severe Storm Conferences. Brad has also been the former President of the local AMS/NWA chapter, where he helped organize and host a severe storm conference in Wichita, Kansas (AirMass 2005). In Brad's spare time, he enjoys being a softball coach for his daughter's team and playing tournament Texas Hold'em Poker.

Interesting Tornado Statistics

By: Andy Kleinsasser, General Forecaster

Every seasoned Kansan knows that we live in the heart of tornado alley. In fact, the Heartland of America boasts one of the most active (if not THE most active) region in the entire world tornado-wise. But when are the peak Kansas tornado days each year? How many Kansas tornadoes have occurred each year since official tornado records began in 1950? What time of the day is historically the most active tornado-wise? Finally, how does Kansas rank nationwide regarding tornado numbers? The following graphs will attempt to answer these questions.

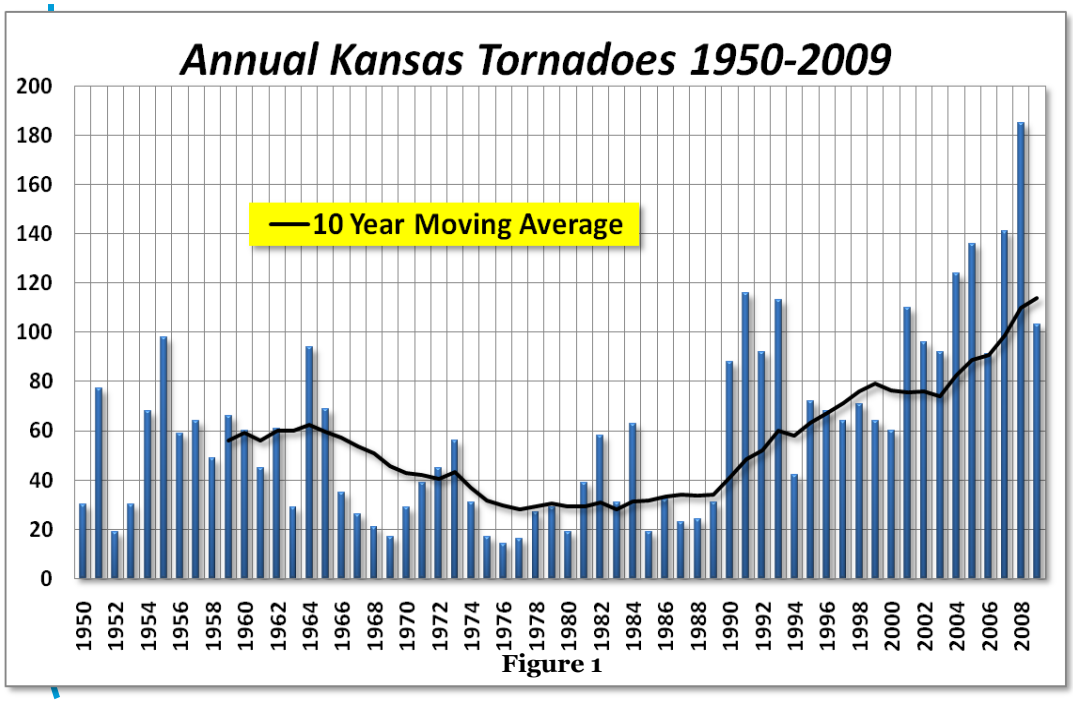


Figure 1

Figure 1 depicts the Annual Kansas tornadoes from 1950 to 2009, along with a 10-year moving average. According to National Weather Service records, the most tornadoes occurred in 2008, when over 180 tornadoes ravaged the Sunflower State. 2009 recorded about 100 tornadoes statewide, a shade under the 10-year moving average. The graph indicates that the average annual Kansas tornado count has been increasing since roughly the late 80s. However, this is

likely due to increased tornado awareness and education, as well as a denser spotter network, which in turn produces more tornado reports sent to the National Weather Service. Another possible explanation is the implementation of the Next Generation Weather Radar network during the early 90s, which aided tornado identification per radar. With the exception for natural variability, the likelihood that tornadoes are becoming more numerous each year/decade is unlikely.

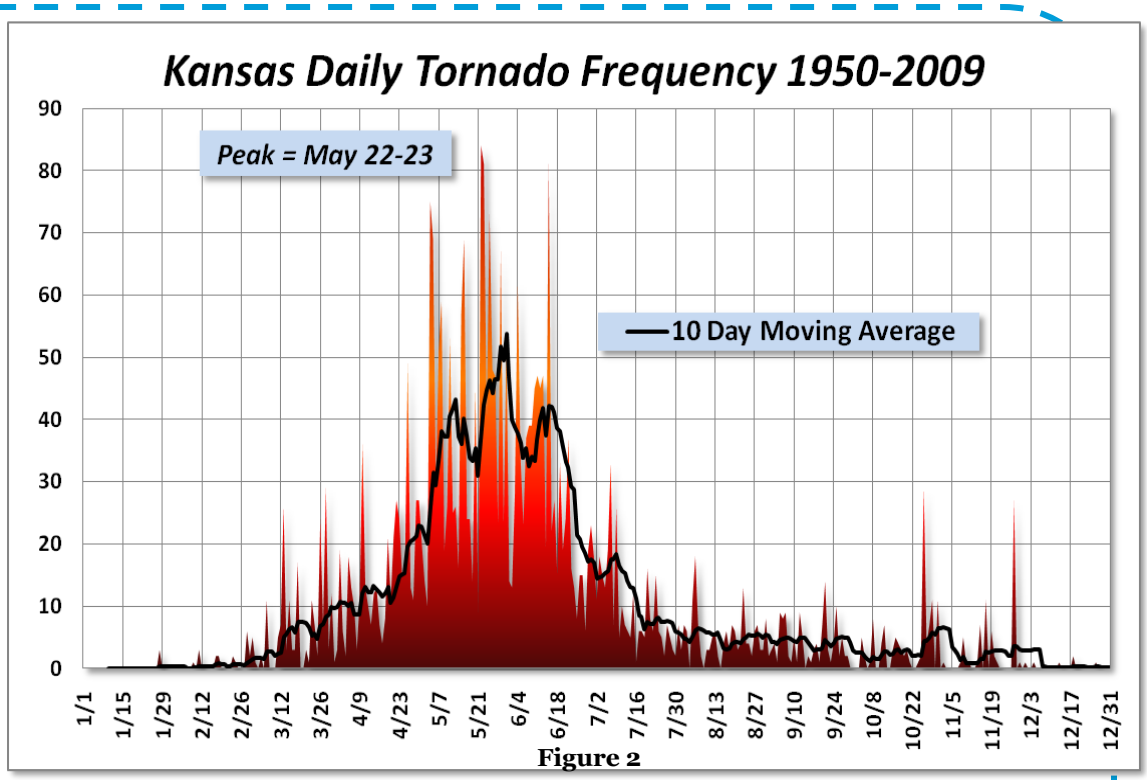


Figure 2

Figure 2 shows us the daily Kansas tornado frequency in the time period spanning 1950 to 2009. As the graph indicates, mid to late April through mid June historically have the highest tornado frequency, with the peak occurring around May 22nd-23rd with over 160 tornadoes occurring over that two day period since 1950. The 10-day moving average peak occurs right around Memorial Day. Notice the sharp drop-off by mid to late June. This is due to the jet stream (storm track) shifting north, affecting mainly the northern tier of the country through the rest of the summer. This effectively shuts down the Kansas "tornado machine", as the hot, "dog-days" of summer set in. Notice the secondary minor peak in tornado activity October-November—when the onset of winter battles with the relatively mild fall airmass still in place across the region.

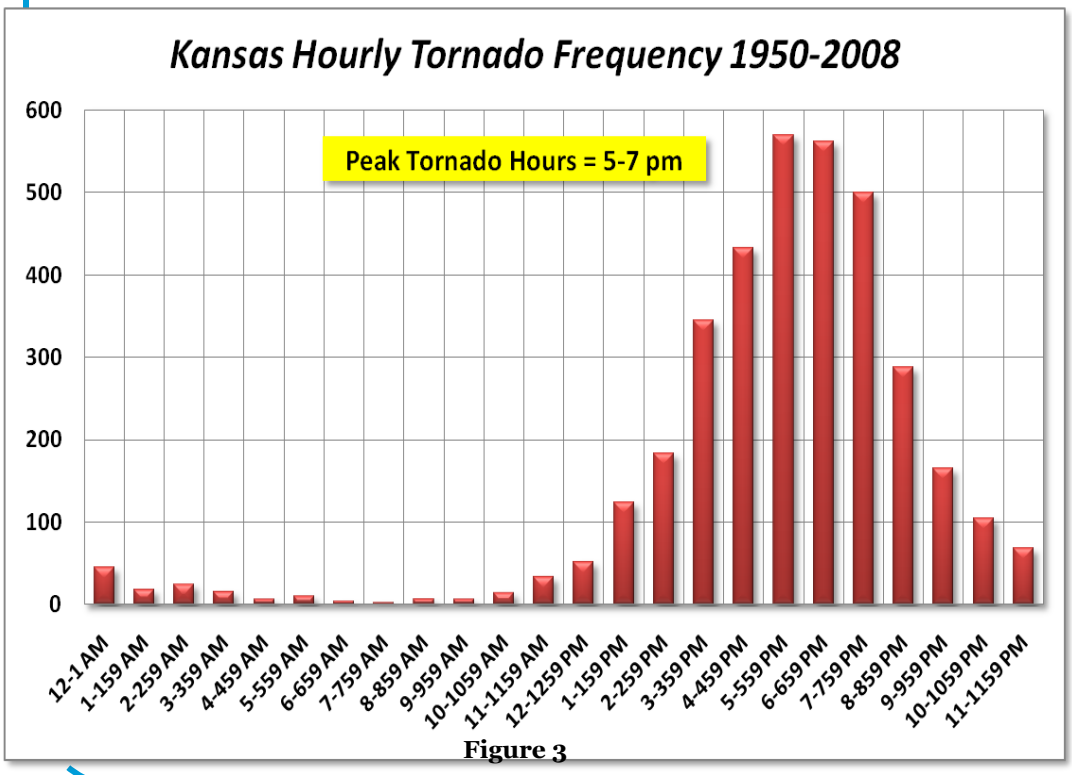


Figure 3

Looking at Figure 3 we see

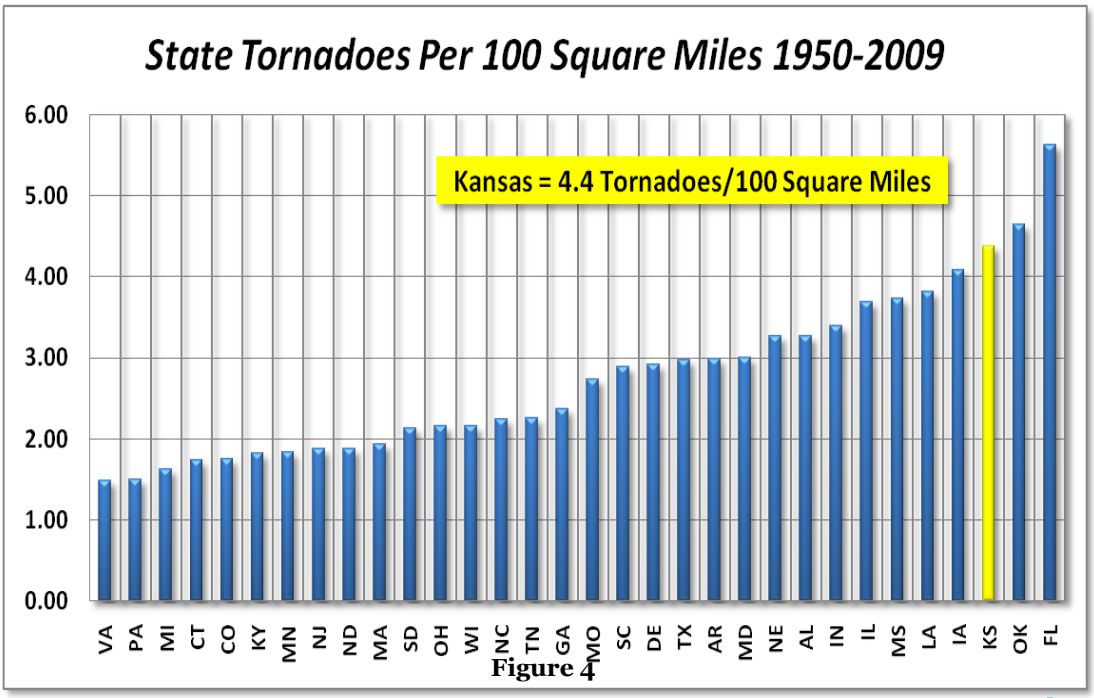


Figure 4

the tornado frequency in Kansas by the hour of the day from 1950 to 2009. As the above graph advertises, the peak hours are historically between 3-9 pm, with the highest two hours occurring between 5 -7 pm. Even though the highest sun angle each day occurs between noon-2 pm, peak afternoon heating doesn't occur until around 4-5 pm. The afternoon heat in concert with ample low-level moisture (humidity) and vertical wind shear (increasing wind speed/direction with height) provides the fuel necessary for tornado-producing thunderstorms to form.

Figure 4 represents the tornadoes by state, per 100 square miles from 1950-2009. Kansas is ranked 3rd at 4.4 tornadoes per 100 square miles behind only Oklahoma and Florida. This graph is meant to represent the tornado density per state since 1950. For a proper perspective, 100 square miles is roughly a bit smaller than the city of Wichita.

Finally Figure 5 shows the EF3 or greater tornadoes by state per 1000 square miles from 1950-2009. Kansas is ranked 8th, at 2.5 EF3 or greater tornadoes per 1000 square miles behind Iowa, Tennessee, Alabama, Mississippi, Indiana, Oklahoma and Arkansas. EF3-EF5 tornadoes represent strong to violent tornadoes, so this graph represents the violent tornado density per state since 1950. For a proper perspective, 1000 square miles is roughly a tad bigger than Sedgwick County.

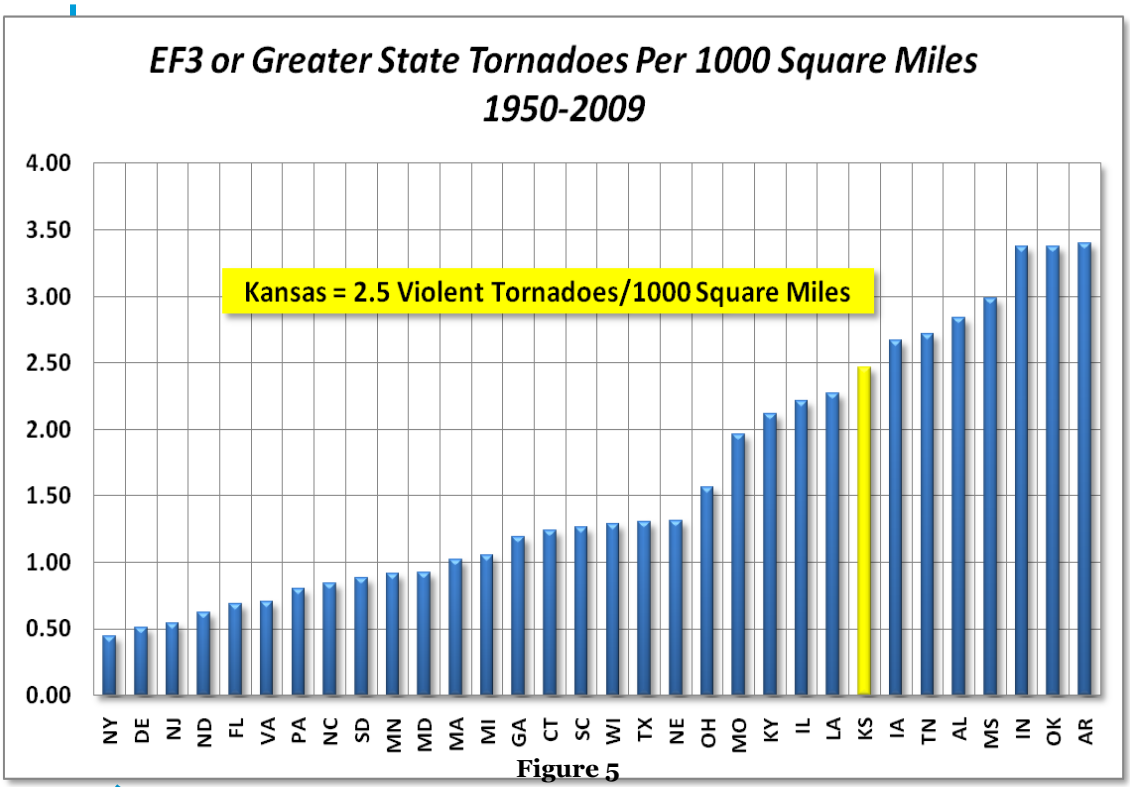


Figure 5

Your help is needed!

By: Chance Hayes, Warning Coordination Meteorologist

The National Weather Service is the main source of weather information for the various media outlets across the country. That holds true right here in Kansas. With the majority of you getting vital weather information via the television or radio, it is imperative that we relay the potentially dangerous weather situations to the media outlets in as real time as possible, so that they may in turn provide you with enough information to make a sound decision. Therefore, we are planning to send out email reminders to you so that you are aware that a possible hazardous weather situation may occur. We are also going to provide you with our toll free phone number in hopes that you will report any hazardous weather that may be occurring in your area. So, when you experience any hazardous weather, please keep in mind how important your report is to your fellow neighbors.

What to report			
Hail		**Wind**	
Plain M&M	0.50 inches	25-31 mph	Large tree branches move, telephone wires begin to "whistle", umbrellas are difficult to keep under control.
Penny	0.75 inches	32-38 mph	Large trees sway, becoming difficult to walk.
Nickel	inches	39-46 mph	Twigs and small branches are broken from trees, walking is difficult.
Quarter (Severe)	1.00 inches	47-57 mph	Slight damage occurs to buildings, shingles are blown off of roofs.
Half Dollar	1.25 inches	58-63 mph (Severe)	Trees are broken or uprooted, building damage is considerable.
Ping Pong Ball	1.50 inches	64-72 mph	Extensive widespread damage.
Golf Ball	1.75 inches	73+ mph	Extreme destruction, devastation.
Lime	2.00 inches		
Tennis Ball	2.50 inches		
Baseball	2.75 inches		
Apple	3.00 inches		
Grapefruit	4.00 inches		
Softball	4.50 inches		

Furnaces Work Overtime This Winter

By: Eric P. Schminke, General Forecaster and Climate Focal point

Furnaces had an early start to their "Winter Workouts" this past fall. Autumn received a chilly reception when Wichita experienced their 2nd coldest October on record with average temperature of 51.2 degrees. Based on available climate data, Salina and Chanute experienced their coldest Octobers on record with frosty averages of 49.2 and 51.6 degrees, respectively. The Air Capital set record lows of 37 and 34 degrees on the 3rd and 11th, respectively and on the 10th and 11th, highs only reached 42 and 45 degrees which set record coldest highs for both dates, respectively. Although it was the coldest October on record for both Salina and Chanute, neither town set a single record low temperature. Salina did, however, set record coldest highs of 38, 40, 46 and 44 degrees on the 10th, 11th, 13th and 14th, respectively. Chanute set record coldest highs of 49 and 48 degrees on the 11th and 14th, respectively.

"Wichita experienced their 2nd coldest October on record..."

However, the password for the October being such a chilly month was persistence. Wichita, Salina and Chanute each experienced below normal temperatures on 25 of the 31 dates and on the majority of those dates, the temperatures were 10 or more degrees below normal. In fact, Wichita and Salina chilled out with temperatures of 10 degrees or more below normal over a 10 day stretch from the 6th to the 15th, and Southeast Kansas played it real cool as Chanute experienced temperatures of 10 degrees or more below normal on 9 of 10 dates from the 9th to the 18th.

Just as it appeared Kansas would spend all of autumn and winter in a deep freeze, November surprised us with some really nice weather. In fact, through the 28th, Wichita's average temperature of 50.9 degrees was the same as October's, while Chanute's average of 51.5 degrees was only 0.1 degree "cooler" than their October monthly average. The warm weather enabled furnaces to take what would be a much needed "siesta", for the arrival of a strong cold front toward November's end not only prevented the 2009 edition from gaining admission into the "Top 10 Warmest Novembers" on record, but would mark the beginning of an exceptionally long cold period.

Although winter didn't officially arrive until December 21st at 1147 AM CST, Old Man Winter and his sidekick, the Abominable Snowman, weren't about to wait that long to come out

of hibernation. On December 8th, a nasty winter storm buried Central Kansas with 6 to 12 inches of snow. Hardest hit was Lincoln County, who was literally snowed under by 10 to 12 inch accumulations. South-Central and Southeast Kansas received Heinz-57 variety winter weather with sleet, freezing rain and light snow. The situation was greatly magnified by 35 mph winds with gusts that reached 50 mph, no doubt resulting in a blizzard as blowing snow produced near zero visibilities.

The vicious cyclone responsible for all this mayhem was wound up like an alarm clock as it invaded the Mid-Mississippi Valley the afternoon of the 8th. This enabled an Arctic air mass to invade Kansas that sent temperatures plunging to record lows of near 10 below in most of Central Kansas the 8th and 9th. Russell's "high" temperature of 11 degrees on the 9th was a record for the date. With northwest winds of 30 to 40 mph, dangerous wind chills obviously resulted.

In mid-December, a second Arctic front invaded Kansas. Although this 2nd front wasn't quite as potent as its predecessor, it still enabled most of Central Kansas to "zero" in with lows of 1-3 above on the 15th.

Thanks to the 2 Arctic fronts, the 2009 edition was proving to be one historic December, as through the 15th, Russell, Salina, Wichita and Chanute were each on a pace to experience one of the 10 coldest Decembers on record. However, southerly flow did return, enabling the region to begin to warm up from the 16th to the 21st. Although Wichita would warm sufficiently to prevent 2009 from gaining admission into the 10 coldest Decembers on record, Salina wasn't as fortunate, for their monthly average of 24.8 degrees would rank as the 3rd coldest on record.

"Salina...monthly average of 24.8 degrees would rank as the 3rd coldest on record. [for December]"

Although it was fairly dry for most of December, a winter storm struck primarily Southeast Kansas, where 4-8 inches of snow occurred. However, the cyclone responsible for this winter storm was also wound up like an alarm clock as it moved from the Southern Plains to the Midwest. On Christmas Eve, most of Central and Eastern Kansas were serenaded by 35-45 mph winds. With gusts reaching 55 mph, these vicious winds whipped the snow into a frenzy, for Southeast Kansas would experience drifts 4-5 feet high. No doubt the blizzard made travel virtually impossible.

Wichita only measured 0.39 inch of water equivalent in December, but this brought the 2009 total to 37.53 inches. This is significant since, combined with the 37.97 inches measured in 2007 and the phenomenal 53.82 inch inundation of 2008, this brought the 3-year total to 129.32 inches. This made 2007-2009 the wettest 3-year period on record in Wichita's climate history.

Under the icy glare of a full "blue" moon that turned night into semi-daylight, temperatures were in the teens when 2009 handed off the baton to 2010. Central, South-Central and Southeast Kansas would remain in a deep freeze thru January 10th as the Arctic air mass tightened its grip to historic proportions. The 10.1 degree average at Chanute from January 1st to the 10th

tied 1979 for the coldest start to a new year. If residents of Southeast Kansas had wondered if another ice age was imminent it would have been understandable. Averaging a paltry 12.4 degrees over this same 10-day period, Salina was on pace to experience their 4th coldest January on record, and by averaging 16.8 degrees over this 10-day period, Wichita was on pace to experience their 8th coldest January on record.

Remarkably, only Chanute had set any coldest temperature records in January. Through the 10th, Chanute recorded sub-zero temperatures on 4 dates, of which 3 occurred in succession from the 8th to the 10th. The low of 10 below on the 9th broke the record of 8 below set in 1977. On January 8th, Chanute's high was a nifty 9 degrees, which easily glazed over the previous record coldest high temperature of 16 set in 1973 and 1976. Moreover, it was just 1 degree shy of gaining admission into the 10 coldest temperatures ever to occur in Chanute in January.

Then, temperatures started to warm and by the 13th, Central and South Central Kansas had reached the 50s while Southeast Kansas began to thaw with readings in the 40s. Such daytime temperatures would persist until the 26th.

When the warmer weather arrived, something else also arrived: The Fog Phenom, which would shroud most areas in a dense fog from the 12th to the 22nd. Quite often, the dense fog would form in the evening and persist almost until noon the next day. The dense fog posed two major problems: Obviously the first was dangerously low visibilities of less than ¼ mile. The second was that with nighttime and morning temperatures ranging from the mid 20s to around 30, most roads and highways became very slick, especially on bridges and overpasses. It truly made for an eerie sight that would've thrilled any suspense author. It also provided one with numerous opportunities to take drives into the country and see nothing.

"When the warmer weather arrived, something else also arrived: The Fog Phenom, …"

Dense fog statistics aren't kept in the same manner as, say, temperatures and precipitation, but a review of Wichita's weather history indicates that this was the longest stretch of dense fog in 50 years!

Just before January signed off, a snow storm hit the region on the 28th and 29th. Hardest hit were South-Central and Southeast Kansas where many areas were buried under 6-8 inch accumulations. Northeast winds of 25-35 mph obviously caused widespread blowing and drifting snow. After the intense cyclone responsible for the near blizzard vacated the area, the "Fog Phenom" returned, shrouding most areas with ¼ to ½ mile visibilities. It was a fitting ending to a month in which so much fog occurred.

Unlike the Mid-Atlantic Region, where many areas were buried under historic snowfalls, February was fairly uneventful the immediate area as only two noteworthy events occurred.

The first occurred from the night of the 7th and continued until the morning of the 8th when a band of wet snow developed over South-Central Kansas. Accumulations of 3-6 inches occurred over an area only around 30 miles wide from Kingman, through Wichita, to El Dorado. Just 20 miles outside this corridor, only a couple tenths of an inch were measured. Parts of Southeast Kansas received 2-4 inches.

The second occurred on the 20th and 21st when an intense cyclone moved northeast from the Western Red River to the Mid-Mississippi Valley. More potent than its predecessor of the 7th and 8th, this system spread a wintry mix across most of Kansas. Parts of Central and South Central Kansas were coated with ¼ to ½ inch of ice from sleet and freezing rain. In Central Kansas, the wintry mix changed to snow, laying down 2-4 inch accumulations over ice-covered roads and highways that made travel treacherous.

The only temperature record to occur was obscure but interesting none-the-less. For the first time on record, Wichita failed to reach 60 degrees during the months of December, January and February. In fact, the Air Capital hadn't reached 60 degrees since November 28th when a high of 67 was recorded.

"The only temperature record to occur [in February] was obscure but interesting none-the-less."

In March, the "60-degree drought" for Wichita finally ended on the 4th when the high reached 60 degrees. This ended a streak of 95 days during which temperatures failed to reach 60 degrees. However, despite being such a prolonged chilly period, the meteorological winter of December-February only ranked as the 13th coldest on record for Wichita with a 3-month average of 30.3 degrees. However, based on the available climate record, the 3-month average of 27.0 degrees was the 3rd coldest on record for Salina while the 29.7 degree average made Winter 2009-2010 the 5th coldest on record for Chanute.

There had been little meteorological "March Madness" until the night of the 19th, when Old Man Winter and his sidekick, The Abominable Snowman decided to have one last hurrah. An intense cyclone moving slowly east over the Red River induced deep-layer southerly flow to back around to a northerly component. Wound up like an alarm clock, the cyclone induced strong northerly winds of 30-40 mph to inject much colder air across Kansas that quickly changed the rain to snow. By the morning of the 20th, Southeast Kansas was buried under 6-8 inch accumulations and with such strong northerly winds, the snow was whipped into a frenzy over areas along, and southeast, of the turnpike; a theme that was all too common this winter.

Spring has sprung, and so have the chances for severe thunderstorms and all their by-products, large hail, destructive winds, tornadoes and flash floods. We shall see what, if any, climate records occur over the next 6 months.

2009 Cooperative Observer Awards

By: Jerilyn Billings, Meteorologist Intern and

Leon Wasinger, Operations Program Leader

The following Cooperative Observers were presented 2009 Length of Service Awards. We would like to thank and congratulate our observers for volunteering their time in providing us with the climatic data which is published by the National Climatic Data Center on a monthly basis, and made available to the private, public and Government entities. Their dedication to service is greatly appreciated!

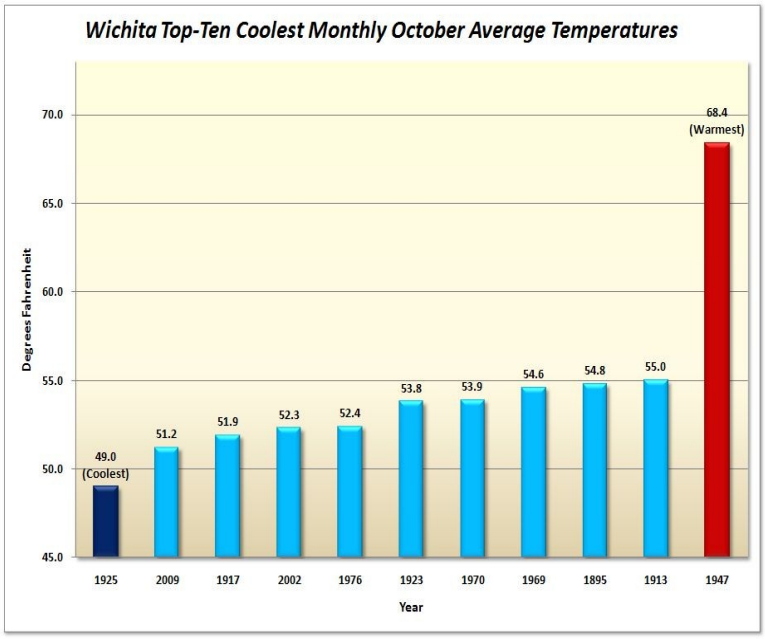
Observer	Station	Years	Observation
Jerrold Houldon	Corbin 3 W	10	Precipitation and River
Kevin Odle	Ellsworth	10	Precipitation and Temperature
Ron Jerrick	Belle Plaine 4 W	10	Precipitation and River
Michael Moon	Perth	10	Precipitation
Joe Bruce	Atlanta	10	Precipitation
J D Redford	Cambridge	10	Precipitation
James L Kinne	Erie 2 SW	10	River
Areletta Koehn	Burns	15	Precipitation
Jon Watkins	Wonsevu	15	Precipitation
Jerald Steiner	Claflin	15	Precipitation
Peggy Bewley	Thrall 4 S	20	Precipitation
Linda Noakes	Erie 1 N	25	Precipitation
Clifford R Jordan	Great Bend	30	Precipitation and Temperature
Beverly Ditty	Virgil	30	Precipitation
Edwin H Andres	Elbing	40	Precipitation

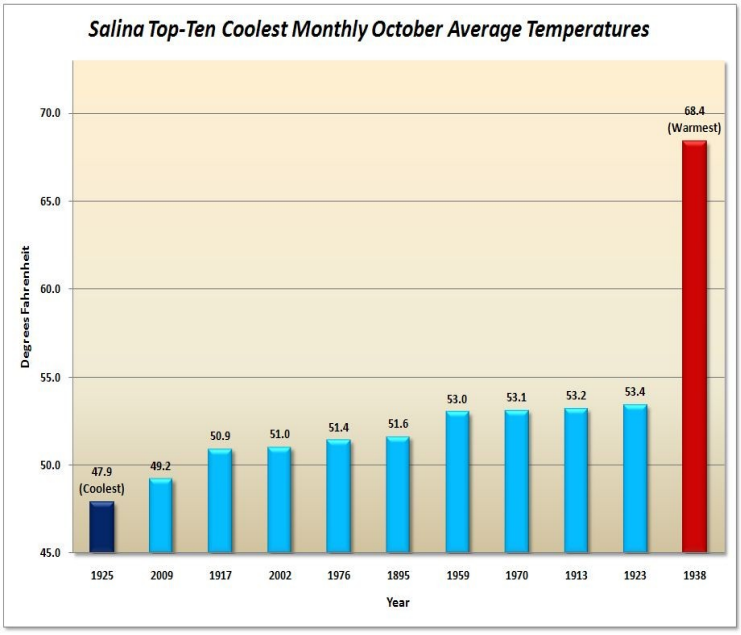
Overview of the Winter Season across Central and Southeast Kansas

By: Chance Hayes, Warning Coordination Meteorologist

Cool October 2009 Sets Records in Wichita and Salina

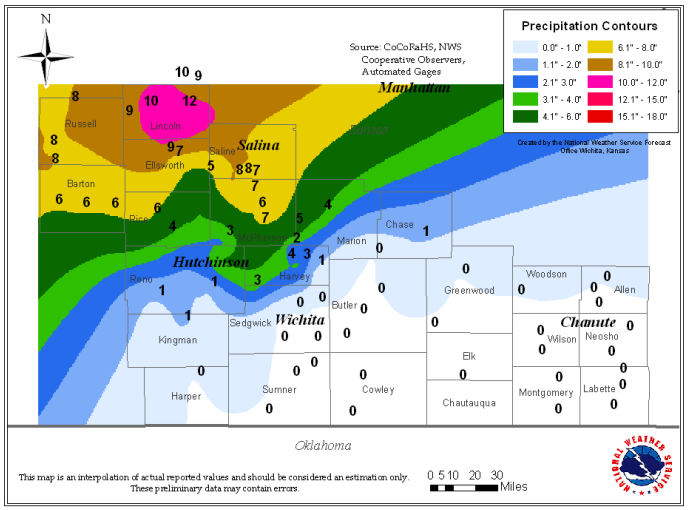
The October 2009 average temperature at Wichita's Mid-Continent Airport was 51.2 degrees, a chilling 7.4 degrees below normal. Consequently, the month went into the record books as the 2nd coolest October in Wichita since records began in 1888. This record beat out the 1917 record when the average October temperature was 51.9 degrees, but still lagged behind the coolest October on record, which occurred in 1925 with a average temperature of 49.0 degrees. A staggering 25 of 31 days recorded below normal readings, with 13 of those days at least 10 degrees below normal. Record low temperatures were set on the 3rd and 11th of the month, with readings of 37 and 34 degrees respectively. Additionally, record cool high temperatures were set on the 10th and 11th, with readings of 42 and 45 degrees, respectively.
Salina also proved to be quite cool, tallying an average monthly temperature of 49.2 degrees, an amazing 8.7 degrees below normal. Like Wichita, the month also went into the record books as the 2nd coolest October on record. This also beat out the 1917 October average of 50.9 degrees, but fell short of breaking





the coldest October on record from 1925 with an average temperature of 47.9. Amazingly, 25 of 31 days in Salina also recorded below normal readings, with 14 of them at least 10 degrees below normal. Record cool high temperatures were set on the 10th, 11th, 13th and 14th of the month with readings of 38, 40, 46, and 44 degrees, respectively.

24 Hour Snow Totals Ending the Morning of December 9th

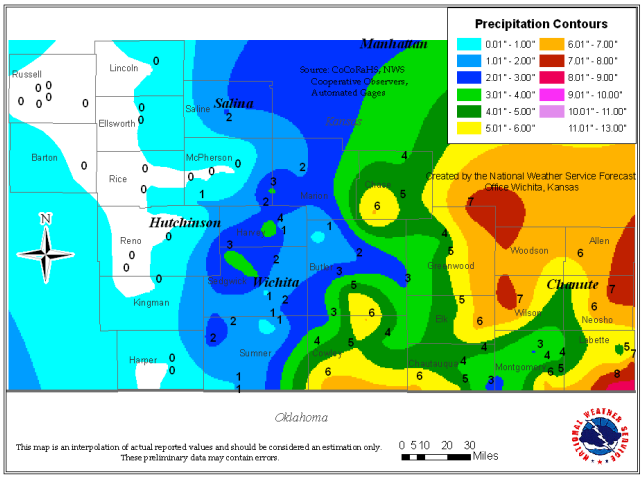


First Winter Storm of the Season!

December 8th 2009 Snow Storm

The first winter storm of the season struck Northern Kansas on December 8th laying down a swath of 6 to 12 inches of snow. Further south over South Central and Southeast Kansas a mix of freezing drizzle, light snow and sleet caused travel difficulties, especially for the morning commute. The most unique aspect of this storm system was the prolonged nature of the snowfall. Snowfall first started during the evening of December 7th and lasted through the nighttime hours of December 8th. Therefore snow was reported across Central Kansas for more than 24 hours! As if the snow wasn't enough, strong northwest winds on the back side of this system caused blowing and drifting snow along with wind chills around -15 degrees.

Snow Depth for Christmas Morning, 2009



Winter storm brings a White Christmas to the area

Deep low pressure moved from the southern Plains into the Midwest from Christmas Eve into Christmas Day, producing strong winds, areas of heavy snow, and near blizzard conditions, from Oklahoma, eastern Kan-

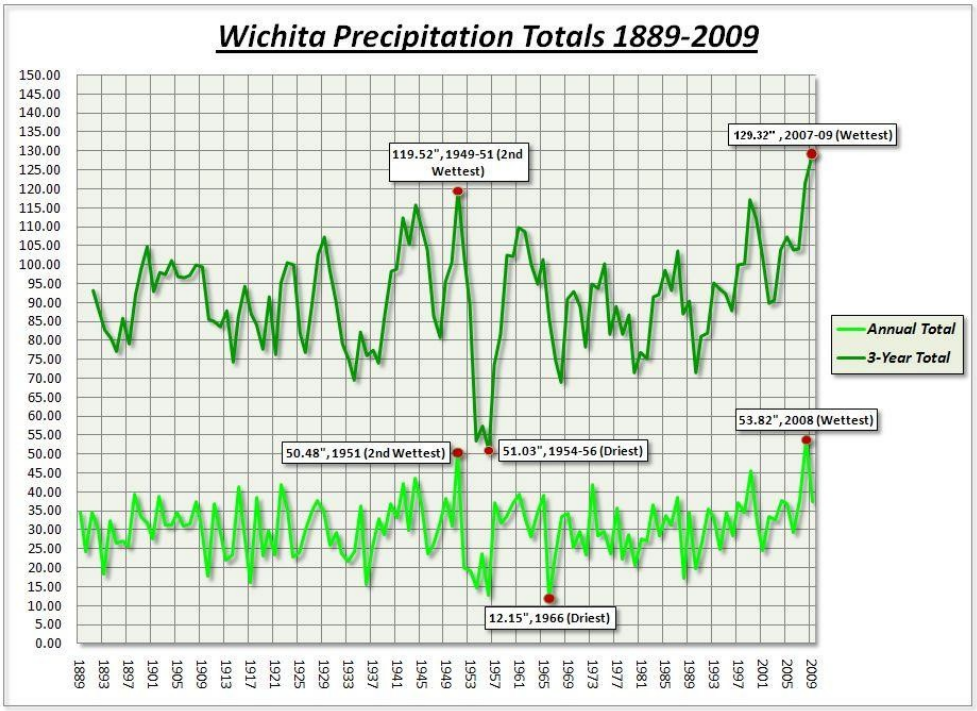
Picture of Snow Drifts in Allen County. Picture taken by Josh Honas

sas, and western Missouri, into the upper Midwest. A wintry mix of freezing drizzle, light freezing rain and sleet preceded the snowfall across central and southeast Kansas early on Christmas Eve day. This created some slick roadways across the area. As colder air moved in on strong and gusty north winds, the wintry mix changed to snow by afternoon and evening. The more intense snowfall occurred across the Flint Hills and s outheast Kansas during the evening on Christmas Eve, where snowfall amounts ranged from 4 to 8 inches. However, the strong north to northwest winds resulted in blowing snow and very low visibilities, with snow drifts as high as 4 feet. The snow diminished to flurries by Christmas morning; however the winds remained quite gusty from the west to northwest. This combined with very cold temperatures in the teens, to produce wind chills from 5 below to 10 below zero.

Wettest 3-Year Period on Record for Wichita!

Three consecutive years of above normal precipitation has produced the wettest 3- year total since records have been kept in Wichita. Below are the 3 wettest 3 year periods in Wichita's history.

1) 2007-2009: 129.32 Inches
2) 1949-1951: 119.52 Inches
3) 1997-1999: 117.15 Inches

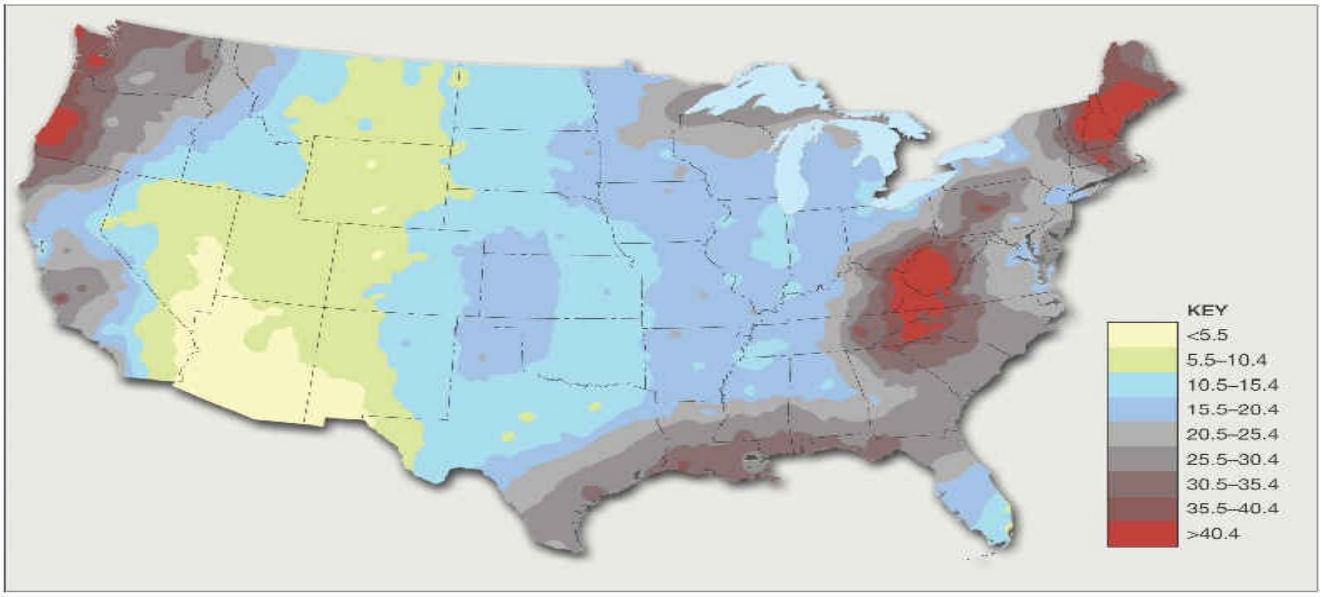


How Unusual is Winter Fog?

Many have asked... is it unusual to have this much fog in Winter? Have we ever had this many days with dense fog before? Dense fog is not tracked as closely as temperatures or precipitation, but we can shed a bit of light through the dense fog with a few facts.

What's Normal?

The map shows the average number of days with dense fog across the United States. According to this map, the average number of days with dense fog across central and eastern Kansas is 10 to 15, with slightly more days across western Kansas. Dense fog is defined as fog that reduces visibility to 1/4 statute mile or less.



How Unusual Is It?

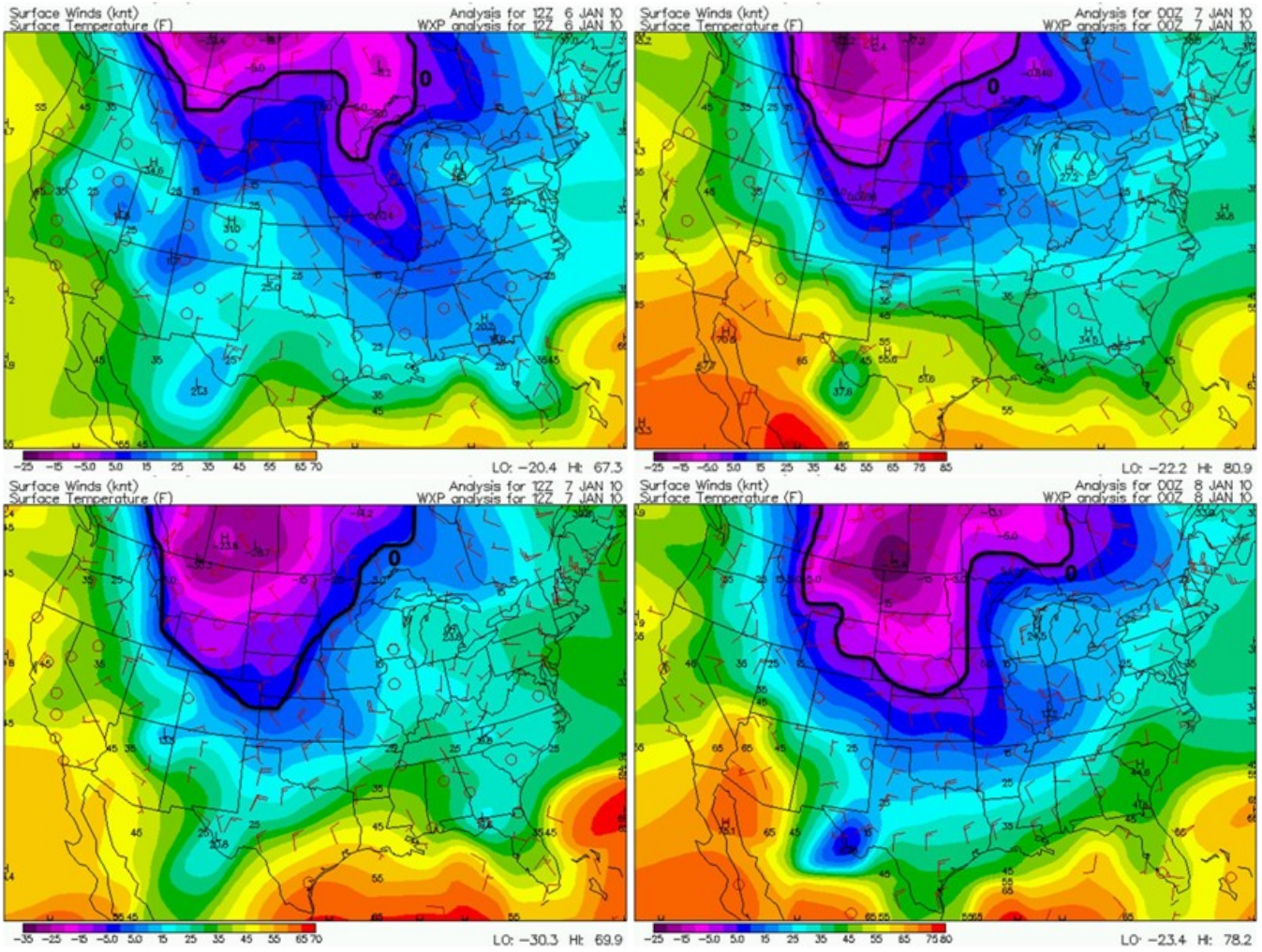
Year	Number of Consecutive Days with Dense Fog	Total Number of Days with Dense Fog	Consecutive (Or Nearly Consecutive) Dates with Dense Fog Observations
2010	7	8	January 12th, 14-20
2003	5	7	October 3-7, 9,10
1994	4	4	December 22-25
1992	4	4	December 27-30
1983	6	6	February 8-13
1982	4	6	February 12, 13, 15-18
1974	4	4	January 17-20
1972	5	5	January 19-23
1969	4	4	January 19-22

There are several instances of dense fog for 3 days in a row. Beyond 3 days, dense fog becomes much more unusual, at least at Wichita Mid-Continent Airport where climatology records are longer.

It is unusual for this area to experience several days in a row of dense fog. Looking back to January of 1960 at Wichita Mid-Continent Airport, there were 9 other stretches of days with dense fog similar to this one. The most recent was in October, 2003. Dense fog was reported on October 3rd, 4th, 5th, 6th, 7th, 9th, and 10th. During that stretch, there were 5 days in a row with dense fog observations at the airport. This year, the dense fog began on January 12th. As of January 20th, we have seen 7 days in a row, and a total of 8 days with dense fog observations. It is hard to say when this stretch of dense fog will be gone for good, but needless to say it is an unusual weather pattern for this part of the country.

Rare Arctic Air Mass to Start the New Year

An unusually cold Arctic airmass came across the area on January 6th and stayed through January 9th putting record low temperatures in jeopardy. In the images below you can see that on the morning of



January 6th the cold air was mainly over Canada. Throughout the day and even into Thursday January 7th, you can see the cold airmass continuing to drop south into the Plains. This area has not seen a cold airmass like this since December 2005, and even February 1996 before that. So far the Wichita Area has had 9 consecutive days below freezing which is uncommon, especially since the average temperature is 39 F.

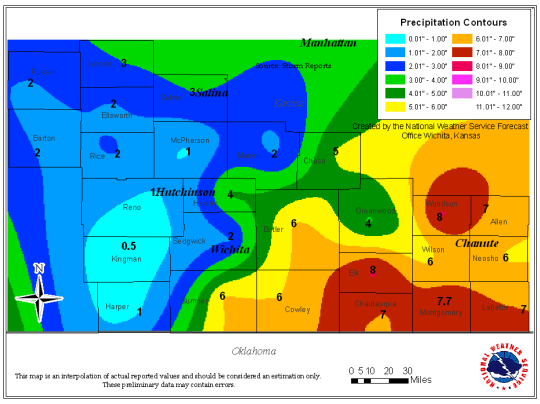
City	Highest Wind Speeds Throughout the Area	Coldest Wind-chills Throughout the Area
Russell	35 MPH	-23 F
Salina	41 MPH	-22 F
Hutchinson	39 MPH	-19 F
Wichita Jabara	44 MPH	-20 F
Wichita Mid-Cont	41 MPH	-18 F
Winfield	45 MPH	-17 F
Chanute	37 MPH	-20 F
Coffeyville	43 MPH	-20 F
Parsons	41 MPH	-18 F

Besides the cold temperatures, this Arctic airmass brought in very strong winds throughout the area on the evening of January 6th and on Thursday the 7th. These strong winds combined with the very cold temperatures created dangerous wind chills. Below are graphs of the strongest winds and the coldest wind chill temperatures. Wind chills through this cold outbreak created dangerous situations for people, animals, and property that were outdoors for a long period of time. Several schools across the area were cancelled or delayed, waterline mains burst and slick driving conditions were reported.

Late March Snow Storm Strikes for the 2nd Consecutive Year!

First Day of Spring 2010 was Anything But Spring-like

Storm Total Snowfall as of 10 AM March 21st, 2010



For a second year in a row a late March snow storm impacted much of the Southern Plains. This powerful low pressure system dove southeast out of the Northern Rockies during the evening hours of March 19th spreading a swath of heavy snow across portions of Oklahoma, Eastern Kansas, Southern Missouri and Northern Arkansas. Strong north winds accompanied the snow causing some drifting along with reduced visibilities.

Snowfall picture from Galesburg Kansas. Photo by Anna Belle Thornton

Be sure to call in any and all reports of current or past weather.

Handy Severe Weather Reporting Reference Card

Weather to Report:

Hail ≥ 0.75” in Diameter
Wind Speeds ≥ 58 mph
Tree and Structural Damage
Rotating Wall Clouds
Funnel Clouds
Tornadoes

Include with Each Report:

Your Name
Your Call Sign (If Applicable)
Your Spotter Number (i.e. BU100)
Your Location
Time and Date of the Event
Location of the Event

Twitter Storm Reports

You can now submit your significant weather observations to the National Weather Service (NWS) via Twitter.

Thanks to the new Geotagging feature available through Twitter, individual tweets can be tagged with the location in which it was sent. This will help to enhance and increase timely & accurate online weather reporting and communications between the public and their local weather forecast offices.

How to Submit a Report:

1. Sign up for a Twitter account at Twitter.com
2. Send report via Web or Mobile Phone using the 'hash tag' #wxreport to group your message in a specific searchable category

---

- **With** Geotagging on a 3rd party Twitter Application (i.e. not using Twitter.com, m.Twitter.com (mobile) or via text messages):
  1. Make sure Geotagging is turned on for your 3rd party application
  2. Make sure Geotagging is enabled on your Twitter account (see Twitter.com/account/settings)
  3. Submit report using the 3rd party application in the following Format

#wxreport <your significant weather>

- **Without** Geotagging on a 3rd party Twitter application or on Twitter.com
  1. Log on to your Twitter Account via the web or a mobile device
  2. Submit your report in the following Format

#wxreport WW *<your location>* WW <your significant weather>

Examples of how to code ***<your location>***

1. **A City Name:**
   WW Winfield, KS WW
2. **A zip code**
   WW 67209 WW
3. **An Address**
   WW 683 W. 184th Rd. Chase, KS 67589 WW
4. **An Airport Identifier**
   WW HUT WW
5. **A Street Intersection:**
   WW 21st St. N and Maize Rd., Wichita, KS WW
6. **A Latitude and Longitude:**
   WW 38.043, -97.344 WW

http://www.srh.noaa.gov/srh/twitter/twitter.php

Twitter Storm Reports

Examples of Properly Coded Significant Weather Tweets

- **With Geotagging**

  #wxreport Tornado on ground 3 miles south of my location at 5:34pm

  #wxreport 3.4 inches of Rain in the past 2 hours

  #wxreport Golfball sized hail at 7:54pm

- **Without Geotagging**

  #wxreport WW 378 W. 156th Rd. Anthony, KS WW Wind Gusts estimated at 60mph

  #wxreport WW McPherson, KS WW 4 inches of snow from 3pm-7am

  #wxreport WW 67201 WW Quarter sized Hail at 5:34pm

Best Practices for Writing your Significant Storm Reports

1. Use a City, State or Zip code as the preferred method to code a non geo-tagged report.
2. While any weather can be tweeted, the NWS is most interested in Significant Weather Reports. (see below)

What Significant Weather to Report

(Report the time that the event occurred and how much or size as appropriate)

- Snowfall during an event and storm total
- Freezing Rain and Freezing Drizzle
- Dense Fog and reduced visibility
- Damage from Winds
- Hail
- Tornadoes or Funnel clouds
- Flooding

General Guidelines

- The purpose of this project is to allow people to submit reports. Please be responsible and respectful of the purpose.
- A valid Twitter user account is required to submit reports. As such, use of this service constitutes an agreement to the Terms of Service (ToS) of the provider.
  Go to http://Twitter.com/tos for more information.
- This project is in an experimental state and may not always be seen or the message may get stuck in twitter-space, don't rely on Twitter for reporting life threatening reports.
- If report is life threatening, please use Original reporting methods
- Official Representatives of the NWS will not respond to any Tweet to confirm its receipt.

Troubleshooting and Questions about Tweets

1. Be sure to put the "WW"s around <your location> in your tweet if you do not have geo-tagging on a 3rd party application. The "WW"'s are used to help computer software mark your location to plot on a map
2. A 3rd party application is something you have to download separately on either your phone or Personal Computer that will send out and geo-code the Tweets
3. A hash tag is the <#wxreport> part of the tweet, and it is used to identify the tweet as a weather report and can be found and plotted on a map.
4. See Twitter Help FAQ for more information if you are new to Twitter : http://help.twitter.com/forums/10711/entries/13920-frequently-asked-questions

National Weather Service

2142 S. Tyler Rd.
Wichita, KS 67209
Phone: 316-942-8483
Email: chance.hayes@noaa.gov

Newsletter Editor:
Jerilyn Billings, Meteorologist Intern
Email: Jerilyn.Billings@noaa.gov

"The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information, database and infrastructure which can be used by other government agencies, the private sector, the public, and the global community."

Online: www. weather.gov/Wichita

Wichita County Warning Area
NWS WICHITA, KS

Find the NWS Wichita Counties in the Puzzle

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

Harper
Cowley
Labette
Woodson
Marion
Barton
Lincoln

Kingman
Butler
Neosho
Greenwood
Harvey
McPherson
Russell

Sedgwick
Chautauqua
Wilson
Elk
Reno
Saline

Sumner
Montgomery
Allen
Chase
Rice
Ellsworth

NWS Wichita Word Search

Answer Below: