National Weather Service
Wichita, KS

Storm Fury on the Plains

Spring Spotter Newsletter

April 2013

Inside this issue:

Historic Snowstorm Buries Central and South Central Kansas

By: Eric Schminke

Winter 2012-13 had been relatively quiet for central, south central and southeast Kansas until February 20th when Old Man Winter and his mythical sidekick, the Abominable Snowman, went into action.

That morning, a strengthening cyclone (Red L in Figure 1) was situated over southern Utah, and Nevada.

As the day progressed, the winter storm moved slowly east toward then over the southern Rockies. As time evolved, moisture-rich east southeast flow in the lower atmosphere steadily increased, spreading colder, sub-freezing air across the Great Plains. As the upper-level cyclone moved east over southern Arizona the upper-level directional flow began to diverge over the Central Plains to promote increasing deep layer ascent over Oklahoma and southern Kansas. The stage had been set for a winter storm that would prove historic for most of Kansas.

South central Kansas was the first to get snowed upon with 2-4 inch accumulations over primarily Harper, Kingman, Sumner, and Sedgwick counties. By late afternoon, the snow had spread due north primarily along and west of I-135 where accumulations had reached 5 inches in several locations.

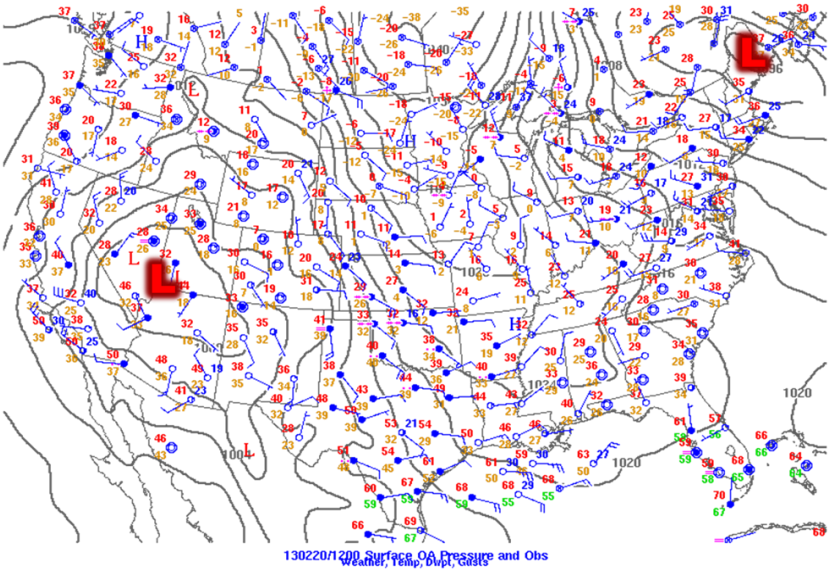

Figure 1. Surface Plot, February 20th at 6 AM CST.

By early evening, the snow intensified, be-

cause the cyclone was so intense that thunderstorms were embedded across south central Kansas thereby causing snowfall rates to increase further. By morning on the 21st, most of central and south central Kansas were buried under 6-12 inches with around 13 inches reported in west Wichita and Clearwater. A video of lightning was caught by one of the four security cameras at WFO Wichita. To see the video go to the link: ***https://www.youtube.com/watch?v=S7nEV57p4OQ.*** By now it was time to get out the record books.

Figure 2. This United Flight had to be dug out at the Wichita Mid-Continent Airport

Moderate to heavy snow continued throughout the day and by nightfall, accumulations of 12-15 inches had overwhelmed most of central and south central Kansas. A total of 14.2 inches had been measured at the forecast office which made this snowstorm the 2nd greatest in Wichita's history, this storm was exceeded only by the even 15 inches measured on January 17th and 18th, 1962. One exception was extreme southwest Kingman County where Nashville and Zenda were 'snowed under' by 18 and 17 inches respectively. In the northwest corner of Sedgwick County, Mt. Hope measured 16 inches.

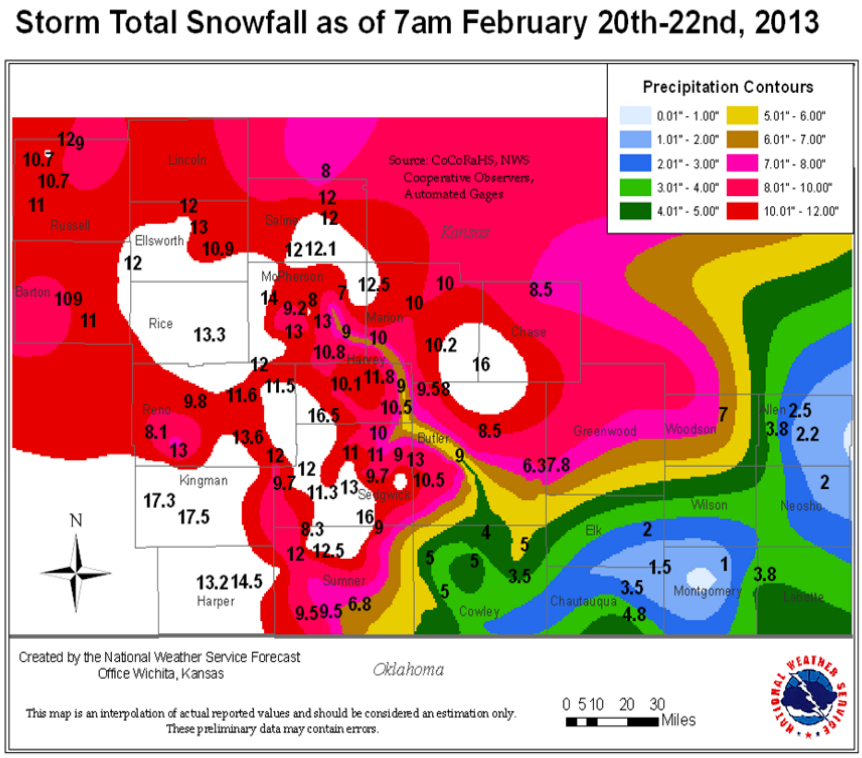

Figure 3.

The Five Greatest Snowstorms In Wichita's History

1. 15.0 Inches, January 17th-18th, 1962. (17th: 3.0 Inches; 18th: 12.0 Inches)

2. 14.2 Inches, February 20th-21st, 2013. (20th: 6.2 Inches; 21st: 8.0 Inches)

3. 13.6 Inches, March15th-16th, 1970. (15th: 1.8 Inches; 16th: 11.8 Inches)

4. 12.8 Inches, February 21st-22nd, 1971. (21st: 11.6 Inches; 22nd: 1.2 Inches)
12.8 Inches, December 23rd-24th, 1918. (23rd: 10.0 Inches; 24th: 2.8 Inches.)

6. 12.0 Inches, March 9th, 1909.

Two other noteworthy "accomplishments" from this historic snowstorm were:

The 6.2 inches measured on the 20th set a record for the date by breaking the 5.2 inch total measured way back in 1912.

The 8.0 inches measured on the 21st is the second greatest on record for the date, exceeded only by the 11.6 inch total measured in 1971.

Fortunately, and we're using that term loosely here, was that the easterly winds associated with the storm weren't that strong. Late that evening, the intense cyclone began to lift almost due north toward the Northern Plains, enabling drier air to begin infiltrating the Southern and Central Plains. Thus this brought the 2nd worst snowstorm to ever hit Wichita and surrounding areas to an end.

Figure 4. Snow measurement taken near Mt. Hope, extreme northwest Sedgwick County, February 21st. Photo courtesy of Eric Sities.

Figure 5. Snowfall in West Wichita.

Annual tornado information for the NWS Wichita Office

By: Chance Hayes—Warning Coordination Meteorologist

Have you ever wondered how many tornadoes our office generally has each year across our 26 counties? Below you will find a chart dating back to 1950 that depicts the total number of tornadoes that have occurred in our jurisdiction. This is depicted by the blue line. During this time frame, we have had a total of 1203 tornadoes or an average of 19 tornadoes a year.

If you look closely at the chart, it seems to show a spike in the number or tornadoes about every ten years or so. Did you also notice a gradual trend in the number of tornadoes and the averages from 1996 forward? What do you think is the reasoning behind this upward trend?

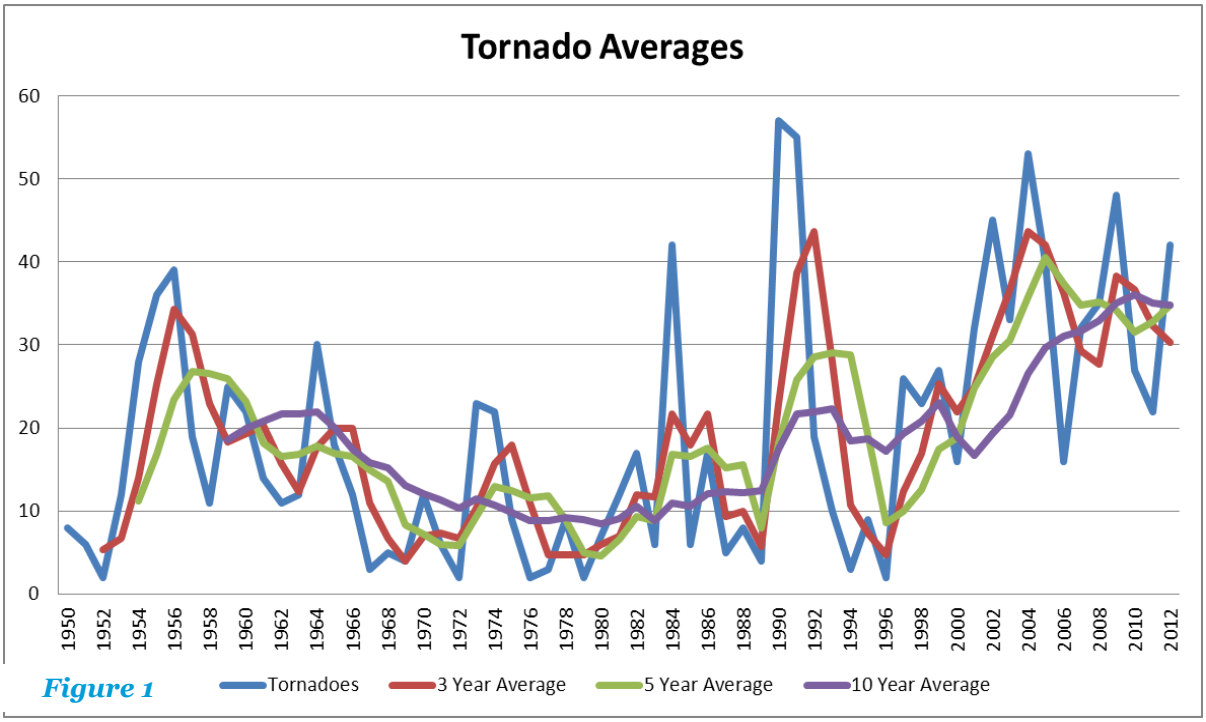

Figure 1

A few items that may contribute to this rising trend could be but are not limited to:

- Doppler Radar
- More storm spotters
- The movie "Twister" which led to more storm chasers

The month of May by far beats the rest for the total number of tornadoes in a given month with 446 tornadoes beginning in 1950. April and June ran a close race for second with 205 and 215 tornadoes respectively. Please take note that a tornado has occurred in every month of the year, so a tornado in December and January is a possibility, albeit very slim.

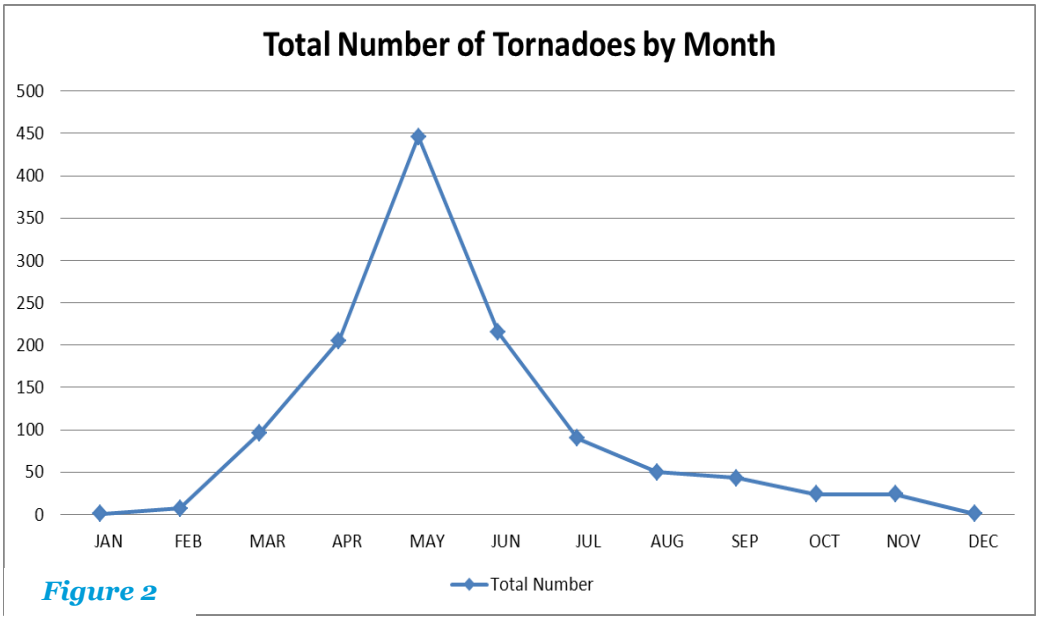

Figure 2

Lastly, let us take a gander at the average number of tornadoes per month over three different time periods. We will look at the average monthly number since 1950, 1980, and 1996.

Once again, this shows an increasing trend in the number of tornadoes being reported on a monthly basis. I would surmise the increase from 1980 would be the increased participation in SKYWARN and storm spotting. However, the increase from 1996 would probably be due to those items mentioned above plus a few others that are not readily recognizable.

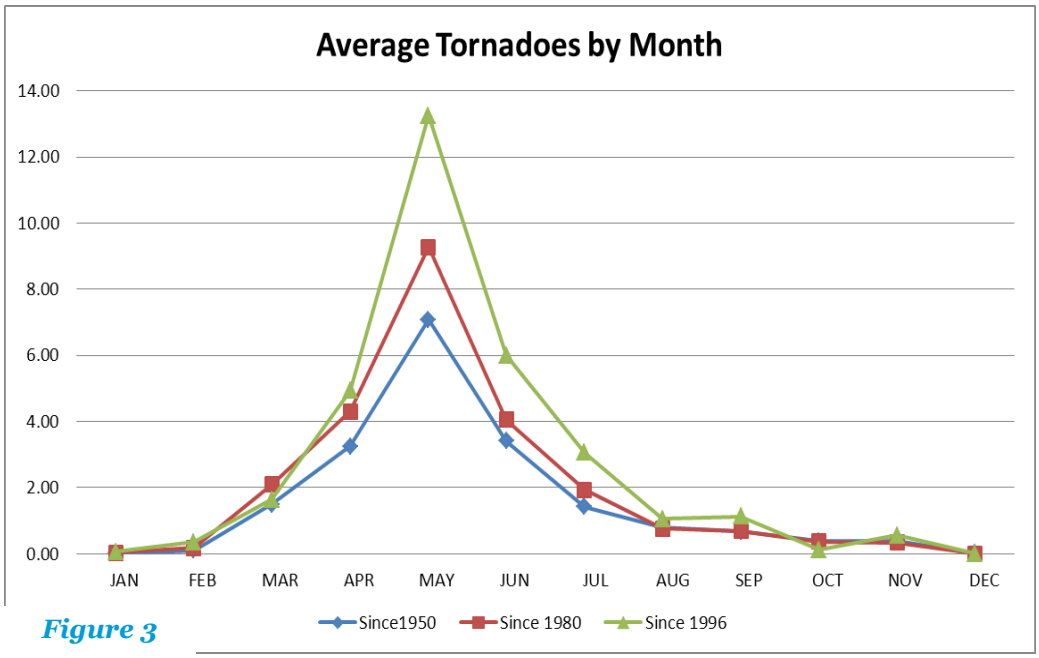

Figure 3

-Meet the Wichita NWS Staff-

Lead Meteorologist Jim Caruso

Jim is originally from Mentor and Painesville, Ohio which are eastern suburbs of Cleveland in the northeast Ohio snowbelt. Snowfalls of 60 to 90 inches per winter season were witnessed while growing up. In about the 8th grade, a fascination with lightning had developed. What solidified his interest in becoming a meteorologist was the May 31, 1985 violent tornado outbreak in eastern Ohio, Pennsylvania, western New York and adjacent parts of Ontario. This was the largest and most intense tornado outbreak to affect this region with over 40 tornadoes, many strong to violent, and 88 fatalities. Jim saw his first F5 tornado damage at Niles, Ohio two weeks after the tornado occurred and about an hour south of where he lived. It was then he realized that he wanted to work for the National Weather Service to issue warnings for the protection of life and property.

Meteorologist Jim Caruso

A Bachelor of Science Degree in Meteorology was obtained from Penn State University in January 1991. After graduating, Jim spent about a year and a half working as a meteorologist for Accu-Weather in State College where he also did some radio broadcasts of the weather.

Jim began his career in the National Weather Service (NWS) in June 1992 as an Intern in Flint, Michigan where he spent two and a half years in mainly training. He was promoted to General Forecaster at the NWS Amarillo Forecast Office in 1994 and spent about three and a half years there before moving to the NWS Wichita Forecast Office in 1998. In September 2001, Jim was promoted to a Lead Forecaster position at NWS Wichita. A few focal point areas that he has been involved in the office include or have included: WARNGEN (Warning Generation Software) and Aviation Forecasting. He has also done several case reviews of local severe weather events occurring in the NWS Wichita County Warning Area. In 2005, he co-authored an article in the NWA Electronic Journal with Jon Davies on non-supercell tornado environments.

In his free time, Jim enjoys investing, taking care of his home, storm chasing, working out, and most sports. Jim plays in local baseball leagues as well as baseball tournaments in different parts of the U.S. including New York and south Florida.

Be sure to find

US National Weather Service Wichita Kansas

on Twitter at @NWSWichita

Also be sure to check if your county Emergency Manager has a Twitter account for your county.

National Weather Service **Fire Weather** Wichita, Kansas

Fire Weather Program-Overview

The Fire Weather Program also called the Red Flag Program exists to alert land management agencies of developing weather conditions when coupled with critical fuel conditions (dry grasses), and could lead to dangerous wildfire behavior. Criteria for Red Flag events are site-specific and will be discussed below. Red Flag events should be thought of as another form of severe weather in that these events threaten lives and property, and timely alert of the conditions is critical.

Red Flag Warnings and Fire Weather Watches enable fire agencies to manage fire suppression resources and prepare appropriate suppression responses.

The NWS in Wichita issues a routine Fire Weather Planning Forecast at least once a day which contain predictions for our area of responsibility through the next week. Land management personnel use these products to direct pre-suppression activities and for other planning.

Fire Weather Products:

- **Grassland Fire Danger Index**
- **Fire Weather Planning Forecast**
- **Fire Weather Watch**
- **Red Flag Warning**

What is the Grassland Fire Danger Index?

The GFDI conveys the potential for a grassfire to become difficult to contain. It uses a mathematical function that involves temperature, relative humidity, wind, and a curing value (dryness of grasses). The level of grass curing in concert with wind speed is the most influential factors determining the magnitude of fire danger (drier grass and higher wind speed equals higher GFDI value). When the GFDI reaches the very high category the NWS talks about elevated fire danger in the Hazardous Weather Outlook. When it climbs into the extreme category a Fire Weather Watch or Red Flag Warning is issued.

GFDI Scale:

(L) LOW	0 TO 2
(M) MODERATE	3 TO 7
(H) HIGH	8 TO 19
(V) VERY HIGH	20 TO 49
(X) EXTREME	50+

What is a Fire Weather Planning Forecast?
A forecast providing timely weather information for the next week geared specifically to the fire community and is useful for operational decision making.

What is a Fire Weather Watch?
This product alerts land management agencies of the potential for a Red Flag event in the near future. The forecaster is reasonably confident that Red Flag criteria will be met, and these watches are generally issued 12-72 hours in advance of an event.

What is a Red Flag Warning?
A product that warns of a Red Flag event and is issued when the forecaster has a high degree of confidence that Red Flag conditions will occur in the next 24 hours.

Both the Fire Weather Watch and Red Flag Warning result in actions taken by land management agencies related to placement and activation of resources. These actions can include assigning more fire fighters to an incident, changing attack strategies, and/or moving fire fighters to areas of safety.

Ideal Burning Conditions:

Wind Speed: *5-15 mph*

Wind Direction: *away from sensitive areas*

Mixing Height: *1800 ft or higher*

Relative Humidity: *30-70%*

Temperature: *55-80°F*

Cloud Cover: *up to 70% coverage*

These products can be found on our web page at the following url:

www.weather.gov/wichita/?n=firewx

Do you know why the sirens sound in your community?

By: Chance Hayes—Warning Coordination Meteorologist

Research has shown that people generally perceive that the outdoor warning devices (sirens) sound off too much. First off, let me address this from the standpoint that "sirens" are actually outdoor warning devices meant to warn people that are at local parks, ball fields, lakes, camp grounds, etc. of impending danger. They are not meant to be utilized for indoor purposes. That is a byproduct or perk of the outdoor warning device. Knowing that the "sirens" are meant for outdoor purposes only, you need to know exactly what the outdoor warning device policy is for the area you live. Some policies are county based, while others may be governed by the city. I would like to encourage you to contact the Emergency Manager for your county and ask them what the siren policy is for your location.

" 'Sirens' are actually outdoor warning devices meant to warn people that are at local parks, ball fields, lakes, camp grounds, etc. ..."

Your local sirens can sound for many different reasons other than tornado warnings. The following list gives you a few reasons why the outdoor warning devices may be sounded at your location:

- Tornado warning from NWS
- Tornado spotted by county storm watcher, chaser, or public
- Funnel cloud spotted by county storm watcher, chaser, or public
- Rotating wall cloud spotted by county storm watcher, chaser, or public
- Straight line winds of 75 mph or greater
- Severe thunderstorm warning

As you can see, the outdoor warning devices can be utilized for many different scenarios. All of which would affect those that are outdoors but not all will affect those indoors. The alarm of the outdoor warning devices doesn't always mean a tornado is on the ground. It means that those that are outdoors are in danger and need to seek indoor shelter.

Despite Recent Precipitation, Drought Continues

By: Andy Kleinsasser, Meteorologist

Overview

Despite recent beneficial precipitation, especially from two big February snowstorms and a March winter storm, drought conditions persist across Kansas. These weather events certainly did aid in replenishing short-term soil moisture, but they only put a modest dent in the long-term precipitation deficits that continue to plague the region. Consequently, despite a short-term reprieve, severe to exceptional long-term drought persists across Kansas (Figure 1).

When did this drought start? It all started back in fall of 2010 when weather patterns that favored below normal precipitation started taking shape across the region. With the exception of a fairly wet period from fall 2011 through mid-spring 2012, below normal precipitation occurred a majority of months across Kansas since fall 2010. Especially dry

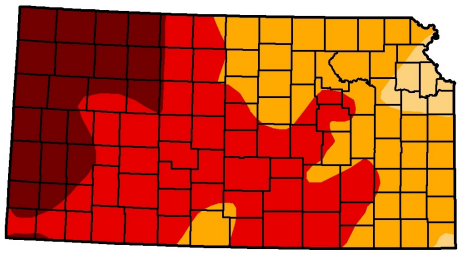

Figure 1. Weekly drought monitor issued every Thursday by the University of Nebraska. Drought conditions as of March 19th ranged from exceptional (worst drought category) over western Kansas, to moderate drought (2nd to least category) over northeast Kansas.

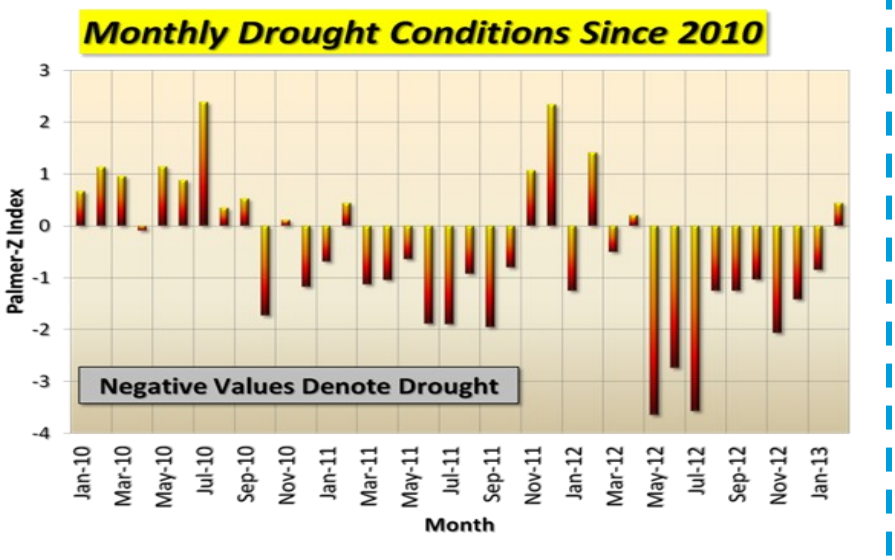

Figure 2. Kansas monthly drought conditions since January 2010 according to the Palmer-Z Index, which measures drought conditions on short time scales (e.g. 1-month). The drought started fall 2010, and persists through the present day despite above normal precipitation fall-spring 2011-12, and February 2013. Notice the especially dry months of late spring-summer 2012. Information courtesy of National Climatic Data Center.

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Also be sure to check if your county Emergency Manager has a facebook page.

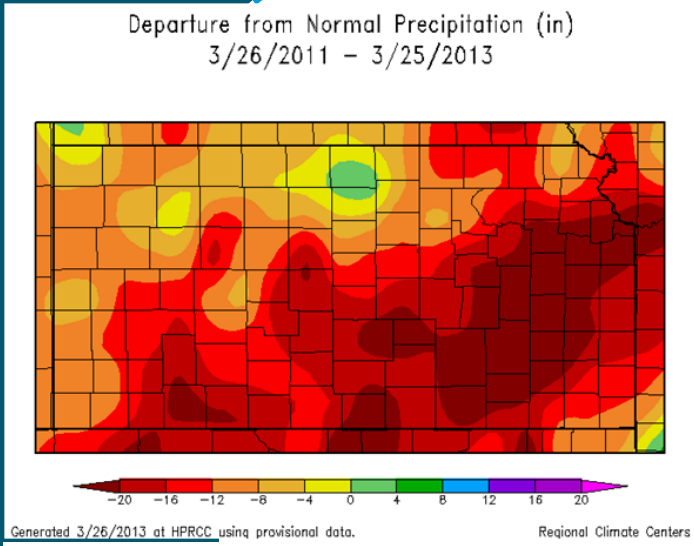

Figure 3. Kansas 2-year precipitation departure from normal from March 2011—March 2013. The dark maroon shade that spans much of the southeast quarter of the state represents 20 or more inches below normal. Image courtesy of High Plains Regional Climate Center.

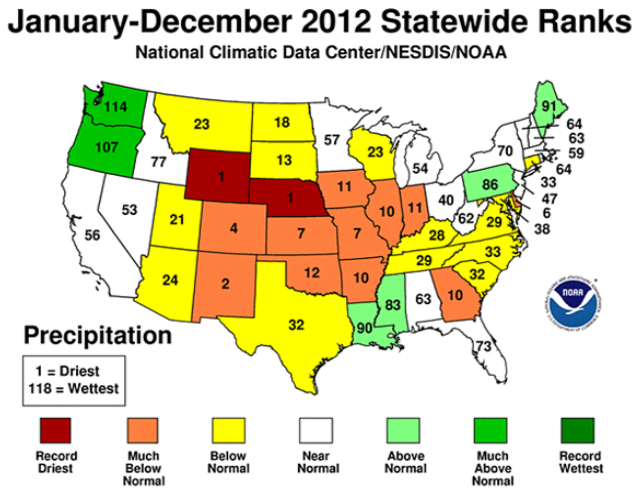

Figure 4. Statewide precipitation rankings for 2012. Kansas recorded its 7th driest year on record, with many states across mid-America experiencing record to near-record dry conditions in 2012.

months occurred from the spring through fall months of 2011 and 2012. The Palmer-Z drought index graphed in Figure 2 illustrates these wet and dry periods since January 2010. Two-year precipitation deficits from March 2011—March 2013 are over 20 inches below normal for many locations across the state (Figure 3), and 2012 was Kansas 7th driest year on record (Figure 4). Spring and summer is a bad time for a dry spell, since it is usually during these months when Kansas receives over half of their yearly rainfall.

To further aggravate the ongoing drought, the summers of 2011-12 proved much hotter than average with 80-90 days combined between the two summers reaching at least 100 degrees across the Sunflower State. Wichita recorded 53 days in 2011 and 36 days in 2012. To put this into perspective, Wichita typically experiences about twelve 100-degree days per year.

Historical Comparisons

How does the current drought compare to past droughts across Kansas (Figure 5)? Many experts are claiming that the current drought's intensity is rivaling some of the historically drought-stricken years of the 1930s (Dust Bowl) and 1950s. However, the overall longevity of the current drought does not yet rival the '30s and '50s when crippling precipitation deficits prevailed for several years. If the hot and dry conditions prevalent the past couple years continue through this spring and summer and possibly the next, the current drought will likely rival the overall longevity of historically bad droughts. Let us hope that does not happen.

"Wichita experienced 7.29 inches of precipitation from December-February, which was the 3rd highest winter total on record ..."

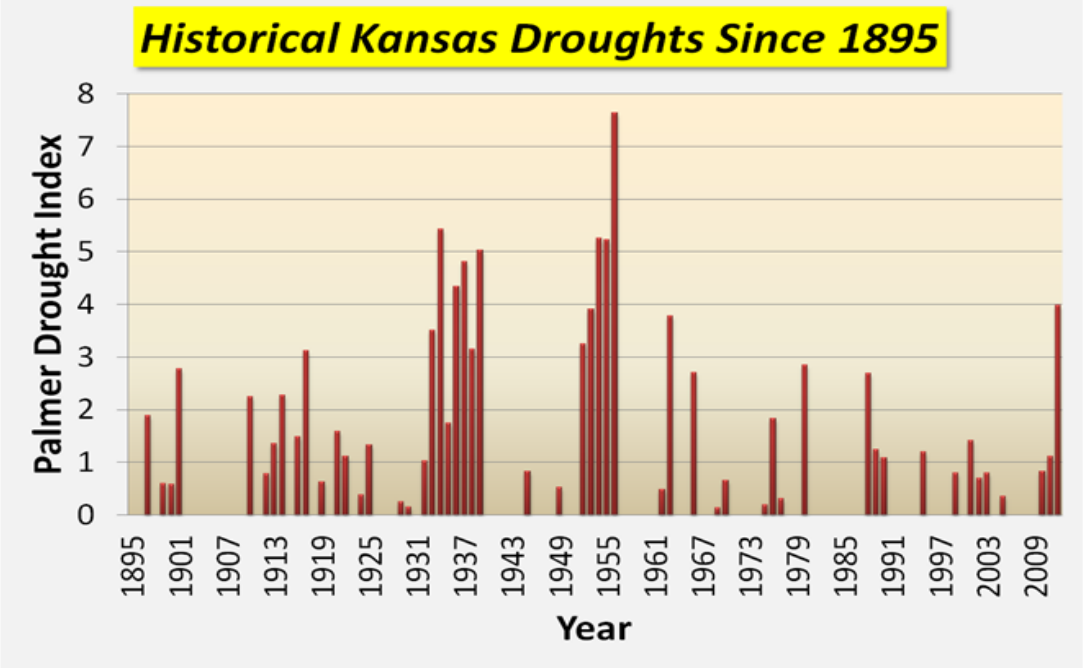

Figure 5. Kansas drought conditions since 1895, per the Palmer Drought Severity Index. Drought severity increases with number. The current drought is the red line at the far right, equaling about 4. While the intensity of the current drought is rivaling some of the historically drought-stricken years of the 1930s and '50s, the overall longevity is not. Information courtesy of National Climatic Data Center.

Figure 6. Low water at Cheney Reservoir making these docks essentially useless.

Agricultural and Hydrological Impacts

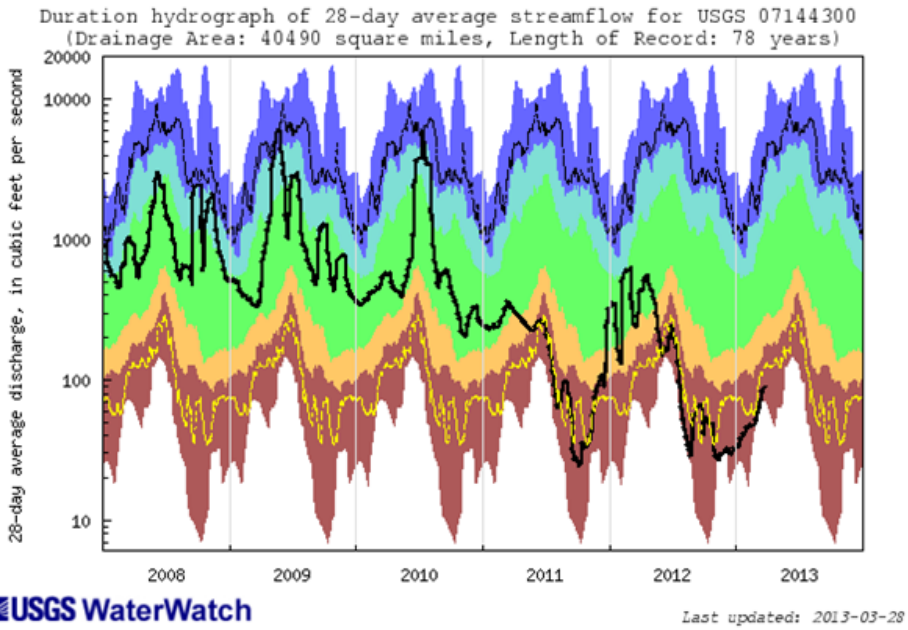

Figure 7. Arkansas River at Derby streamflow since 2008. The solid black line is actual streamflow; blue denotes above normal flow, green near normal, and yellow/maroon below normal. The bottom extent of the maroon curve is near-record low flow. Notice the extremely low flow during portions of 2011, 2012, and currently early in 2013.

Drought impacts have been especially severe for agriculture and water resources. Reservoirs, streams, wells and aquifers are running well below normal which is impacting water resources for area communities and forcing various water-use restrictions across the state. Cheney reservoir, a main water supplier for the Wichita area, is currently about 40% below normal (Figure 6). If the drought continues at the current amount of water consumption, city officials estimate the reservoir will dry up by 2015. Private well use was recently prohibited in Ellis as city officials are concerned about water shortages as area wells dry up. Additionally, recreational boating has suffered due to the low water. Furthermore, Figure 7 depicts the near-record low stream flow on the Arkansas River near Derby. Before the abundant February precipitation, many Kansas streams and rivers were at or near record-low stream flows.

Agricultural impacts have been far-reaching as well. Due to the dry fall in 2012, winter wheat took a hard hit. As of early November 2012, it was reported that the status of winter wheat across the parched Midwest was at its lowest point since 1985, and hay supply was at its lowest point since 1974. The decreased hay and crop yields caused feed prices to rise which forced some ranchers to sell livestock. Hay thefts were reported throughout the region, and unfortunately a Wagoner, Oklahoma man was shot in a dispute over hay bales. Range and pasture lands have been impacted as well as stock water supplies. The following statistics compiled in late February 2013 by the USDA clearly depict the adverse agricultural impacts across Kansas caused by the drought:

Winter Wheat Condition: 12% very poor, 24% poor, 41% fair, 22% good, 1% excellent.

Range and Pasture Condition: 53% very poor, 30% poor, 15% fair, 2% good, 0% excellent.

Feed Grain Supplies: 22% very short, 25% short, 52% adequate, 1% surplus.

Hay and Forage Supplies: 35% very short, 37% short, 27% adequate, 1% surplus.

Stock Water Supplies: 48% very short, 30% short, 22% adequate, 0% surplus.

Long-Range Outlook

What is the long-range weather outlook? Is there any relief in sight? These are difficult questions to correctly answer given the challenging aspect of long-range forecasting (greater than a week or two in the future). However, the experts at the Climate Prediction Center are calling for greater chances for a warmer than normal spring across the region with slightly greater chances for above normal precipitation, especially over eastern Kansas. Nevertheless, whatever the long-range forecast, the best chance to put a big dent into or break a drought across Kansas is during the spring and early summer. The spring and summer typically boasts one-half to two-thirds of the average annual precipitation across the state. This bodes well for at least some drought improvement (Figure 8).

How much rainfall is needed to end the current drought? While estimating a definitive amount is difficult, it's safe to say that more is better. While not quite as much rainfall is needed to positively impact regional agriculture, much more is needed to bring reservoir, well and aquifer levels back to normal. Do we need 15-20 inches above the normal amount, essentially the 2-year precipitation deficit for many areas across the region, to break the drought? While that amount is probably on the high side, a better rough estimate is probably somewhere in the 5-15 inch range to greatly help replenish the ailing water supplies. This amount constitutes additional rainfall ON TOP of normal rainfall. Furthermore, the precipitation cannot come all at once, lest it runs-off quickly and isn't able to soak into the parched ground; it needs to come incrementally (one inch this week, another inch next week, etc).

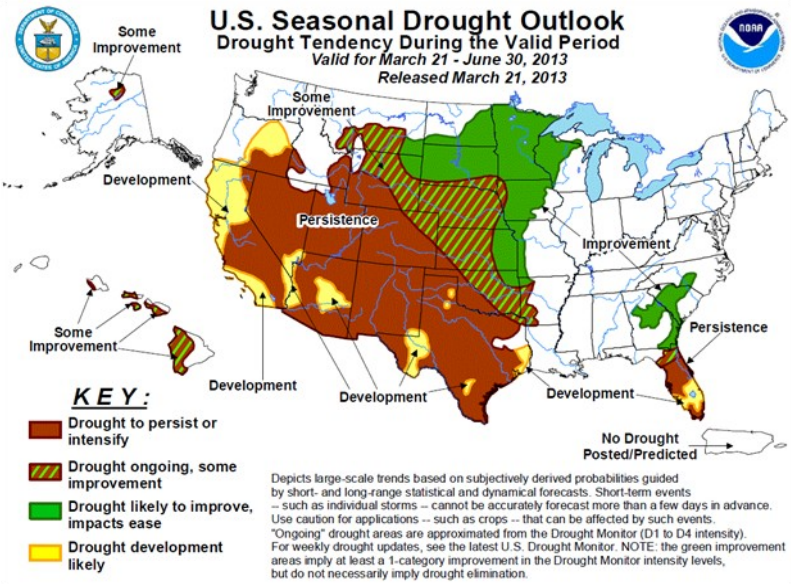

Figure 8. The official drought outlook through June 2013 issued by the Climate Prediction Center calls for the drought to persist, although some improvement is likely. The best chance to put a big dent into or break a drought across Kansas is the spring and early summer, as this time of year typically boasts one-half to two-thirds of the average annual precipitation across the state.

Winter 2012-13 Highlights

By: Eric Schminke, Meteorologist

During Winter 2012-13, Old Man Winter and his colleague, the Abominable Snowman, were in the mood for some real fun and games as they produced two of the greatest winter storms the region has seen in 40-50 years!

It had been a relatively uneventful winter for central, south central and southeast Kansas until February 20th when the two mythical characters went into action.

The first of two major winter storms dumped 13 to 17 inches of snow across central and south central Kansas. The Wichita Mid-Continent Airport measured 14.2 inches for the two day storm, which was the second greatest amount recorded in Wichita's history. (Please see more about this storm on page 1 of this newsletter).

The 2nd snowstorm struck on the 25th and continued until the morning of the 27th. Although accumulations weren't quite as impressive as those of the 20th and 21st, north winds that whistled to tunes of 30 to 40 mph produced a dangerous situation with severe visibility restrictions.

Accumulations from the snowstorm of the 25th-27th ranged from 8 inches in Kingman to 2 inches in El Dorado with most reports between 3 and 5 inches (Figure 4). Wichita measured an even 7.0 inches from this event, but the strong north winds no doubt caused significant blowing and drifting. Many roads and highways especially east-west oriented variants were closed. Northerly 25 to 35 mph winds persisted on the 27th. The renewed drifting reclosed segments of some county roads in Harper, Kingman and Reno counties that had been cleared the previous day.

The truly major snowstorms of the 20th-22nd and the 25th-27th enabled February 2013 to become Wichita's snowiest month on record, edging the 20.5 inch total measured exactly 100 years earlier (see below). These two snowstorms also enabled winter 2012-13 to become Wichita's 5th snowiest on record with 24.5 inches (see list on next page). For the 2012 – 2013 snow season Wichita received 30.0 inches of snow tying for 5th in all-time snowiest seasons.

The Ten Snowiest Months in Wichita's History:

21.2 Inches in February 2013*
20.5 Inches in February 1913
19.7 Inches in January 1987
19.6 Inches in January 1949
18.5 Inches in January 1962
17.7 Inches in January 1973
16.8 Inches in March 1912
16.7 Inches in February 1971
16.5 inches in March 1970
16.3 Inches In December 1918

The 10 Snowiest Winters in Wichita's History:

27.0 Inches in 1912-13
26.1 Inches in 1986-87
25.7 Inches in 2002-03
25.0 Inches in 1974-75
24.5 Inches in 2012-13*
23.4 Inches in 1961-62
23.3 Inches in 1982-83
22.9 Inches in 1939-40
22.7 Inches in 1948-49
22.6 Inches in 1959-60

Winter-like weather persisted throughout much of April across the Plains, with inches of snow over Nebraska and states to the north, while shallow cold air caused a wintry mix over Kansas. On April 10th, a very strong shallow cold airmass plunged southward across the Plains. The combination of the shallow cold air and the warm mid and upper levels causes precipitation to fall as rain while surface temperatures are at or well below 32 degrees. The rain that fell accumulated on elevated surfaces and froze. Ice accumulations of a quarter of an inch up to a half of an inch were reported across central and south central Kansas. The ground temperatures had been so warm that the non-elevated roadways were not as slick as elevated overpasses.

48 hr Snow Amounts ending at 7am on February 26th, 2013

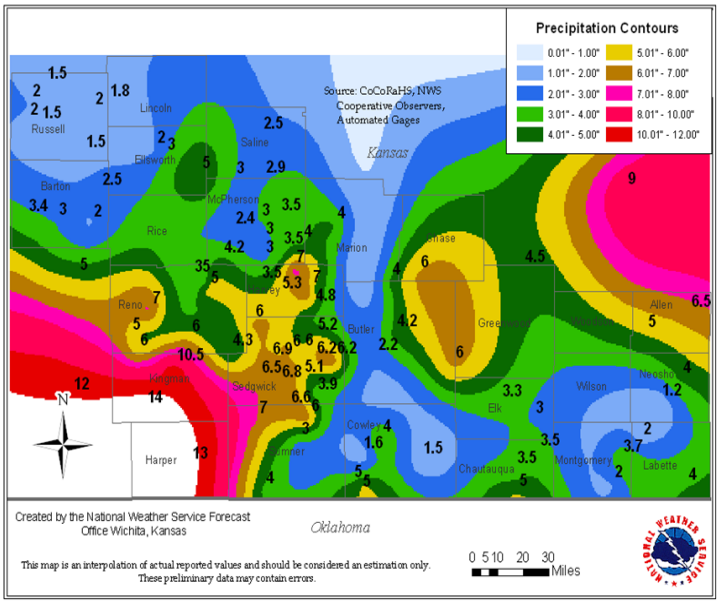

Figure 1

Winter Summary

The first significant snowfall of the season arrived December 19th when low pressure rapidly developed over the Oklahoma panhandle that morning. As the cyclone moved east along the Kansas/Oklahoma border throughout the day and that evening, it greatly intensified. The result was a blizzard that whipped through central Kansas throughout the night. Although the resulting 1-3 inch snowfalls in and of themselves didn't achieve Winter Storm Warning criterion (6 inches or more are required), vicious northwest 35 to 45 mph winds whipped the snow into a frenzy causing near zero visibilities.

When 2012 handed off the baton to 2013, the atmosphere was in a foul mood as a Heinz 57 variety of winter weather descended on the area. Although light snow was the primary precipitation mode, light rain, sleet and freezing drizzle also contributed to what, no doubt, was a dreary New Year's Eve for the neighborhood.

The new year started with a 'flurry' of activity as a couple of perturbations spread light snow across Kansas. Widespread 2-4 inch accumulations blanketed central Kansas with parts of Russell, Barton and Saline counties receiving 4 -4.5 inches. South central Kansas received 1-3 inches. By January 2nd, the snow had vacated Kansas, but Canadian high pressure spread across the state causing the neighborhood to chill out with lows that ranged from near zero in Russell to the mid teens in parts of south central and southeast Kansas.

Figure 2. Snow Rollers. Courtesy of Lucinda Gates in Anthony, KS

On the afternoon of January 4th, a low pressure trough developed along the Colorado/ Kansas border that forced the Canadian high pressure to the east and southeast of Kansas. This allowed stout 20 to 30 mph south winds to transport much warmer air into the area. By the 6th, most areas had warmed into the lower 50s with highs in the upper 50s prevalent on the 8th.

The second meaningful precipitation arrived on January 10th when an intense cyclone situated over the panhandles spread rich moisture north across the Southern and Central Plains. This set the stage for widespread ¼ to ½ inch rainfalls, but in its wake, another shot of bitterly cold air spread across Kansas with lows of 10-15 degrees gripping the region on the 13th and 14th.

When January entered its final lap, the neighborhood received an early taste of spring as afternoon highs soared into the mid 60s and mid 70s from the 26th to the 28th. Many records were set or tied. The records were: (The previous mark is in parentheses.)

Wichita:	**New Record High**	**New Record Warmest Low**
27th:	**69 Degrees (Tied 2002)**	**43 Degrees (Tied 1914)**
28th:	**74 Degrees (72 In 2011)***	

***The 74-degree record high set on the 28th was just 1 degree shy of tying the all-time January record of 75 degrees set on the 8th in 2002 and on the 22nd in 1976.**

Salina:		
28th:	**74 Degrees (68 In 1938)**	

Chanute:		
28th:	**75 Degrees (68 In 1917)***	**56 Degrees (54 In 1968)**

***The 75-degree record high set on the 28th tied the all-time high for January set on the 24th in 1950 and on the 29th in 1917.**

Russell:	
28th:	**76 Degrees (72 In 1950)**

The extreme warm spell from the 26th to the 28th set the stage for the first round of severe thunderstorms for 2013 as parts of southeast Kansas were lashed by 60 to 70 mph winds.

Early in the morning of the 29th, a strong cold front surged southeast toward a very warm, moist and unstable airmass entrenched over southeast Kansas. A line of severe thunderstorms erupted along the front as it crossed southeast Kansas. The 60 to 70 mph winds occurred in parts of Chautauqua and Labette counties where a few trees were uprooted. The very heavy rains that accompanied the thunderstorms set records for a few locations. Chanute's 1.97 inch total measured on the 29th easily swamped the previous mark of 1.25 inches set in 1982. It was also only 0.07 inches shy of tying the all-time January calendar day record of 2.04 inches measured on the 30th in 1975.

In the wake of the front, another shot of bitterly cold air invaded Kansas. Northeast and eastern Kansas caught the brunt of the Arctic blast where temperatures plunged to between 5 and 10 degrees the morning of the 31st.

The winter of 2012-13 was certainly one characterized by extremes, the greatest by far being in the snow department. Other detailed snowfall statistics are available at the following web address:

http://www.crh.noaa.gov/ict/?=winterstudy

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

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Online: www. weather.gov/Wichita

NWS Wichita Word Search

Famous Kansas Tornadoes
NWS Wichita

Find the cities that have been impacted by famous tornadoes.

G	S	N	O	S	R	A	P	A	G	D
R	S	A	N	A	T	H	V	K	H	N
E	H	S	L	O	E	A	S	E	L	E
E	L	H	A	R	T	Y	L	P	S	I
N	O	T	G	N	I	S	I	O	H	T
S	E	N	K	A	T	V	S	T	L	L
B	S	S	A	N	L	I	N	E	S	E
U	F	R	A	N	K	L	I	N	H	U
R	R	R	N	F	U	L	A	E	H	O
G	A	N	D	O	V	E	R	D	E	T
N	L	G	U	U	H	N	O	G	U	K

Andover
Haysville
Parsons

Franklin
Hesston
Topeka

Greensburg
Hoisington
Udall

Answer Below: