Storm Fury on the Plains

National Weather Service

Fall Spotter Newsletter

November 2013

Inside this issue:

Drought Ends After Weeks of Flooding Rains

By Janet Salazar – Service Hydrologist

Multiple rounds of showers and thunderstorms impacted central and southeastern Kansas from the end of July through the first half of August. Numerous upper level disturbances, in a persistent northwest flow regime across the central U.S., interacted with stalled fronts and very moist air masses from the Gulf of Mexico.

This pattern resulted in heavy rainfall which gave way to flash flooding and river flooding which started July 26th and continued into the next month. Over a 4 day period from the 26th-29th, rainfall amounts were an overwhelming 5 to 10 inches. On July 29th, areas experienced incredibly high precipitation rates. For example, up to 3.5 inches fell in 2.5 hours in Lindsborg, Kansas while Wonsevu in Chase County encountered 3.12 inches in 1 hour!

The tremendous amount of rain that was no longer able to soak into the already saturated ground spilled over into streets, fields, and made its way to riverbeds. There were many reports of impassable county roads, and they remained that way for days. Minor flooding occurred along parts of the Little Arkansas, Whitewater, Verdigris, Cottonwood, Neosho, and Smoky Hill rivers as well as Gypsum Creek. Moderate flooding status was reached at Cottonwood Falls on the Cottonwood River when it crested at 11.1 ft the morning of August 1st, 2013. The Neosho River at Parsons was another forecast site that reached moderate flooding during the early morning hours of July 31st. See Figures 1 and 2 for hydrographs of both Cottonwood Falls and Parsons on the next page.

Butler County at SW 10th St & Butler Rd on 4 August 2013

By the end of July, the vast majority of the area received 150-300 percent of its normal rainfall. Monthly rainfall amounts were above 4 inches across the area with

Flooding in Lindsborg. Photo courtesy KAKE.

Gypsum Creek looking south toward the K4 Gypsum Valley Rd intersection. Photo by Bearden 7/30/2013.

most of the area receiving more than 6 inches of rain. Higher localized amounts over 9 inches fell across portions of McPherson, Marion, Chase, and Cowley counties. The highest reported rainfall from a COOP station came from Lindsborg with 14.81 inches.

Despite being in an Extreme to Exceptional Drought for the first half of the year, the rainfall caused reservoirs to rebounded quickly. Pool elevations rose and filled the conservation pools and even reaching into the flood control pools in some cases.

The bouts of heavy rains transitioned into August. It was the same story here with a tropical air mass in place combined with a stalled front. This set the stage for torrential rains on the night of August 3rd into the morning hours of the 4th. Two to four inch rains inundated parts of central and south central Kansas. Barton and Reno counties were the hardest hit with 24-hour rainfall amounts of 5 to 7 inches. For example, a precipitation station in Ellinwood reported 6.47 inches, while in Reno County, 6.50 inches was reported at a site south of Hutchinson. Rainfall rates were impressive during this event, for example, the Hutchinson Airport ASOS measured 4.32 inches of rain in a 90 minutes span on the morning of the 4th. It should come as no surprise that flash flooding was a result. Flash flooding occurred within the city of Hutchinson due to the Cow Creek rising out of its banks. As a result of the flash flooding, numerous vehicles stalled in excessive high water in streets, and many basements were flooded.

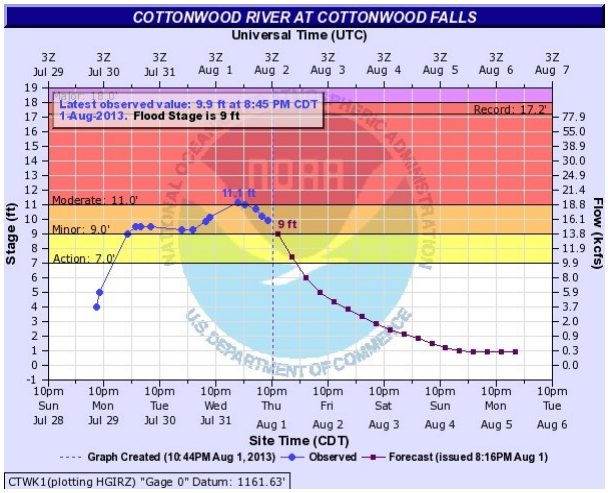


Figure 1

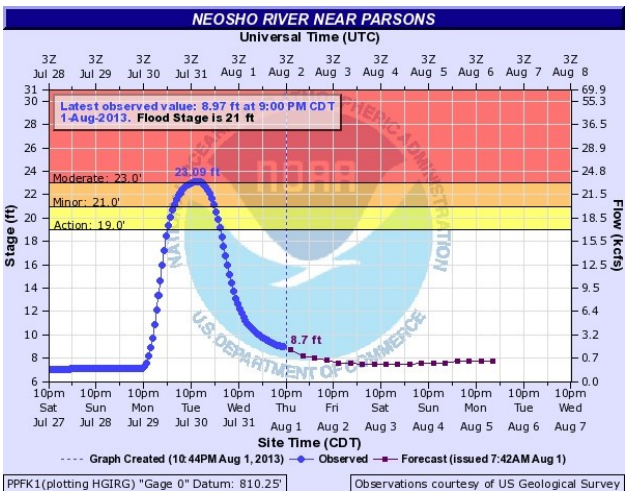


Figure 2

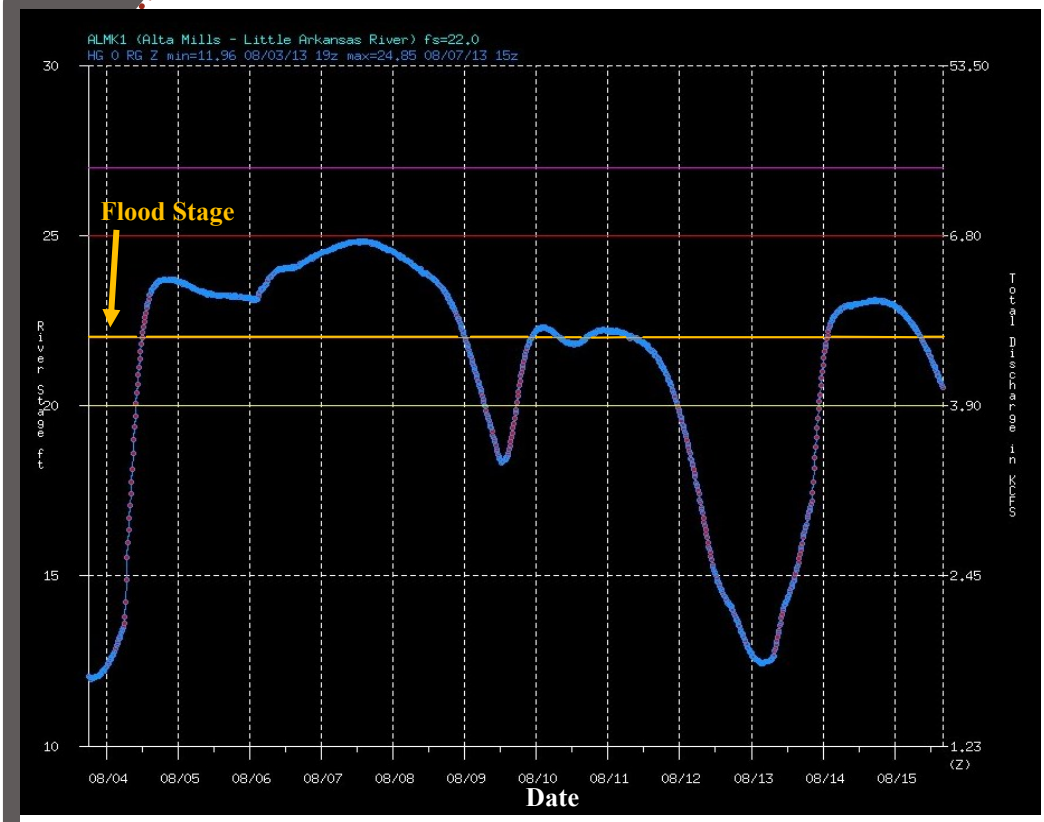


Figure 3: Little Arkansas River at Alta Mills exceeding its flood stage (orange line) and how it rose and fell below during the period of August 4th through the 15th.

Other cities, such as Great Bend, Ellinwood, Ellsworth, Sedgwick, and Wichita, also dealt with street flooding problems and stalled cars on morning of the 4th. Many other county roads in parts of central and south central Kansas were impassable due to water covering them. The heavy rains eventually transitioned to southeast Kansas along the Verdigris River Basin. Precipitation amounts in that basin were between 2 to 4 inches by the morning of the 5th.

Continued widespread showers and thunderstorms impacted central, south central and southeast Kansas through the middle of the month. Saturated grounds could not handle the rain, exasperating the flooding threat. A total of 23 river forecast points in the Wichita Hydrological Forecast area were in flood at one time or another from 1st through the 16th of August. Flooding occurred on segments of rivers mainly in south central and southeast Kansas, but a few in central Kansas were also impacted.

Due to multiple episodes of heavy rainfall from late July through mid August, many of the rivers were on a "roller coaster ride". For example, the Little Arkansas River at Alta Mills oscillated up and down out of flood stage four times between August 4th through the 15th (Figure 3).

In contrast of the "roller coaster ride" the upstream flood waters flowing downstream kept the Arkansas River at Arkansas City up above flood stage for eleven days (Figure 4).

During the first ten days of August, the areas hardest hit with heavy precipitation were south central and southeast Kansas with up to 6 to 10 inches of rainfall. If we included precipitation totals between July 27th through July 31st, the total rainfall between July 27th and August 10th, the heaviest rainfall amounts would be between 12 to 18 inches over northern Harvey, southern Reno, southern Marion, central Butler, and Elk counties.

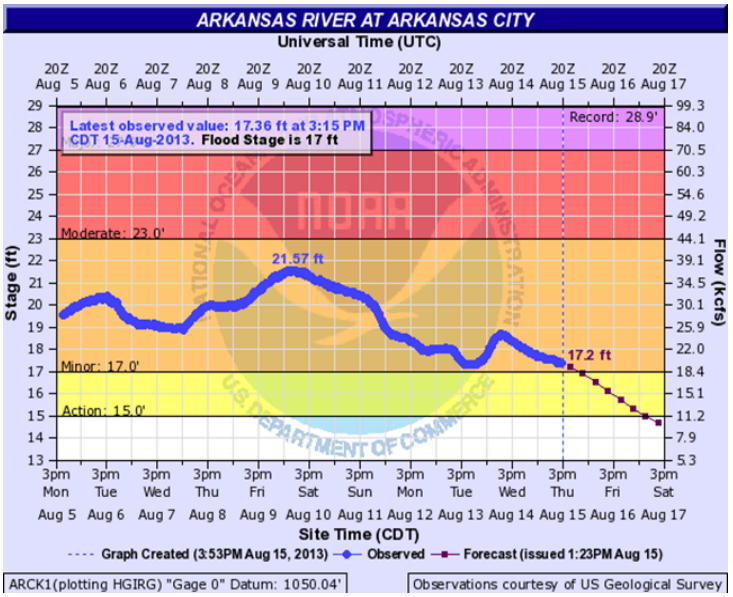


Figure 4: Arkansas River at Arkansas City was above flood stage (above the orange line) for 11 days.

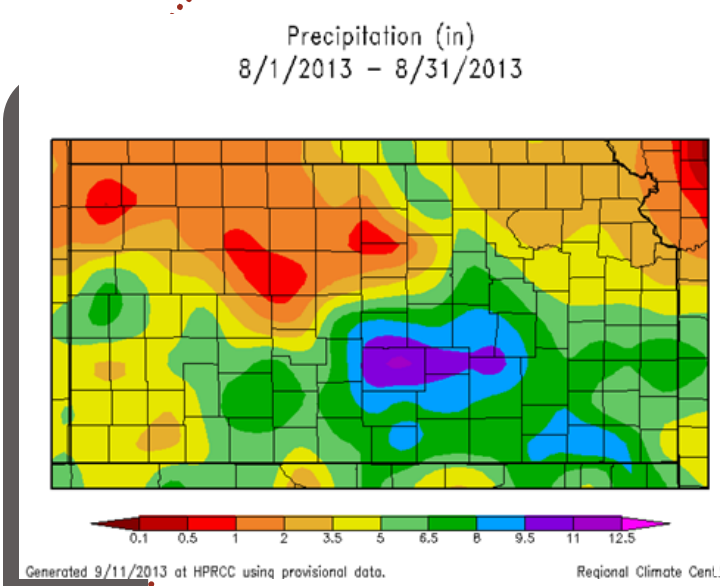


Figure 5

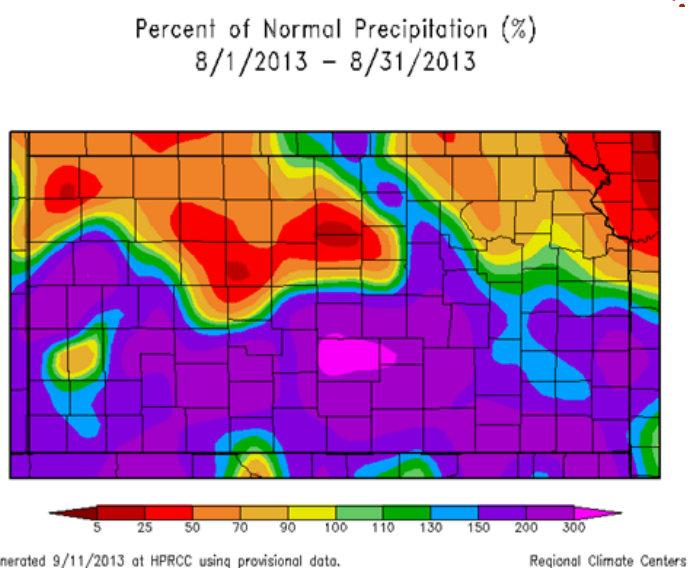


Figure 6

Figure 5 shows us the total precipitation for the month of August ranged from as little as three-fourths of an inch across north central and northwest Kansas while 12.5 inches fell in Reno County in south central Kansas. Most of south central and southeast Kansas received well over 5 inches of rainfall with the highest amounts of over 8 inches concentrated over a handful of counties in south central Kansas. Most of the area received 150 to over 300 percent of the normal August rainfall (Figure 6). The extreme amount of rainfall over these few weeks helped to end the drought over eastern Kansas.

What a difference a year can make. The pictures below show a comparison at the Arkansas River/floodway control structure along I-235 in northwest Wichita taken 1 year apart.

We will have to wait and see what will be in store for 2014….floods or drought?

August 2012

August 7th 2013

NWS Wichita Lead Meteorologist Kevin Darmofal

Kevin has been a lead meteorologist in Wichita for almost 18 years!

Kevin Darmofal has been a Lead Meteorologist at the National Weather Service in Wichita, KS for almost 18 years. He began his professional career in weather after graduating from the University of Kansas in 1988. Then he ventured briefly into television part-time by doing on-air weather for Sunflower Cable, Channel 6 in Lawrence and also produced the weekend weather shows at KMBC Channel 9 in Kansas City. Kevin next went full-time into the private sector for two years with WeatherData, Inc. before beginning his career in the National Weather Service (NWS) in March of 1991. He started his NWS career with the as an intern at the NWS Chicago/Romeoville. In the summer of 1994, he was promoted to General Meteorologist in Louisville, KY before coming to Wichita as a Lead Meteorologist in January of 1996.

Like many meteorologists, Kevin's love for weather began at a very early age. The great derecho of July 4, 1969, that ripped across Lake Erie and northern Ohio, was his first recollection of weather, at the age of 4 ½ and is likely what sparked his interest in the science of meteorology. Kevin considers his unofficial start to a life in weather began at the age of 8 years old, when he began drawing weather maps and forecasts from watching the early evening news (weathercasts).

Kevin has worked many memorable weather events while in Wichita, including: the May 3rd, 1999 tornado, the Halloween flood of 1998, the record Wichita hailstorm of September 15th, 2010 and most recently the tornado outbreak of April 14th, 2012 . He loves the daily challenge of forecasting and also likes to occasionally get out on the road to spot and photograph severe local storms, including tornadoes.

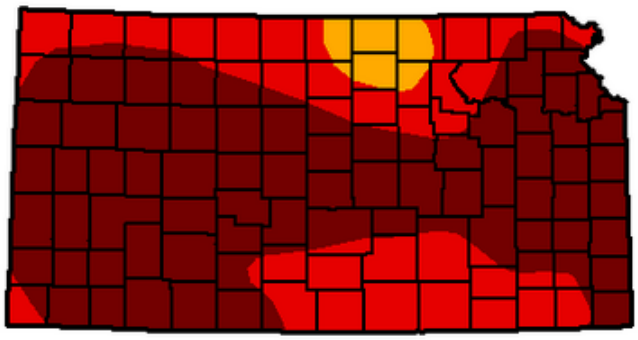
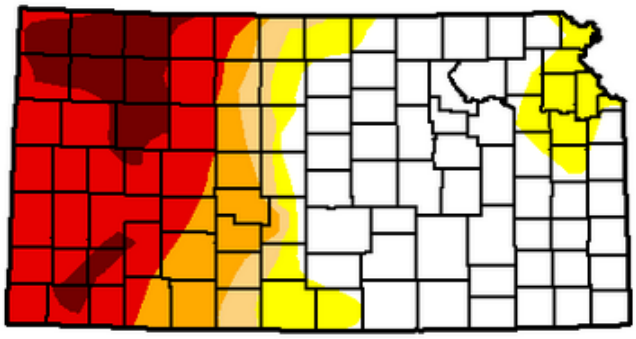
Kevin met his wife Julie, in Wichita, and she has become an avid KU sports fan through marriage. They also love hockey and enjoy watching their son play in the youth hockey program. Summer trips to the Colorado front range have become a frequent family venture and will perhaps become their second home some day.

Summer 2013: *Cooler* and *Wet*

By: Andy Kleinsasser

What a difference a year (or two...or three) makes! After some of the hottest summers on record since 2010, and one of the driest summers on record in 2012, a cooler and wet summer was finally experienced in central, south-central and southeast Kansas in 2013. In fact, "wet" is an understatement, as portions of central and southern Kansas experienced one of the wettest summers on record, thanks to a persistent unsettled pattern from roughly mid-July through mid-August. Ironically, June 2013 was actually quite dry across much of the area.

Furthermore, the many deluges from roughly mid-July through mid-August thankfully dealt a fatal blow to the historical drought that plagued the region since spring 2011, mainly over the eastern two-thirds of Kansas, replenishing reservoirs and other water supplies.

August 2012 Drought Conditions	August 2013 Drought Conditions
	

August 2012-2013 Kansas drought severity comparisons. Red colors indicate exceptional drought conditions, while yellow and white colors indicate relatively drought-free conditions. A persistent hot and dry pattern led to extreme to exceptional drought spreading across much of the region by the end of summer 2012 (left image). In contrast, a persistent wet pattern from roughly mid-July through mid-August dealt a fatal blow to the historical two and one-half year drought across generally the eastern two-thirds of the state.

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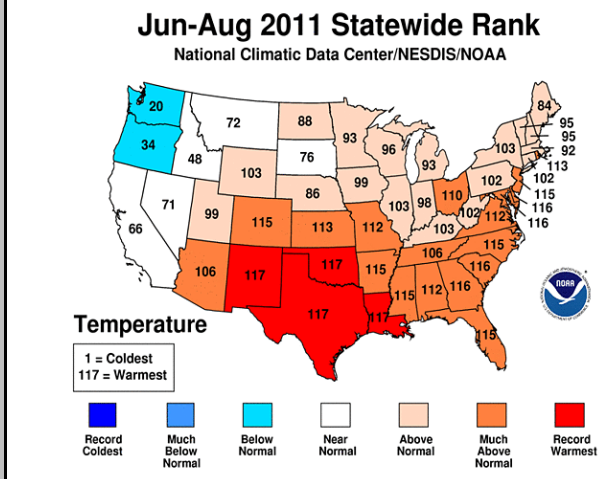
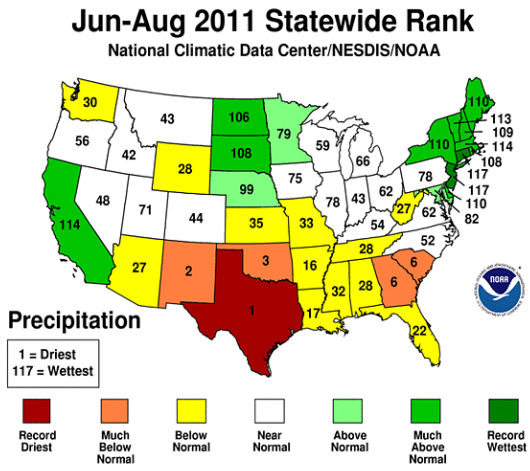
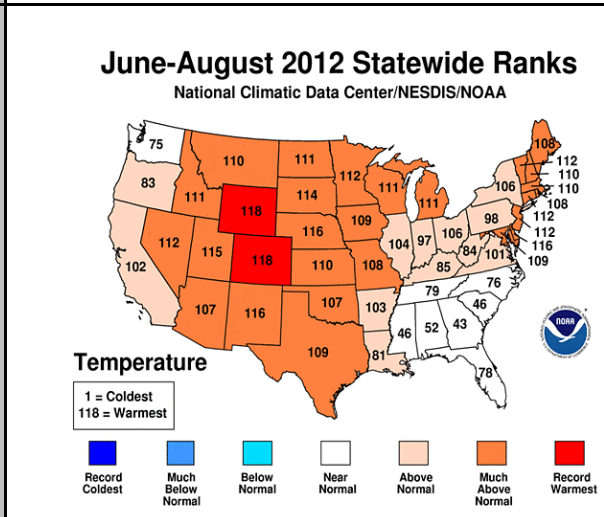
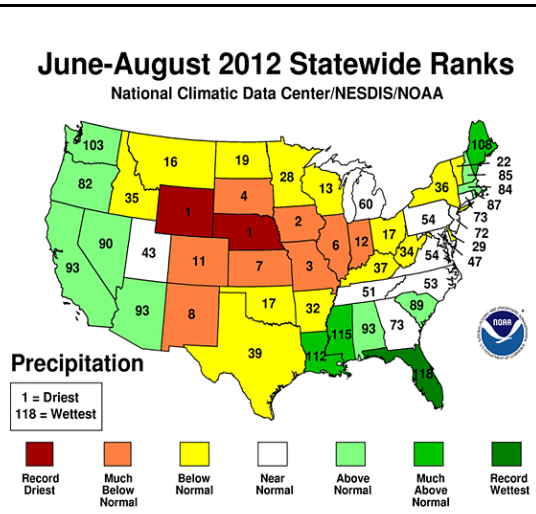
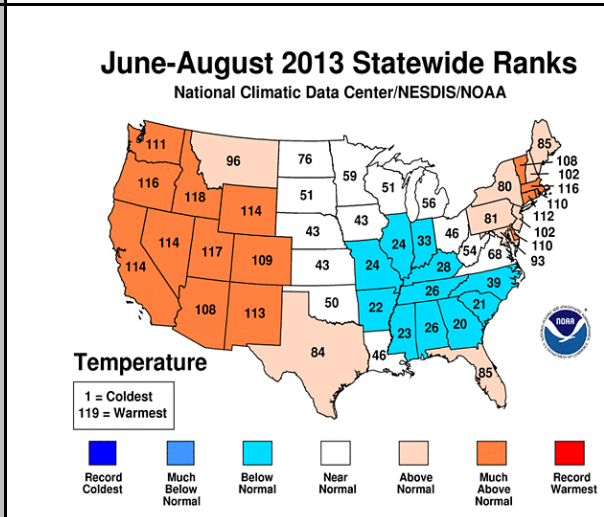
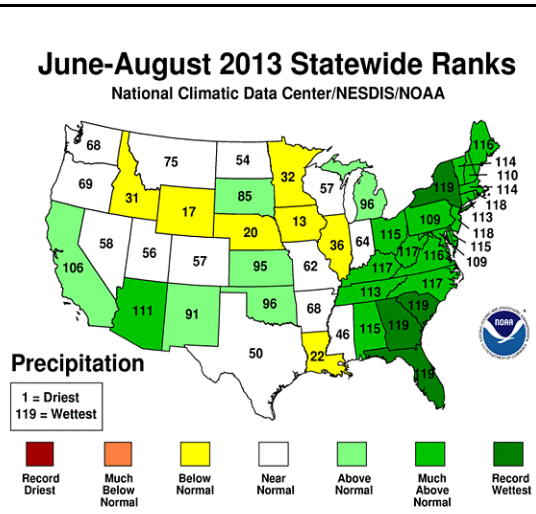
US National Weather Service Wichita Kansas

on Twitter at @NWSWichita

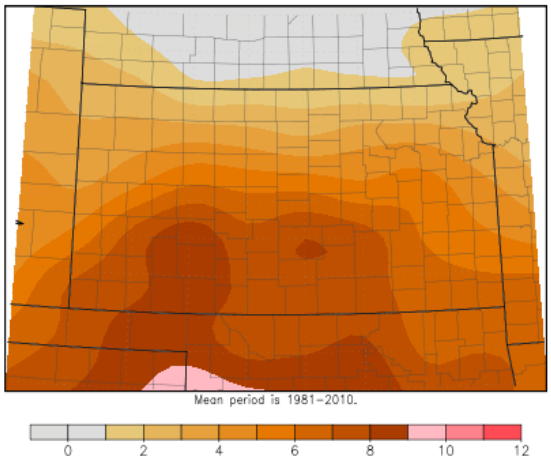
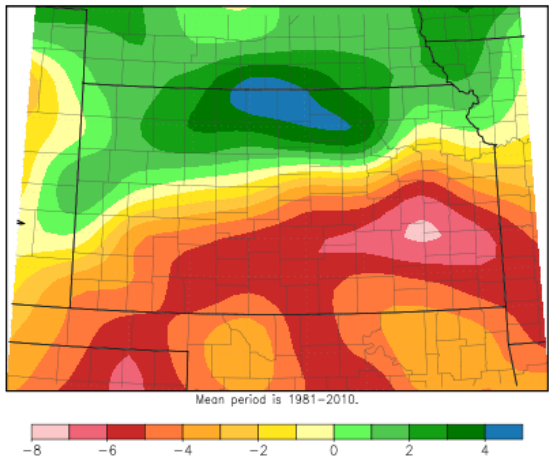
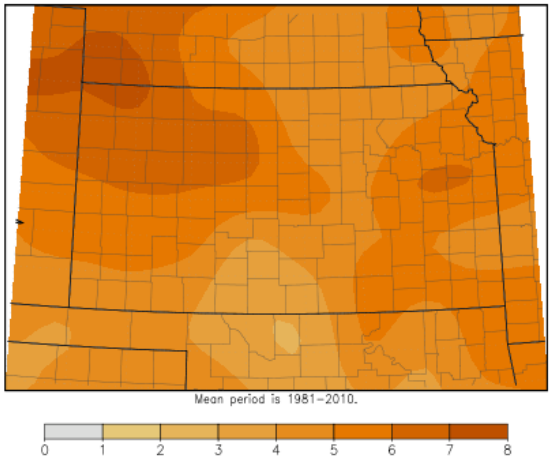
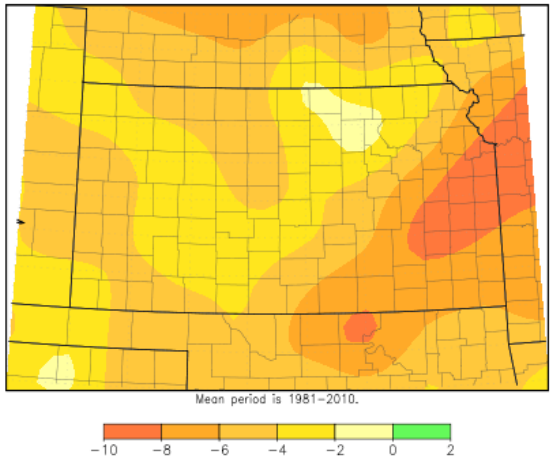
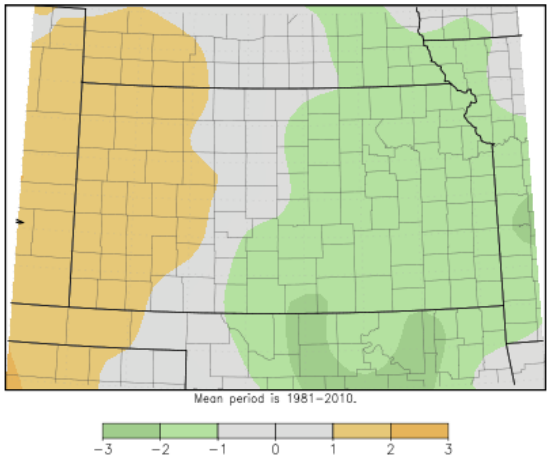
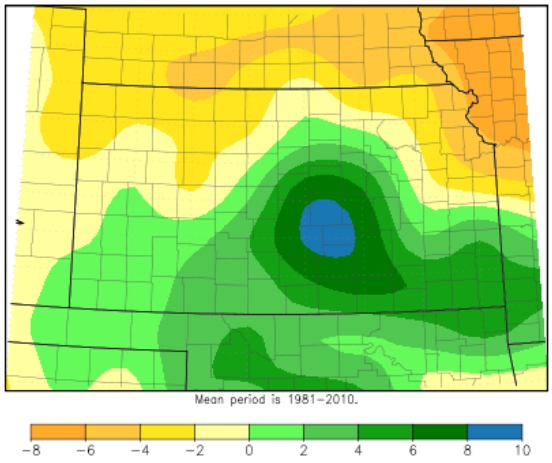
Also be sure to check if your county Emergency Manager has a Twitter account for your county.

Summer 2011-2013 State Rankings

	Temperature	*Rainfall*
2011		
2012		
2013		

Summer 2011-2013 statewide temperature rankings (left column) and rainfall rankings (right column) nationwide. The summers of 2011-2012 were in the top-ten warmest Kansas summers on record (top left, middle left), with summer 2012 in the top-ten driest (middle right). In contrast, summer 2013 was in the top-25 wettest Kansas summers (bottom right).

Summer 2011-2013 Departures From Normal

	Temperature	*Rainfall*
2011		
2012		
2013		

Summer 2011-2013 temperature and rainfall departures from normal across Kansas. Notice the relatively hot and dry summers of 2011-2012 (top four images), most notable over generally the southern half of the state in 2011. In contrast, summer 2013 was relatively cool and especially wet, mainly over central and southern Kansas (bottom two images).

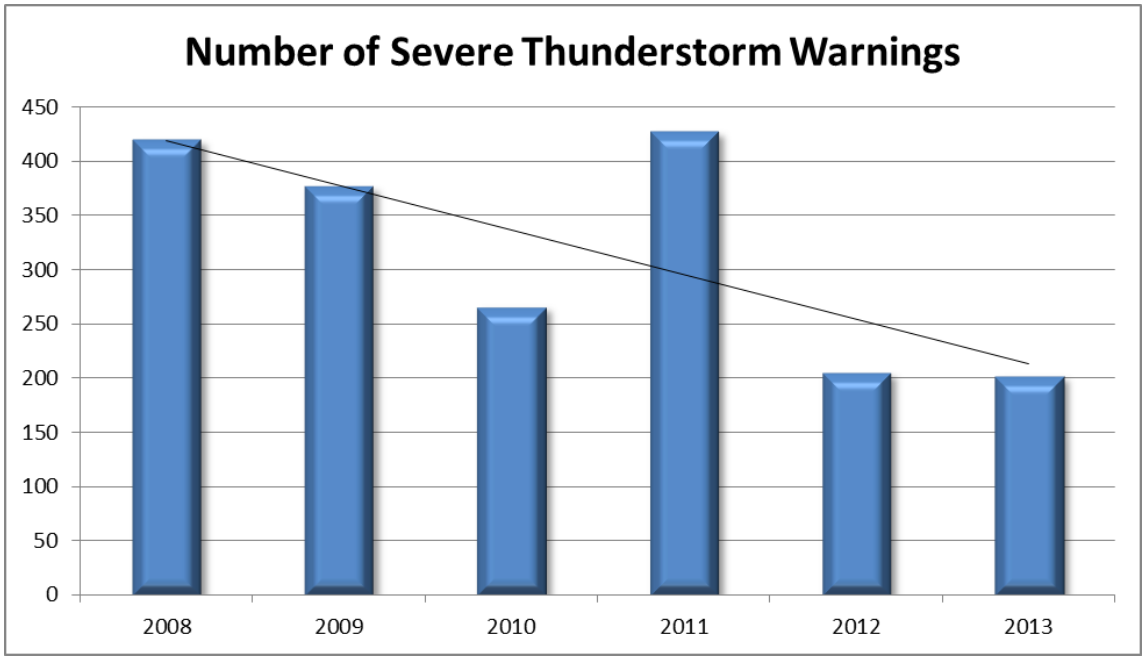
Just how busy has severe weather been for the 26 counties Wichita serves?

By: Chance Hayes

Let's take a look back at the last 6 years of severe weather data to see how many warnings the Wichita office has issued for the 26 counties that fall under our jurisdiction. The six year time frame was chosen due to the fact that in 2008 our office began issuing storm based warnings instead of county based warnings. Basically, this means a warning would be drawn as a polygon that we felt accurately assessed the area of greatest risk without regard to county boundaries.

Right off the top, one would think that the last two years would have been somewhat slow considering we were in the middle of a drought.

When looking back at the past six years you can see that the trend has been downward in regards to severe thunderstorm warnings with the exception of 2011. Could this be due to the drought, or is it just a cycle that we are going through? How about the number of severe weather events? Has the number of hail reports greater than 1 inch in diameter or winds speeds higher than 58 mph decreased as well?



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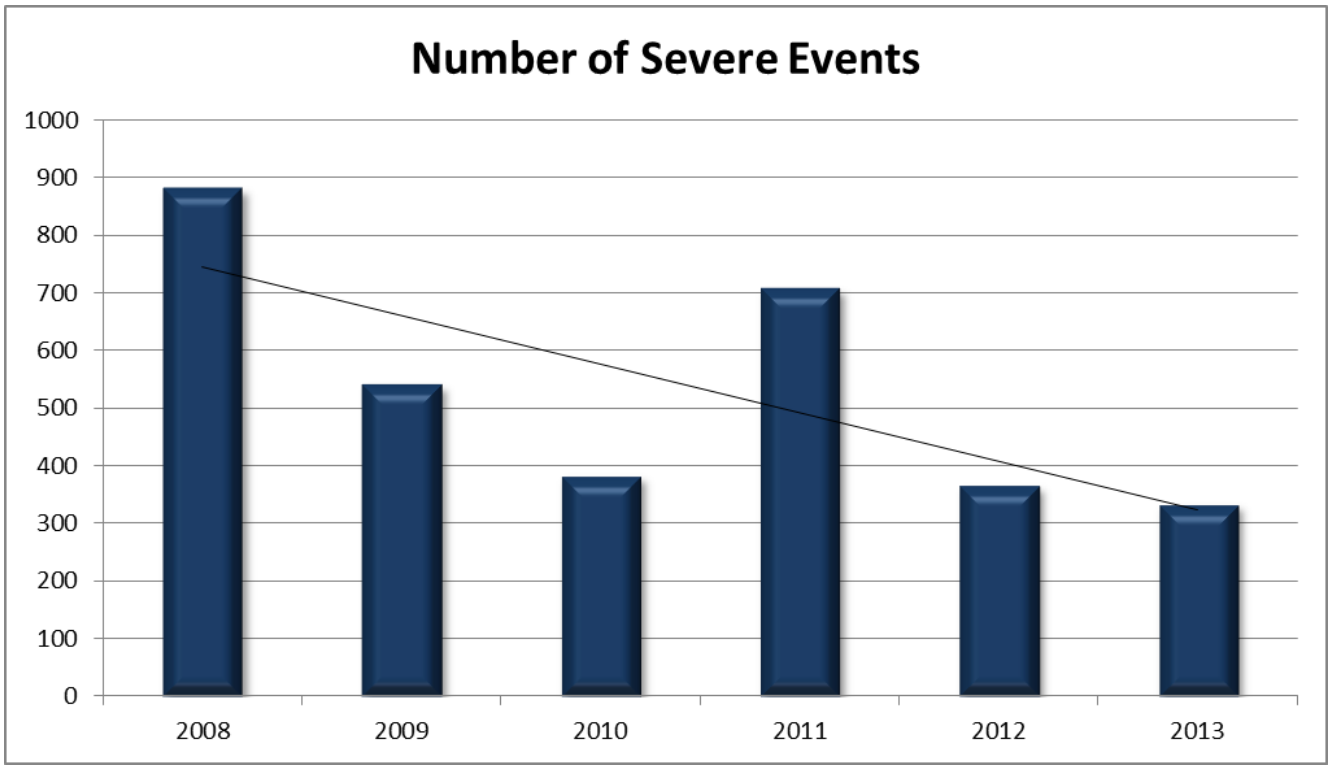
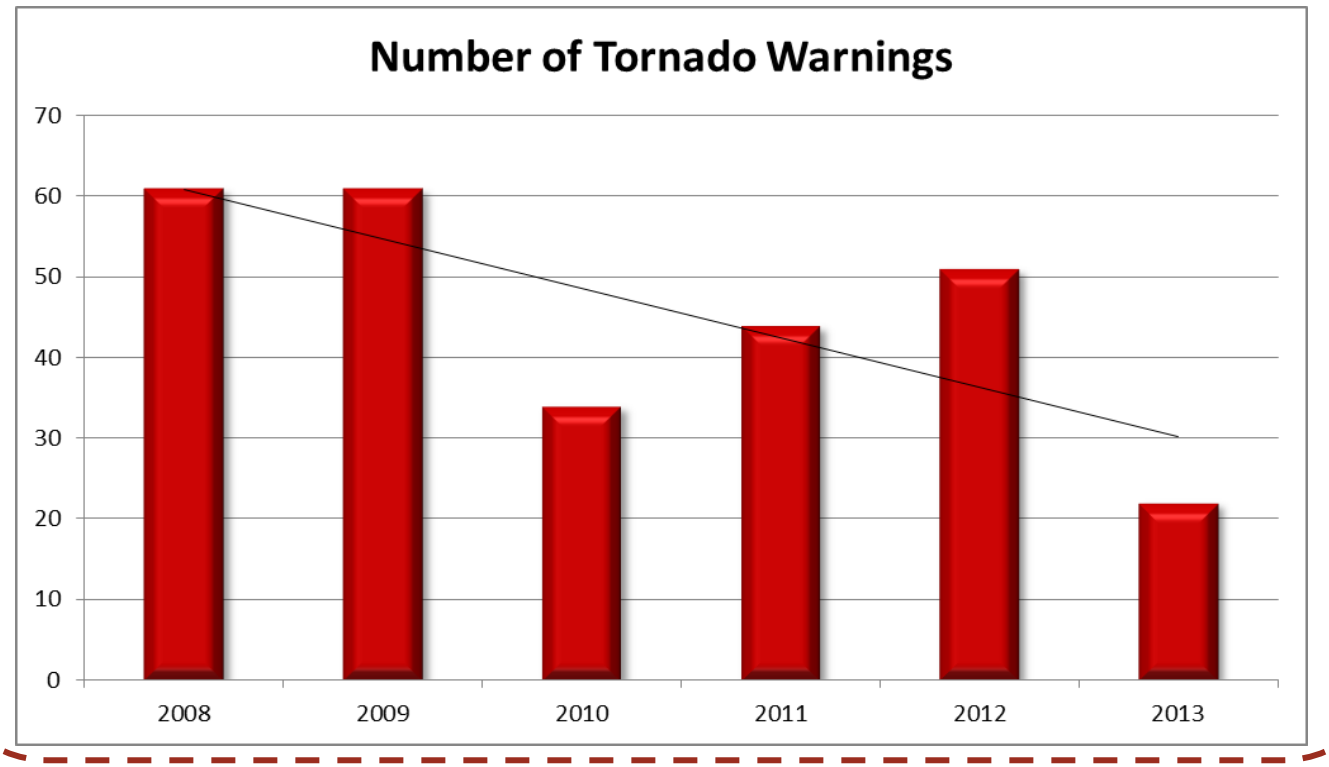
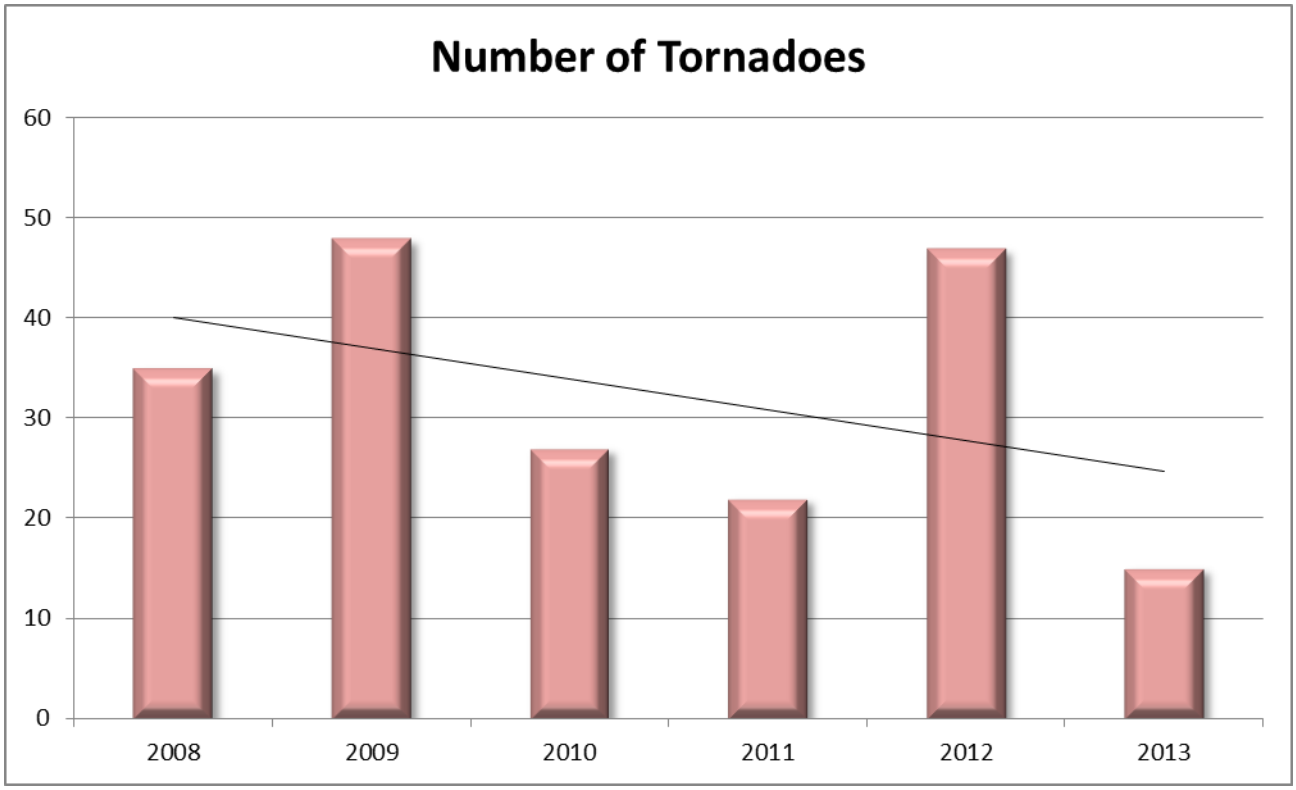


Yes, you can see a direct correlation in the number of severe events (above) to the number of warnings issued. Would this trend also hold true for Tornado warnings? Let us take a look.

Once again, you can see that the trend line is moving down for the number of tornado warnings (below) , how about the number of tornadoes that touched down?





Based on the charts we can surmise that we have definitely seen a downward trend in the number of warnings and events across central and southeast Kansas.

Keep in mind that this is not a forecast for future years, it merely represents the past. You must remain vigilant and prepared to react to any hazardous weather that moves into your area. Remember, it only takes one tornado, lightning strike, hail stone, or wind gust to injure or take ones life.

Extremely Powerful Severe Thunderstorms Roar Through On June 27th

By: Eric Schminke

Extremely powerful severe thunderstorms erupted over central Kansas on the afternoon of July 27th, before going on a rampage across south central and southeast Kansas until late that evening. A cold front was the main mechanism that sparked the severe thunderstorms. The cold front surged south/southeast across Kansas that afternoon and evening into a region where 100 -107 degree temperatures were prevalent. The first cells erupted over Lincoln county around 345 PM and quickly developed supercell characteristics. As the cold front dove south/ southeast into relatively drier lower levels, the severe thunderstorms quickly evolved into a squall line that accelerated as the evening approached.

Early in the event, the severe thunderstorms produced both very large hail (in one case as large

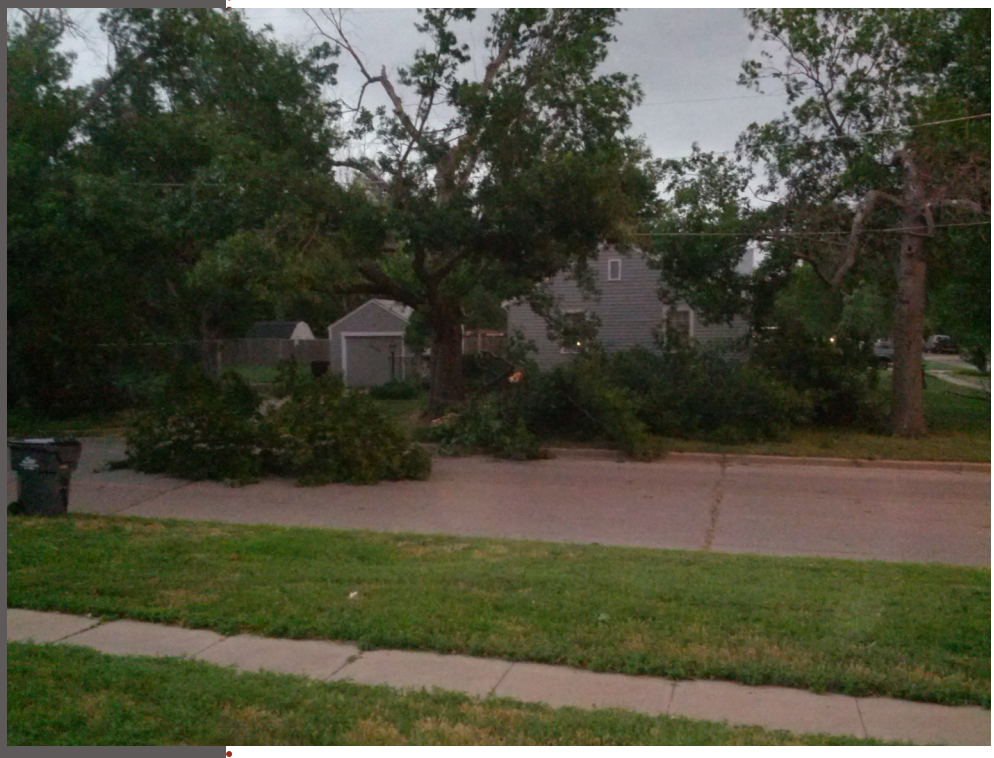
as softballs) and destructive winds, but then the thunderstorms evolved into prolific damaging and at times destructive wind producers.

The severe thunderstorms caused a 50 mile wide swath of tremendous damage from Lincoln, south through McPherson, through Wichita, and into north central Oklahoma. The counties that were hit exceptionally hard by this outbreak were Lincoln, Ellsworth, McPherson, and Sedgwick.

The severe thunderstorms tore through Lincoln County from 345-500 PM. Winds estimated around 85 mph unroofed one building, tore the side off a second structure, caused unspecified damage to a third building and destroyed a wind generator. Hay bales and other debris were thrown across highways. In a couple instances, hail as large as golf balls joined in the "fun". This was the case 3 miles east/northeast of Vesper which was ripped by golfball-sized hail driven by 80-mph winds. While the greatest danger from these severe thunderstorms was the extremely damaging winds, large hail also posed a threat. At 4:37 PM, softball sized hail landed in extreme west central Barton County in the town of Albert. Surprisingly, there were no reports of damage.

In Ellsworth County, a fireworks stand located on the north side of Ellsworth was leveled by a gust measured at 74 mph, while trees with 1 foot diameter trunks were uprooted in the east central part of the county.

In McPherson, a 92-mph gust was measured at the airport when the anemometer snapped. Major damage was caused to trees, power lines, and power poles causing widespread power outages.



Damage at 9th and Edgemoor in Wichita. Picture courtesy of Kane Oster.

The severe thunderstorms invaded the Wichita metro area around 630 PM and lasted for nearly 45 minutes with speeds ranging from 70-90 mph. As the squall line approached Wichita, the northeast and southwest segments merged. This merging was the most likely cause for the concentrated channel of incredible 80-90 mph gusts that lashed Mid-Continent Airport and vicinity from 650-710 PM.

The Weather Forecast Office measured an 89 mph gust that caused roof damage and the

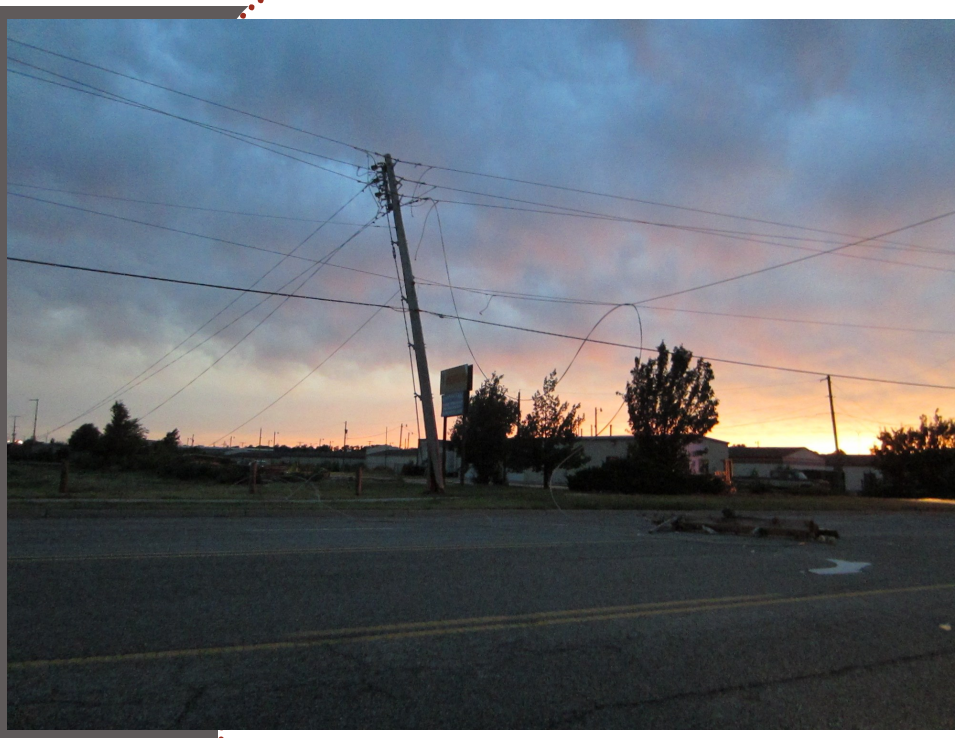


Image Above: Large utility pole tilted over just south of S. Tyler Rd and West Kellogg, Wichita. Picture courtesy of Brad Ketcham.

windows on the west of the station to bow inward. It was the second strongest gust ever recorded at the station. The record was 101 mph that roared through the airport on July 11, 1993. (NOTE: That same afternoon, a backup wind sensor measured a 109-mph gust.) On July 14th, 1948 a 100+ mph gust was measured at the original Municipal Airport, but the exact speed was unknown. It was during the July 14th, 1948 severe thunderstorm event that the strongest sustained speed record was measured at an even 80 mph.

During the event a small Federal Express aircraft was turned a complete 180 degrees and sustained wing damage at Mid-Continent Airport. Parts of the passenger and cargo terminals were damaged, three overhead garage doors were blown in, and several baggage carts were flipped over.

In west Wichita, gusts around 80 mph leveled a fireworks stand where two people were injured. Large trees were uprooted; several of which landed on homes. In east Wichita, elm trees with 2-3 foot diameter trunks were uprooted 3 miles east of the Eastborough suburb. Around 25,000 residences lost power in the Wichita Metro area alone due to downed powerlines. 4,000 of those residences were still without power a day later. Many houses sustained roof damage especially in Maize and northwest Wichita.

The severe thunderstorms caused around $200,000 damage in Sedgwick County alone. It is possible that comparable damages occurred in Lincoln and McPherson counties as well.

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por El Servicio Nacional del Tiempo (by National Weather Service)

Wichita, KS

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ñ	b	r	c	í	h	a	i	o	q	m
y	t	o	s	e	b	u	n	v	é	s
v	l	l	u	v	i	a	v	h	p	v
h	e	a	n	i	r	n	i	e	v	e
f	i	c	ó	e	q	u	e	u	t	n
r	h	e	v	n	f	l	r	l	ñ	t
í	s	g	l	t	á	m	n	d	o	i
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f	u	t	o	r	n	a	d	o	í	c
z	a	t	n	e	m	r	o	t	b	a

primavera (spring) — frío (cold) — invierno (winter) — tornado (tornado)
lluvia (rain) — verano (summer) — hielo (ice) — calor (heat)
nubes (clouds) — tormenta (storm) — ventisca (blizzard) — viento (wind)
sol (sun) — nieve (snow) — luna (moon) — otoño (fall)

Answer Below: