



2018 KANSAS SEVERE WEATHER AWARENESS



INFORMATION PACKET

**SEVERE WEATHER
AWARENESS WEEK**

March 5-9, 2018

**TORNADO SAFETY
DRILL**

Tuesday, March 6, 2018

10am CST/9am MST

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2017 Kansas Tornado Overview

<u>Tornadoes:</u>	60	2 below the 1950-2017 average of 62 35 below the past 30 year average of 95 32 below the past 10 year average of 94
<u>Fatalities:</u>	0	<u>Injuries:</u> 2
<u>Longest track:</u>	26.64 miles	(Pawnee to Barton counties, May 16)
<u>Strongest:</u>	EF3	(Pawnee to Barton counties, May 16)
<u>Most in a county:</u>	5	(Barton)
<u>Tornado days:</u>	15	(Days with 1 or more tornadoes)
<u>Most in one day:</u>	14	(May 19)
<u>Most in one month:</u>	29	(May)
<u>First tornado of the year:</u>	February 28	(Crawford County, 10:27 pm CST, EF0 0.1 mile length, 75 yard width)
<u>Last tornado of the year:</u>	October 6	(Pottawatomie County, 8:06pm CDT, EF1, 1.1 mile length, 40 yard width)
<u>Length of tornado season:</u>	220 days	(Days between first and last tornado)



*Tornado in southwestern Gove County on October 2, 2017.
Photo courtesy of Brandon Shahan.*

2017 Monthly Tornado Totals

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
EF5	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
EF4	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
EF3	0	0	0	0	1	0	0	0	0	0	0	0	1	2%
EF2	0	0	0	0	0	0	0	0	0	1	0	0	1	2%
EF1	0	0	1	2	2	1	0	0	0	4	0	0	8	13%
EF0	0	2	8	4	26	1	1	0	0	8	0	0	50	83%
Total	0	2	9	4	29	2	1	0	0	13	0	0	60	100%
Percent	0	3.3	15.0	6.7	48.3	3.3	1.7	0	0	21.7	0	0		

*Violent (EF4—EF5) in red, Strong (EF2-EF3) in yellow, Weak (EF0-EF1) in green. Monthly totals in gray.
(Percent values may not add to 100% due to rounding)*

Annual Highlights: A total of 60 tornadoes occurred in Kansas in 2017, which is near the long-term average (records beginning in 1950), but well below more recent 10 and 20-year averages. Fortunately, no tornado-related fatalities occurred in Kansas, but 2 injuries were reported. Both injuries occurred on May 16th as an EF3 tornado tracked for 26.64 miles across Pawnee and Barton counties. There were no violent tornadoes in Kansas last year.



Tornado damage two miles west of Great Bend Airport on May 16, 2017. Photo courtesy of NWS Wichita.

The most active month in 2017 was May with 29 tornadoes observed. This is 98 tornadoes below the one-month record high (127 in May 2008). April, May, and June, typically the core of the tornado season, were abnormally quiet in 2017. Tornado counts were 10, 9, and 20 below normal, respectively, for each month.

The costliest Kansas tornado in 2017 was the EF3 tornado that moved across Pawnee and Barton counties on May 16th. Damage was estimated at approximately \$658,000.

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Kansas Tornado Statistics

by County

1950 - 2017

TORNADOES, FATALITIES, AND INJURIES

County	Tor	Fat	Inj	County	Tor	Fat	Inj	County	Tor	Fat	Inj
Allen	27	0	4	Greenwood	43	0	10	Pawnee	52	0	1
Anderson	15	3	12	Hamilton	26	0	1	Phillips	41	0	1
Atchison	15	0	11	Harper	62	0	1	Pottawatomie	34	1	5
Barber	40	0	2	Harvey	49	1	63	Pratt	73	3	10
Barton	101	4	38	Haskell	32	0	10	Rawlins	47	0	4
Bourbon	19	0	7	Hodgeman	55	0	4	Reno	81	0	22
Brown	45	0	5	Jackson	31	4	17	Republic	60	0	3
Butler	80	28	225	Jefferson	40	0	101	Rice	47	0	6
Chase	41	0	2	Jewell	43	0	2	Riley	29	0	51
Chautauqua	19	0	0	Johnson	43	0	12	Rooks	52	0	6
Cherokee	37	4	66	Kearny	45	0	0	Rush	52	0	8
Cheyenne	43	0	0	Kingman	67	0	1	Russell	78	1	7
Clark	40	0	0	Kiowa	59	11	74	Saline	45	0	66
Clay	43	1	31	Labette	42	1	29	Scott	58	1	1
Cloud	50	1	8	Lane	47	0	2	Sedgwick	89	13	360
Coffey	23	0	5	Leavenworth	30	2	30	Seward	38	0	15
Comanche	42	0	2	Lincoln	33	0	2	Shawnee	55	18	528
Cowley	73	77	293	Linn	14	0	3	Sheridan	40	0	0
Crawford	35	4	43	Logan	29	0	0	Sherman	110	0	0
Decatur	47	0	5	Lyon	47	7	222	Smith	45	0	2
Dickinson	38	1	17	Marion	47	1	2	Stafford	72	3	5
Doniphan	19	0	2	Marshall	33	0	1	Stanton	22	0	0
Douglas	40	1	48	McPherson	54	1	16	Stevens	25	1	5
Edwards	50	0	7	Meade	51	0	0	Sumner	84	5	14
Elk	24	2	8	Miami	20	4	10	Thomas	46	0	1
Ellis	62	0	6	Mitchell	48	0	5	Trego	63	5	101
Ellsworth	50	0	0	Montgomery	34	1	1	Wabaunsee	38	1	26
Finney	97	1	41	Morris	34	0	7	Wallace	35	0	4
Ford	100	0	2	Morton	20	1	2	Washington	40	2	12
Franklin	30	3	34	Nemaha	37	0	3	Wichita	35	0	4
Geary	19	0	3	Neosho	31	0	4	Wilson	16	0	0
Gove	58	0	3	Ness	53	0	4	Woodson	12	0	8
Graham	41	0	0	Norton	30	0	0	Wyandotte	10	2	36
Grant	25	0	9	Osage	44	17	6				
Gray	50	0	3	Osborne	45	0	13				
Greeley	38	0	0	Ottawa	33	2	12	Total	4651	239	2924

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Kansas Tornadoes 2017

Cheyenne 1	Rawlins	Decatur	Norton	Phillips	Smith	Jewell	Republic	Washington	Marshall 1	Nemaha	Brown	Doniphan
Sherman 1	Thomas	Sheriden 2	Graham 2	Rooks 1	Osborne	Mitchell	Cloud	Clay 1	Riley	Pottawatomie 2	Jackson	Atchison
Wallace	Logan	Gove 4	Trego	Ellis	Russell	Lincoln	Ottawa 1	Dickinson	Geary 1	Wabaunsee 4	Shawnee	Jefferson
Greeley 1	Wichita	Scott 3	Lane	Ness	Rush 1	Barton 5	Ellsworth 3	McPherson	Morris 1	Lyon 1	Osage	Douglas
Hamilton	Keamy	Finney	Hodgeman	Pawnee 2	Stafford 2	Reno 2	Rice 1	Marion	Chase 2	Coffey	Franklin 1	Johnson 1
Stanton	Grant	Haskell	Gray	Ford 2	Edwards	Harvey	Kingman 3	Butler 2	Greenwood	Woodson	Allen	Bourbon
Morton	Stevens	Seward	Meade	Clark 1	Kiowa	Pratt 2	Sedgwick	Sedgwick 2	Elk	Wilson	Neosho	Crawford 2
				Comanche	Barber 3	Harper	Sumner	Cowley	Chautauqua	Montgomery	Labette	Cherokee

60 tornadoes (3 county crossers)

Kansas Tornado Facts

Days with more than 20 tornadoes

Date	#Tornadoes
05/23/08	70
04/14/12	43
06/15/92	39
05/05/07	36
05/24/16	34
06/04/55	33
05/29/04	28
10/26/06	28
05/25/97	25
06/09/05	25
05/15/91	24
07/07/04	23
05/06/15	22
04/26/91	21

Kansas Tornado Count by Decade

1950s: 560
1960s: 457
1970s: 303
1980s: 339
1990s: 789
2000s: 1192
2010s: 634 (through 2017)

Most Tornadoes in One Episode

May 23, 2008	70 Tornadoes
April 14, 2012	43 Tornadoes
June 15-16, 1992	41 Tornadoes

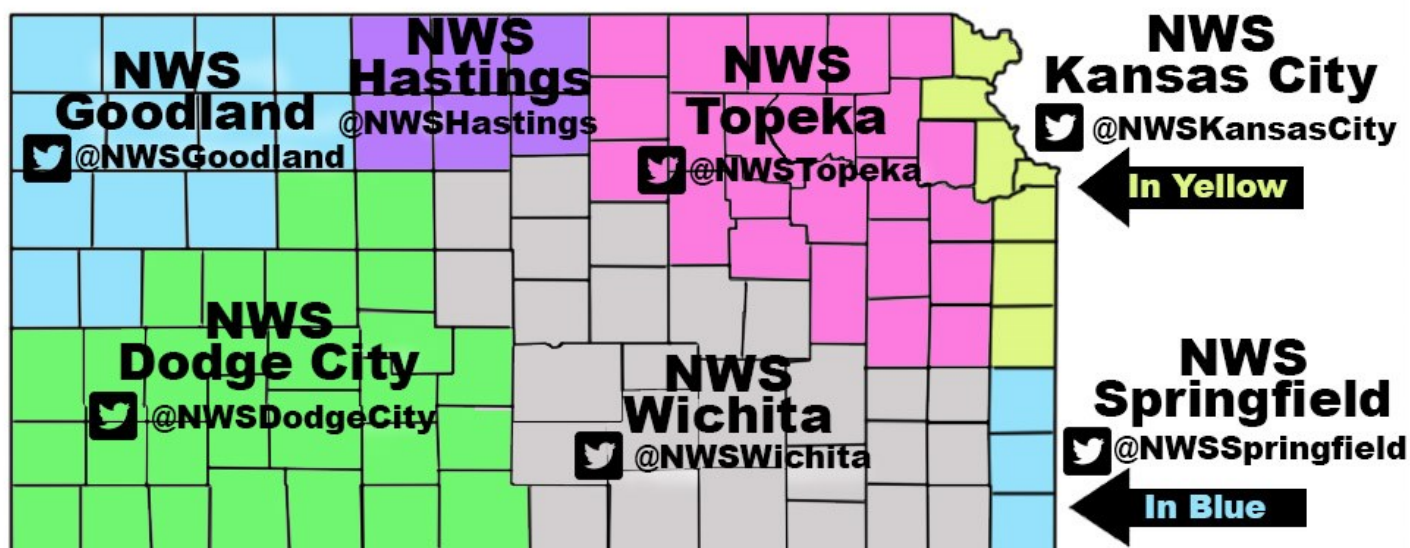
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Did you know...

There are seven National Weather Service offices that serve portions of Kansas!

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

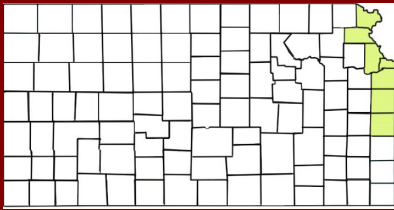
Contact the NWS office in your area to learn more about weather, weather safety, NOAA Weather Radio, office tours, or to learn more about careers in meteorology in the NWS or in NOAA.



The following pages contain 2017 Severe Weather Summaries for each NWS office. Here is severe weather terminology you may encounter.

- **Severe Thunderstorm** – The National Weather Service issues severe thunderstorm warnings for storms that are currently, or are capable of, producing winds of 58 mph or stronger and/or hail one inch in diameter or larger. Severe thunderstorms are often much stronger than this minimum criteria, so it is a good idea to take severe thunderstorm warnings seriously.
- **Tornado** – A tornado is a violently rotating column of air, in contact with the ground, either as a pendant from a cumuliform cloud or underneath a cumuliform cloud, and often (but not always) visible as a funnel cloud. A funnel cloud is a condensation cloud typically funnel-shaped and extending outward from a cumuliform cloud and is associated with a rotating column of air.
- **Flash Flood** – A flash flood is flooding that occurs very rapidly, and usually within 6 hours of heavy rainfall. Flash flooding may occur along creeks, rivers or streams. It can also occur in low lying or urban areas where drainage is poor. Water levels can rise very quickly during flash flooding including locations that did not receive the heavy rainfall but are located downstream from areas that received an extreme amount of rainfall. Flash flooding can occur in the winter months when rain falls on existing snowpack and causes it to melt rapidly. Flooding is the number one severe weather killer in the U.S.

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2017 Severe Weather Summary

Extreme East Central and Northeast Kansas

National Weather Service Pleasant Hill, MO

2017 saw numerous severe storms move through far northeastern Kansas. Most notable of these storms were the March 6th super-cells and squall line that produced numerous tornadoes across western and central Missouri. Before these storms moved out of Kansas one tornado occurred in Leawood, Kansas, and produced minor damage. More notable to the 2017 severe

weather season in far northeast Kansas was the widespread flooding that occurred in the mid to late summer. Numerous flooding events brought significant damage to portions of the Kansas City (Kansas) Metro area, which resulted in multiple water rescues. The most notable of these water rescues occurred on live television on the morning of July 27th when several businesses were inundated with swiftly running water near the Kansas and Missouri State Line along Indian Creek. Indian Creek in eastern Kansas experienced record flooding more than once, as another round of heavy rain caused record flooding on August 21st, into the 22nd.

**2017 Far Northeast Kansas Severe Weather Stats
By The Numbers**

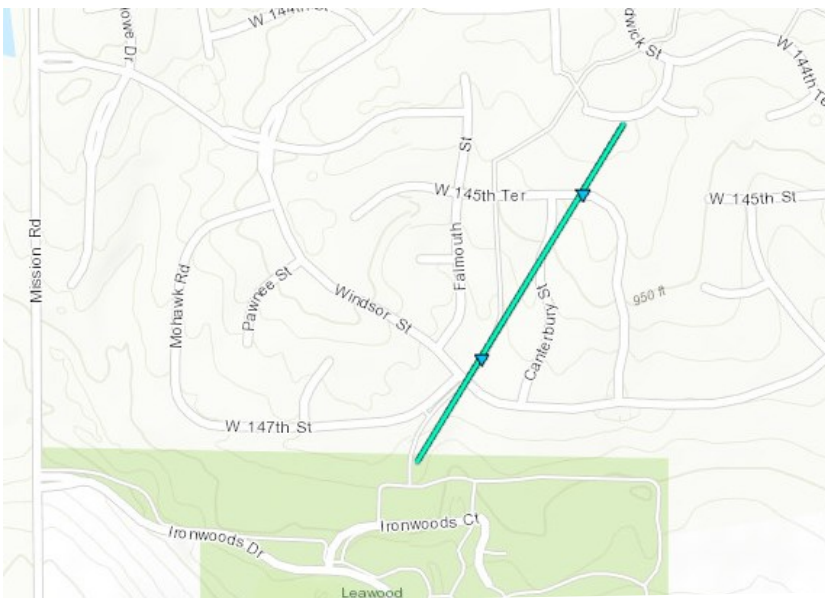
Number of Severe Wind, Hail, Flooding Reports: 163

Tornado: 1 (EF-0) March 6, 2017

Largest Hail: 2.85” (Johnson County) May 18, 2017

Most reports received: Johnson County (70)

March 6, 2017: Large Hail, Strong Wind & EF-0 Tornado



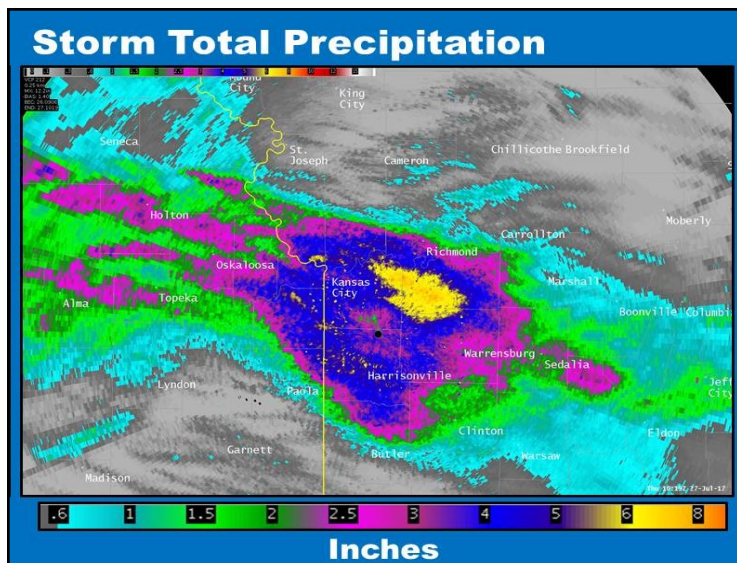
A weak and brief tornado formed in Leawood on March 6. This EF-0 tornado was the only tornado to form in 2017 in NWS Kansas City's Kansas counties.

On the evening of March 6th, a line of severe thunderstorms formed, then moved into eastern Kansas, and western and central Missouri. Ahead of and along this line of storms, supercells formed and produced large hail, damaging winds, and several tornadoes; only one of which occurred in Kansas, an EF-0 tornado in Leawood, Kansas. Large hail up to 2.75 inches occurred in DeSoto before the storms moved into Missouri. Strong winds did more widespread damage to portions of the Kansas City (Kansas) Metro than the isolated EF-0 tornado in Leawood.

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July 26-27, 2017 - Flash Flooding and Water Rescues in Kansas City

On the evening of July 26th, a line of thunderstorms formed roughly along the Interstate 70 corridor. The orientation of these storms were such that they trained over Kansas City and surrounding areas for several hours causing some extreme flash flooding. The heaviest rain hit some of the most vulnerable parts of the city namely Indian Creek near the Kansas and Missouri state line. At this location, between 5 to 7 inches of rain fell over a roughly 3 hour period causing Indian Creek at State Line Road to rise to 27.96 feet, a new record for that location. The result was businesses in that area becoming inundated with several feet of water. Numerous car dealerships along the Indian Creek bed had much of their merchandise go underwater. A strip mall consisting of a restaurant, among other businesses, had water at least 6 feet deep. The restaurant owners tried to salvage their business but had to flee to the roof in order to escape the rising waters around them. Local news televised a dramatic water rescue of the restaurant owners via motorized raft.



Radar estimated rainfall on the evening and overnight hours of July 26-27



Above: Numerous new and used vehicles were inundated by the swiftly flowing and quickly rising Indian Creek at 103rd and Wornall at the Kansas and Missouri State Line (Photo courtesy of KMBC Television).

Right: A nearby restaurant was flooded to the rafters. The owners who showed up early in the morning were forced to take refuge in the ceiling and eventually the roof, where they were rescued from the swiftly flowing waters (Photo courtesy of Brittany Thomasson)

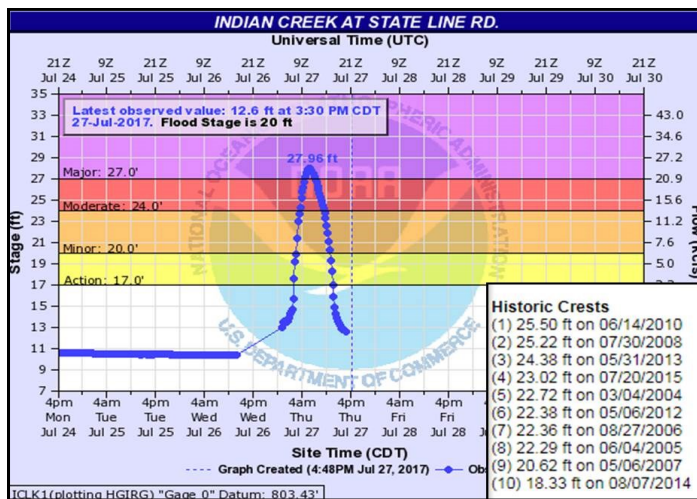


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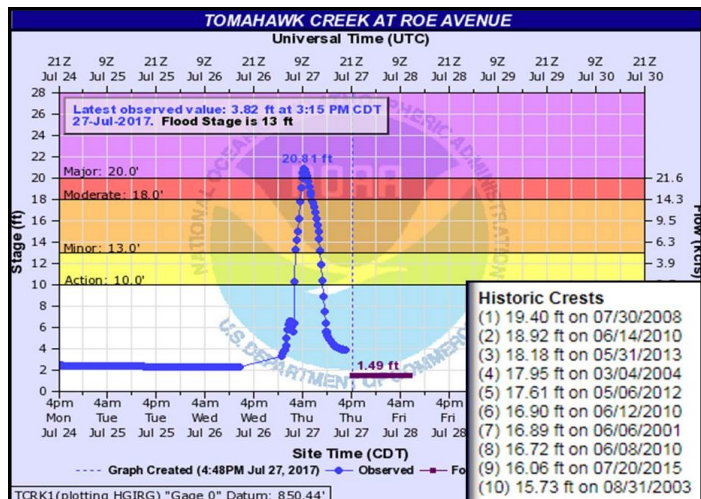
Indian Creek at State Line was not the only site that broke their highest flood record. Tomahawk Creek at Roe Avenue in Johnson County Kansas also set an all time record flood event.



Aerial photograph of the 103rd and Wornall area, where Indian Creek cross the Kansas-Missouri Stateline. Photo courtesy of KMBC Television.



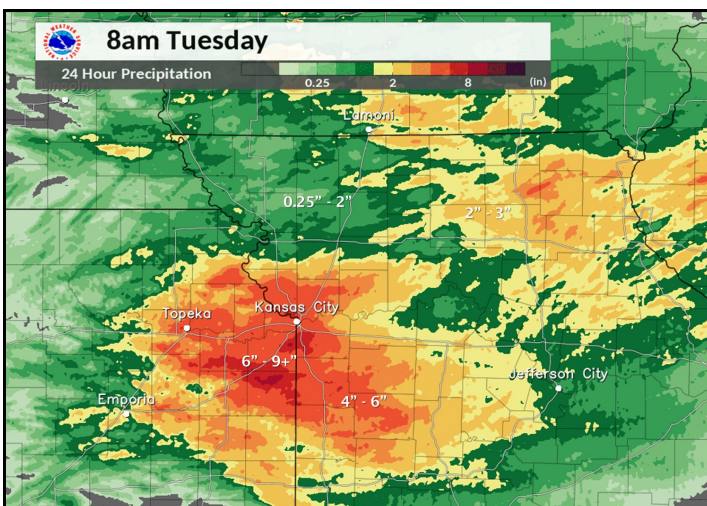
Indian Creek near State Line Road had record flooding (27.96 feet) which caused damage to nearby car dealerships and businesses.



Tomahawk Creek near Roe Avenue had record flooding (20.81 feet).

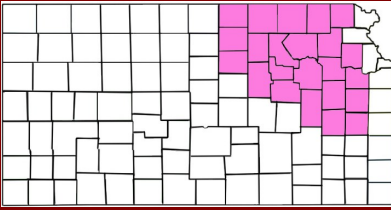
August 21-22, 2017 - Flash Flooding and Water Rescues in Kansas City

From August 21st through the 22nd, multiple rounds of heavy rain fell with widespread amounts of 4" to 6" and isolated reports of 8" to nearly 10". In addition to numerous roads and some schools closing due to widespread flooding, the recently set record crest made on Indian Creek at State Line Road was broken. Other local stream records were broken as well. Several water rescues were made overnight Monday into Tuesday morning with one fatality due to flooding. The fatality—the only known fatality caused by severe weather in the Kansas City forecast area—occurred on the east side of Highway 69 near 363rd Street in Miami County where deep rushing water was present.



24-hour precipitation that fell on August 21-22, 2017

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2017 Severe Weather Summary Northeast and East Central Kansas National Weather Service-Topeka, KS

Overall, the 2017 severe weather season was relatively benign for northeast and north central Kansas. Although, the Topeka forecast area received a couple of high-impact events. These events ranged from several tornadoes to widespread flash-flooding. The most notable event occurred August 21st, better known as the “Total Solar Eclipse Day”, where several rounds of heavy rainfall produced upwards of 10 inches across portions of Douglas and Franklin counties.

March 6th Tornadoes

A strong, early spring cold front traversed the central and northern Plains throughout the day on March 6th. Boundary layer conditions ahead of the front consisted of mixed-layer CAPE values near 1,000 J/kg with effective storm relative helicity values approaching 200 m²/s². Deep, boundary-layer mixing ahead of the cold front yielded Lifting Condensation Level (LCL) heights on the order of 1,200 to 1,500 meters. Semi-discrete thunderstorms developed along the surface cold front during the mid-afternoon hours. Seven brief, weak tornadoes were documented across portions of Flint Hills along Interstate 70. Several of the tornadoes neglected to have full condensation throughout the funnel, similar to the image on the right. Not only were the tornadoes difficult to spot due to the lack of full condensation, but a large grass fire was ongoing ahead of the broken line of thunderstorms, further decreasing visibility in the area. Fortunately, only minor damage was confined to outbuildings, powerlines and cropland irrigation.



June 15th–17th Severe Weather

Mid-June marked an active severe weather period for portions of northeast Kansas. This three day stretch consisted of all severe hazards: large hail, damaging winds and a couple of tornadoes. Scattered thunderstorms developed across portions of central Kansas during the afternoon hours of June 15th, quickly moving east and southeast towards the Topeka County Warning Area (CWA). Upon entering the CWA, thunderstorms merged into linear segments with wind gusts upwards of 90 mph. Radar also suggested one or two Quasi-Linear Convective System (QLCS) tornadoes across the Flint Hills. Fortunately, damage reports were mainly confined to powerlines and trees. The 16th consisted of a broken line of supercell thunderstorms pushing south from Nebraska producing large hail up to the size of a tennis ball, winds upwards of 90 mph and one tornado near Beattie, Kansas. A similar scenario occurred on June 17th, although supercell thunderstorms developed within the CWA during the afternoon hours. Numerous reports of hail larger than golf ball size were reported across the area. Again most damage during the three day severe weather episode was confined to outbuildings, trees and powerlines.

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August 21st Flooding

While many were concentrating on the Total Solar Eclipse during the early afternoon hours, portions of eastern Kansas were highlighted with the potential for severe thunderstorms and flash-flooding. A cold front was slowly pushing southward across the area during the late evening hours of the 21st into the morning hours of the 22nd. A strong low-level jet on the order of 35-40 knots ushered plentiful moisture into the area throughout the aforementioned evening and overnight hours. As a result, several rounds of thunderstorms were observed across east-central Kansas between 9:00 PM and 7:00 AM. Numerous reports of 8 to 10 inches of rainfall were reported across portions of southern Douglas and northern Franklin counties. Several swift water rescues were required across the area due to the quickly rising waters. However, the impressive rainfall amounts were not only confined to Douglas and Franklin counties. Many areas along and east of a line from Holton to Burlington received 3 to 5 inches of rainfall. Numerous creeks and streams across east-central Kansas reach at least minor flood stage.



Tornado damage, west of Beattie, Kansas

October 6th Tornadoes

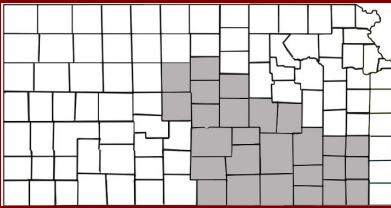
For the second consecutive year, severe thunderstorms and tornadoes occurred in Kansas on October 6th. The 2017 edition began with scattered supercell thunderstorms developing across portions of central Kansas during the late afternoon hours. Upon entering the Topeka CWA, storms continued to exhibit rotation. While no tornadoes were reported in north-central Kansas, numerous damaging wind gusts were reported. One tornado was reported near Olsburg, Kansas in Pottawatomie County. Fortunately, damage reports were confined to outbuildings and trees.

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

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

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

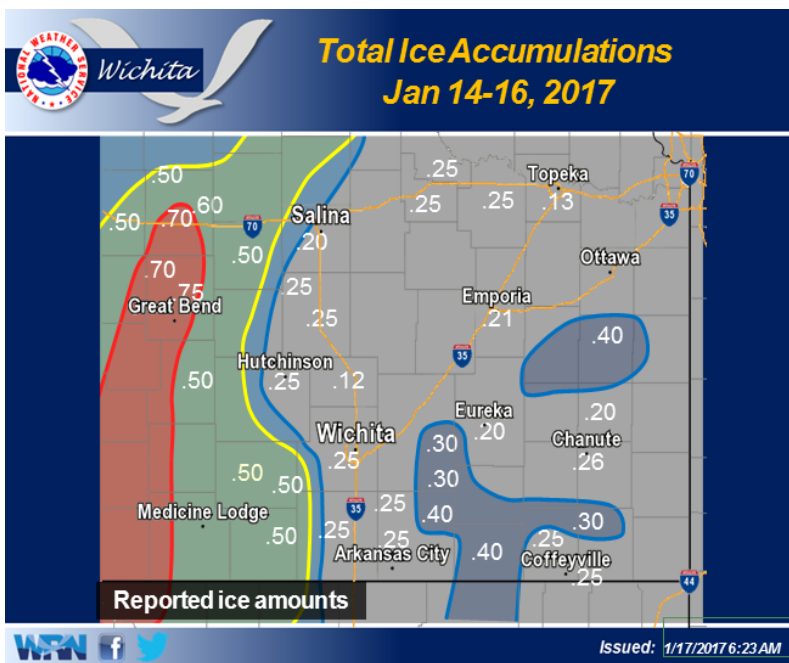
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2017 Severe Weather Summary Central, South Central & Southeast Kansas National Weather Service - Wichita, KS

January 13-16th Ice Storm

A significant ice storm impacted much of Kansas over the weekend of January 13-16th, 2017. Ice accumulations of at least 0.25” were common with crippling amounts of 0.50-0.75” across portions of western and central Kansas including communities such as Medicine Lodge, Great Bend, Russell and Dodge City. Needless to say, tree and powerline damage was widespread, and slick roads led to numerous accidents. Approximately 4,000 homes were without power across Barton, Harper, Kingman and Rice counties.



*Damage from 0.50" ice accumulation in Zenda.
Photo courtesy of Jodi Davis.*

March 4-6th Grass Fires

Fire danger concerns became elevated the weekend of March 4th with conditions worsening by March 6th. The extreme fire danger was the result of very strong southwest to northwest winds in excess of 50 mph along with very low relative humidity as low as 5%. Consequently, several large grass fires affected portions of central and south-central Kansas March 4-6th.

On March 6th, fires approached the town of Wilson in Ellsworth County from the northwest forcing residents to evacuate. Residents were eventually allowed back into their homes later that night. On March 5th, a second large grass fire flared up north of Hutchinson with valiant firefighting efforts containing about 90% of the fire by early afternoon on the 6th. However, the fire rapidly flared back up during the early evening on the 6th as winds switched to the northwest, and relative humidity values plummeted. This forced evacuations of around 10,000 people along the far northern edge of Hutchinson.

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Grass fires north of Hutchinson.
Photo courtesy of KWCH.



Grass fires north of Hutchinson. Photo courtesy of KAKE.

April Rainfall and Flooding

A slow-moving, upper-level low pressure system brought significant rainfall to southeast Kansas and especially the Ozarks region starting on Friday April 28th and continuing into April 30th. A few locations across southeast Kansas picked up around 5 inches of rain through this event, with some areas of southern Missouri receiving over 10 inches of rainfall. The heavy rainfall caused numerous streams and rivers to flood.

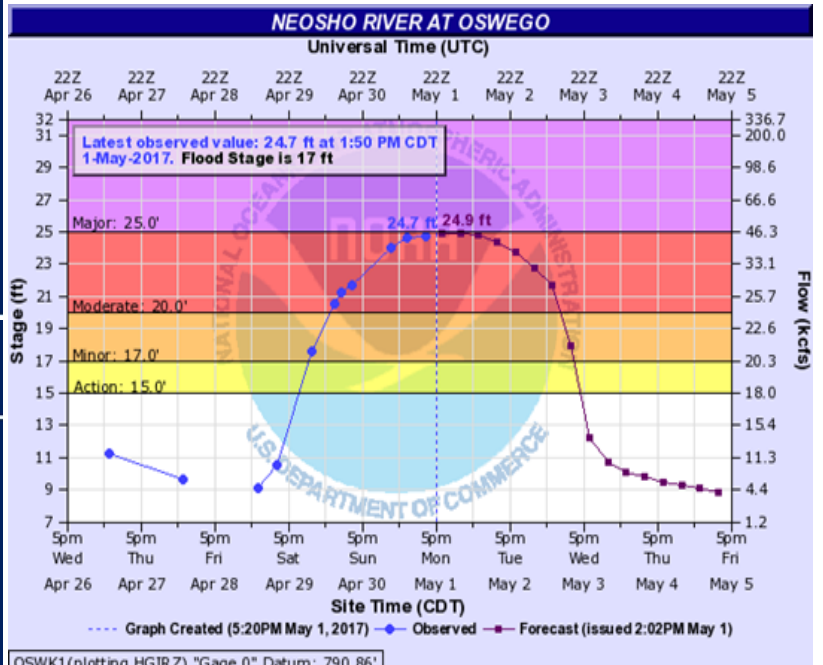
This same storm system brought significant snowfall to parts of western Kansas which is extremely rare late April.

Wichita's wettest Aprils since 1888

Wettest Aprils (Inches)	
1944	12.42"
2009	9.94"
2017	7.28"
1942	7.08"
1945	6.79"
1951	6.33"
2016	6.23"
1940	6.15"
1922	6.12"
1999	6.02"

Chanute's wettest Aprils since 1894

Wettest Aprils (Inches)	
1994	16.25"
1927	15.12"
2017	11.02"
1944	9.18"
1922	9.08"
1929	8.88"
1983	8.29"
1947	8.27"
1915	8.14"
2009	7.49"



Near major flood stage was observed along the Neosho River near Oswego late April into early May.

May 16th Barton County Tornadoes

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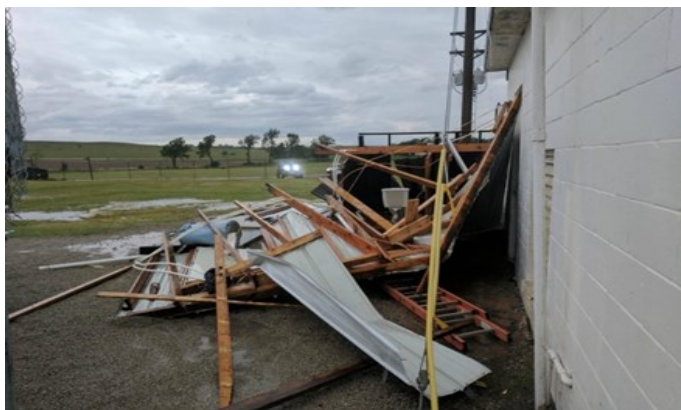
Storms developed over western Kansas and Oklahoma Panhandle during the afternoon hours of May 16th. One supercell thunderstorm tracked northeast out of far southwest Kansas and persisted for a few hours. This storm rapidly intensified as it approached southwest Barton County producing an EF2 tornado that struck Pawnee Rock and eventually produced EF3 damage west and northwest of the Great Bend Airport. This storm continued to the northeast producing additional damage before lifting northwest of Hoisington. The tornado was on the ground for 27 miles, and two minor injuries were reported. Another brief tornado occurred northeast of Susank; this tornado touched down in an open field and did not produce any damage.



May

(Above Left) EF3 damage around 2 miles west/northwest of the Great Bend Airport.

(Above Right) EF2 damage on west side of Pawnee Rock.



From May 18: Damage at the Salina Speedway, west of the Salina Airport.

Photo courtesy of Dusty Wiegert.

18th Severe Storms

Storms rapidly developed over western Oklahoma and central Kansas during the afternoon hours of May 18th along a warm front that was situated generally near I-70. A few of these storms produced brief tornado touchdowns and damaging winds. The most severe damage occurred just west of Salina in and around the Salina Speedway from a tornado-warned storm.

June 15th Severe Storms

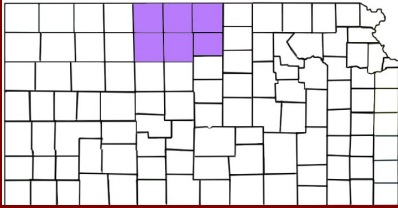
Storms developed over central Kansas during the late afternoon hours of June 15th and rapidly became severe due to extreme instability in place. After the storms developed they tracked southeast into the evening hours leaving a path of destructive winds and large hail across central and south central Kansas. Widespread tree damage was reported along with power outages due to 60-80 mph winds. There were a few injuries in Hutchinson when



From June 15: Supercell and lightning bolt west of Kingman, KS.

Photo courtesy of Matt Crowther.

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2017 Severe Weather Summary North Central Kansas National Weather Service - Hastings, NE

A severe weather season of typical length, but lacking any signature severe weather events, could be one way to describe the 2017 north central Kansas severe weather season.

Prior to the normal severe weather season, extreme fire weather conditions reared its head on March 6th. A wildfire fanned by high winds, warm temperatures and fueled by dry grasses, rapidly torched several thousand acres of prairie in Rooks County. This was part of the worst wildfire day in Kansas history during which over 650,000 acres of land burned across the state.

Thunderstorm-related severe weather started in mid-April when golf ball to tennis ball sized hail covered Highway 128 near Burr Oak. In mid-May, winds of 70 mph ripped through Phillips and Smith counties downing trees, power lines and taking the roof off a restaurant in Phillipsburg.

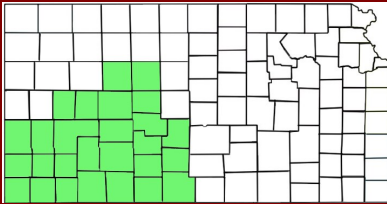
The main summer months were littered with hail, wind and heavy rain events. June 13th brought hail causing sporadic crop damage across several locations including parts of Phillips, Smith and Osborne counties. Phillips county again recorded strong winds over 60 mph with thunderstorms in early July and mid-August, but little damage was reported. Unfortunately, after a wet spring, the lack of shower and thunderstorm activity through the summers months left north central Kansas at a moisture deficit by fall.

When it comes to tornadoes, 2017 didn't exactly stand out either. Only one tornado was confirmed for the year and that didn't occur until October 1. A brief EF-0 rated rope tornado occurred in far northwest Rooks County around 7:00 PM, but no damage was reported. Damage did likely occur nearby in Phillips and Smith counties where half-dollar to baseball sized hail was reported near Agra and Kensington. A week later, hail the size of golf balls fell near Hunter and that essentially ended the 2017 severe weather season.



*Golf ball size hail near Webster State Park on June 15th.
Photo provided by Butch Post.*

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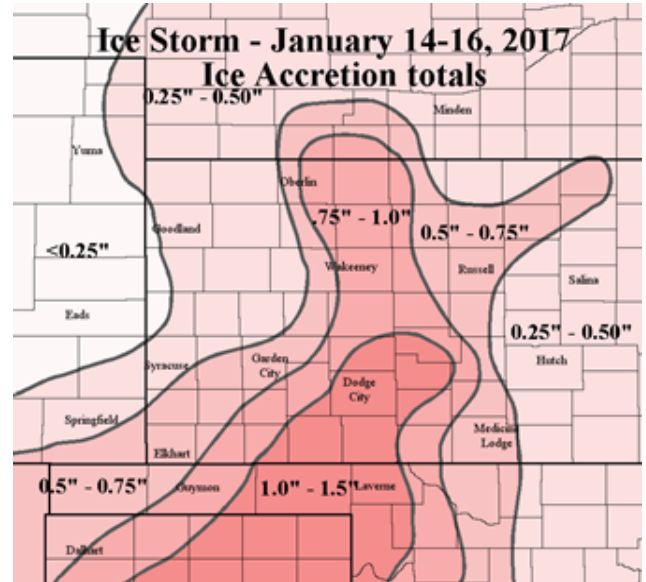
2017 Severe Weather Summary

Southwest Kansas

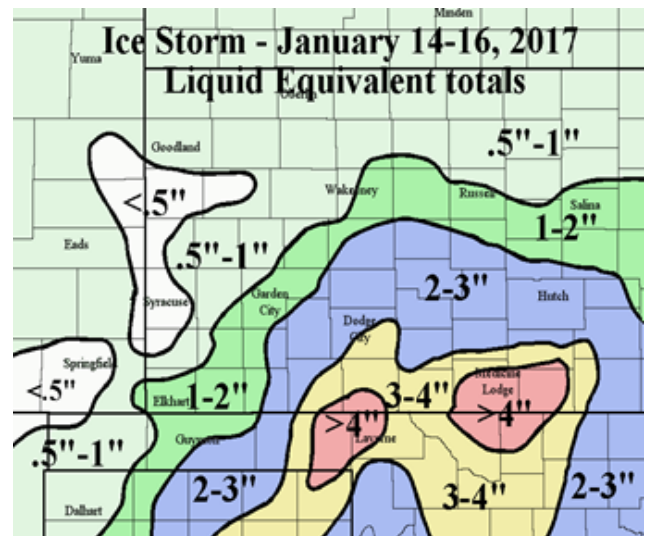
National Weather Service - Dodge City, KS

January 14-16 Ice Storm

After a very dry fall, 2017 started out with an extreme weather event! A major ice storm occurred across much of the area on January 14th into the 16th. The amount of moisture that fell and the ice accretions were excessive for this storm. Although the buildup of ice was not as great as the December 2006 ice storm, the damage to trees and subsequently power lines that centered on Dodge City was extreme. Many reasons contributed to tree damage throughout southwest Kansas, including the weakened condition of trees due to the drought of 2011, insect damage that followed the drought and the fact that there had not been significant icing in the decade preceding this storm. Unfortunately it appears that this ice storm contributed in some part to the devastating wild fires that occurred in early March.



Extensive tree damage occurred during the Jan. 14-16 ice storm.



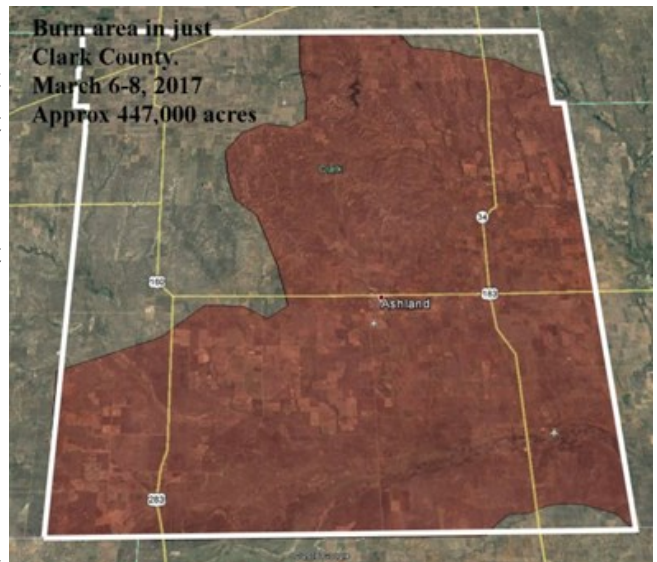
Early March Wildfires

On March 6th, many devastating wildfires erupted across parts of Kansas, Oklahoma and Texas. Many fires were started by downed power lines as a result from weakened connections from the January ice storm. The fire in Ford County was the result of a brush pile in Dodge City that had not been fully extinguished before the dry, warm winds began.

The largest and most costly fire occurred across Clark County. There were seven separate fires! Two moved near or through Englewood, originating in Oklahoma. Another consumed several homes just north of Ashland.

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Four other fires in northern Clark County consumed several homes initially and became a monster fire as a cold front moved through. The fires subsided during the first night but flared up the following late morning and afternoon on the 7th. Livestock losses may have been as many as 9,000 head. Total acres burned in just Clark County were estimated at 447,000. There were 31 homes destroyed and 6 damaged. There were a total of 108 outbuildings destroyed and 13 others damaged. Many, many miles of fence were destroyed. Early damage was estimated at \$3 million.



On the same day in Lane and Ness counties, a wildfire started after a power line disconnected from an outbuilding and fell to the ground. The fire spread very fast with the high winds; this fire burned three dozen outbuildings and damaged or destroyed thousands of fence posts and burned at least 20,000 acres. In Hodgeman County, a fire quickly spread from 50 to 60 mph winds. The ignition point north and west of Jetmore was the result of a downed power line. The fire consumed several homes and buildings. Total acres burned were approximately 18,000.

In Comanche County, a fire threatened Protection, and the town was evacuated twice but never had damage within the city limits. Although the fires subsided late on the 6th, the fire flared again by late morning on the 7th. In Ford County, a fire started at a burn pile near the racetrack in Dodge City. The fire burned at least two dozen structures, fences, trees and several vehicles. It initially spread northeast and then quickly turned east and southeast as a cold front moved through the area.

Late April Snow



It did finally start raining later in March, decreasing the threat of wildfires. The moisture was definitely a blessing. Then, winter returned late in April. An intense upper storm moved from the Four Corners region and interacted with unseasonably cold air to produce a major blizzard across western Kansas with snowfall amounts of 12 to 24 inches. Cattle loss across western Kansas was estimated to be as many as 100,000 head. One electric company alone had around \$75 million in damages to its infrastructure, and it will take at least 3 years to fully repair. This unusual, late-spring storm was made more destructive by the weight of the snow since it was very wet and driven by 50 to 60 mph wind gusts. All roads across the western fourth of the state were closed and impassable for one to two days.

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2017 Severe Weather



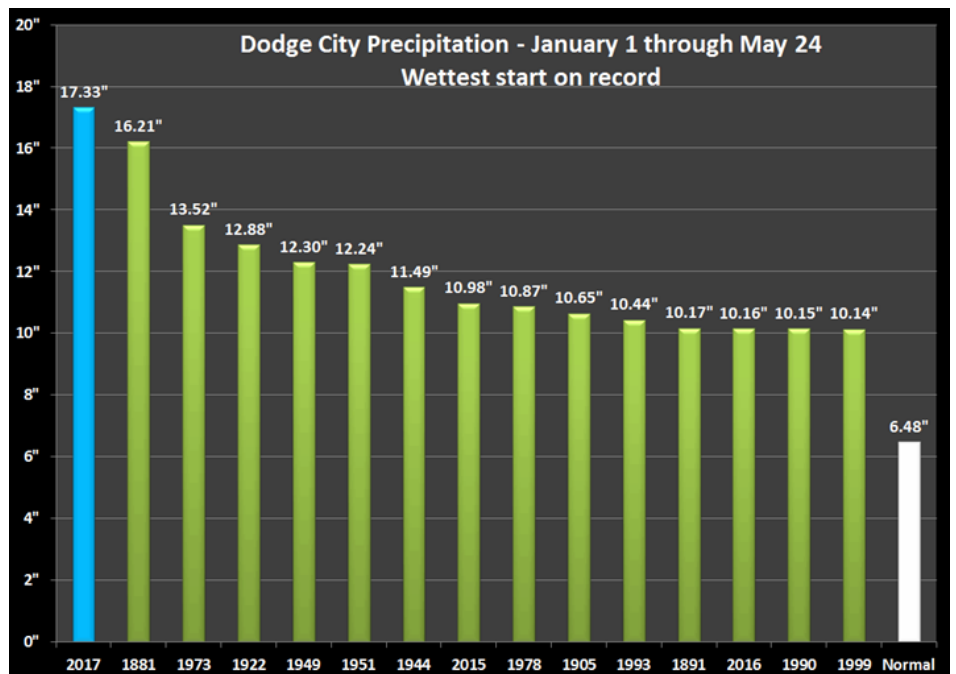
As far as severe weather goes, there were the typical days of hail and high winds. The number of tornadoes during 2017 was about half of what normally occurs. Only 16 were reported and most did not cause any damage. The strongest tornado started in Pawnee County on May 16th and caused EF3 damage as it crossed into Barton County. The last tornado to occur in our area during the year was on October 2 in Scott County. It caused EF2 damage.

In August, there were several severe hail and wind storms. The first storm occurred around Kiowa located in Barber County on the 5th causing at least \$3 million in damage. Hail also accompanied the wind.

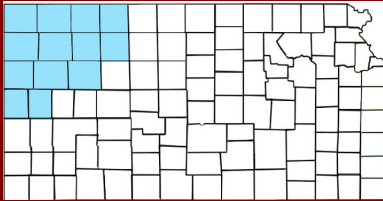
Two days later, 80 mph winds and softball sized hail pummeled the earth, as well as a few automobiles just west of Medicine Lodge, also in Barber County. The following day on the 10th, another very severe hail and wind storm occurred across Trego County. Devastation was extreme! Property was heavily damaged by hail bigger than softballs, accompanied by winds stronger than 70 mph. In addition, there was a tremendous toll done to wildlife. The hail was so bad that days after the storm, the scarring of the ground could easily be seen from a satellite view.

2017 Precipitation

The majority of the area was above normal for precipitation for 2017 despite a two-month dry period from mid-January through mid-March as well as having an extremely dry fall and early winter to round out the year. For instance, at Dodge City it was the wettest start on record (back to 1875) from January 1st through May 24th. In addition, spring (March 1 through May 31) was the 2nd wettest on record at Dodge City. Unfortunately what followed by late summer was little to no moisture to finish out 2017. The 95 day period from October 7th through January 10th, 2018 produced only 0.01” of rain at Dodge City – the driest 95 day period on record. Similar conditions were observed throughout the High Plains region.



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2017 Severe Weather Summary

Northwest Kansas

National Weather Service - Goodland, KS

As with every spring and summer across the High Plains, severe weather once again plagued the region. However, the 2017 severe weather season was generally quiet in terms of tornadic activity. Thirteen tornadoes were confirmed across the Tri-State Region via reports or NWS storm surveys; this count is well below the yearly average of 23 since 1990. The weather-related damage in 2017 was primarily done by wind, hail and winter weather.

Damaging Winter Weather Events

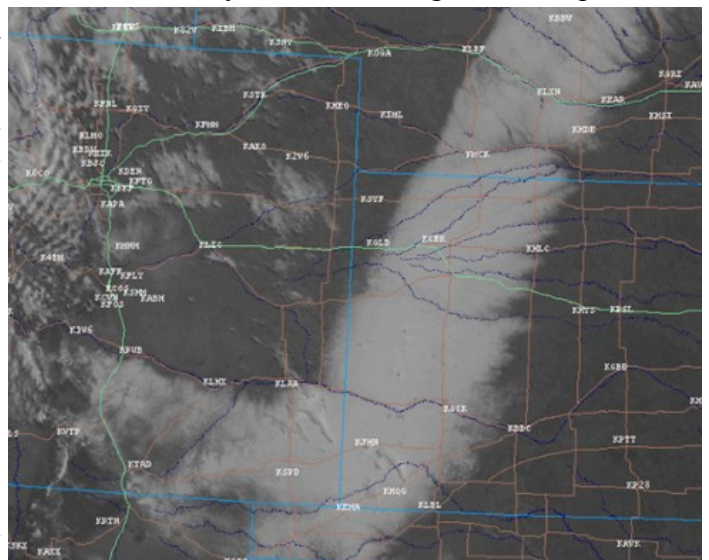
Two significant winter storms struck the High Plains this year. The first winter storm arrived January 15th and persisted through the 16th. For northwest Kansas, this was a rare breed of winter storm as the main impact was freezing rain and substantial ice accumulations. Widespread reports of one quarter of an inch to one inch of ice were received. Several locations lost power due to power lines collapsing under the weight of the ice. The last time an ice storm of this magnitude struck the region was on December 10-11th, 2007.

While the January ice storm significantly impacted western Kansas particularly southwestern portions of the state, the late April blizzard dwarfed the ice storm in terms of damage for northwest Kansas. The winter storm began on April 29th with rain changing to snow. Snow was slow to accumulate initially due to warm ground temperatures and mixed precipitation



*Semi stuck in the snow - 5/1.
Photo courtesy of Becky Klippert*

of rain and snow. However, as temperatures fell and precipitation intensified, a complete change to snow was observed. Conditions rapidly deteriorated on the morning of April 30th as heavy snow and high winds ramped up. Blizzard conditions persisted for approximately the next 12 hours across northwest Kansas. Reports of visibility near zero, wind gusts between 50 and 65 mph and snow totals over one foot were common. The highest snow total was along the Wallace and Logan County line where 28 inches were reported by emergency management.



*Satellite image of remaining snow - 5/1.
Photo courtesy of College of Dupage*

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Even though the April blizzard left a band of snow only about 100 miles wide, the destruction within that band was immense. Thousands upon thousands of power poles were snapped due to the high wind and the weight of the wet snow. Power was not returned to some locations for more than a week. All major roads through northwest Kansas were closed during the storm. Motorists passing through barricades quickly became stranded, and the National Guard rescued trapped travelers from deep snow drifts. A couple of their more capable winter weather vehicles got stuck in the snow around Colby, Kansas due to the extreme nature of this storm. As a result of the widespread significant damage, President Donald Trump signed a federal disaster declaration for all thirteen northwest Kansas counties in the NWS Goodland forecast area.

Severe Weather



Storm approaching Goodland, KS - 5/26. Photo courtesy of Britny Lynch

The 2017 severe weather season got off to a relatively slow start primarily due to dry weather and a lack of significant severe-producing systems. This is not to say the region was completely devoid of severe weather. The first severe report of the year was quarter sized hail in southern Gove County on April 15th, and the first tornado of the year occurred southeast of Kanorado in Sherman County on April 27th.

The traditional spring severe season (May and June) brought only a few “outbreaks” of severe weather. The most notable outbreak occurred on May 25th and 26th as several rounds of supercell thunderstorms moved across northwest Kansas. These storms primarily produced quarter to baseball sized hail and wind gusts of 60 to 100 mph. Four tornadoes (two in Sheridan County and two in Yuma County Colorado) and flash flooding also occurred during this severe weather outbreak.

June 2017 was fairly quiet in terms of significant severe weather. Well-above normal rainfall was observed, and many locations benefitted from the heavy rain. Some locations benefitted too much as flash flooding did become a problem at times. Only two reports of hail greater than two inches were received during the month, which is not bad at all for the peak of severe weather season when hail can exceed baseball to softball size. An even more surprising fact is that no tornadoes were observed during the month.

The dry spell for northwest Kansas tornadic activity was finally broken after 56 days. On July 21st, a large landspout tornado developed in northeastern Cheyenne County between Bird City, KS and Benkelman, NE. The landspout remained over open country resulting in no damage. Other than breaking the long tornado drought, this tornado is also notable because it grew to over one quarter mile wide at times.

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The next severe weather outbreak occurred on August 10th. Weather conditions became very unstable across western Kansas by the early afternoon hours, and thunderstorms rapidly developed. Two in particular were quite significant. The first storm developed in Cheyenne County and marched southeast. While the storm was slow to get going, it intensified over Sheridan County eventually producing softball sized hail and 100 mph wind gusts. The storm continued to produce significant severe weather as it continued southeast into Graham, Gove, and Trego counties. The town of WaKeeney was hit particularly hard by this storm. Due to the winds and hail: crops were decimated, trees and power lines were snapped, farm outbuildings were blown down, and windows and roofs were destroyed on well-built structures.



*Crop damage southeast of Hoxie, KS on August 10.
Photo courtesy of Jaclyn Carter*

A second storm developed in northern Sherman County shortly afterwards. The storm also moved southeast and impacted Goodland with baseball sized hail. In the course of 11 months, the town of Goodland observed hail larger than two inches in diameter three separate times (September 15th, 2016; May 26th, 2017; August 10th, 2017).

The final severe weather event of the year took place on October 1st and 2nd. A boundary stalled across western Kansas allowing severe thunderstorms to move northeast into northwest Kansas over a couple consecutive evenings. On October 1st, one storm produced three inch hail in Sheridan County and a couple tornadoes in Graham County. A stronger storm moved from Scott County to Gove County on October 2nd producing hail to the size of golf balls, four tornadoes, torrential rain and flash flooding in Gove County. The same storm also produced tornadoes in Scott County covered by NWS Dodge City. A fifth brief tornado occurred in southeastern Greeley County. The most notable tornado on October 2nd was the tornado which impacted the



*Tornado southeast of Tribune, KS on October 2nd.
Photo courtesy of Max Olson*

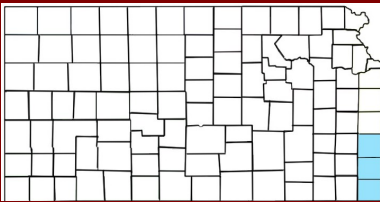
town of Quinter. This tornado developed near the elementary school, moved northeast and eventually exited town. The tornado damaged several structures, homes and numerous trees. A quonset collapsed as a result of the damage it sustained. Damage primarily consisted of: snapped tree trunks and limbs; downed power poles; broken windows to businesses, homes and vehicles; downed fencing; roofing material removed from structures; a flipped trailer; and a mobile home blown off its support.

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Tornado in southwest Gove County on October 2nd. Photo courtesy of Brandon Shahan

All in all, the severe weather season for northwest Kansas was about normal. However, this season was definitely odd in terms of the low number of tornadoes (11 in northwest Kansas) and the long tornado drought during the height of the severe season. Severe weather season often brings images of large, violent tornadoes to mind; this 2017 season brought memories of a tremendous blizzard, a few significant wind-driven hail events, well-above normal rainfall and flash flooding.



2017 Severe Weather Summary Southeast Kansas National Weather Service - Springfield, MO

Relatively Quiet Year Across Far Southeast Kansas

2017 started out with perhaps the most costly storm of the year as an ice storm downed trees and power lines across southeast Kansas in mid-January. Only two tornadoes touched down in 2017 with both being rare winter “cool season” tornadoes as they touched down on February 28th in Crawford County. Fortunately, both tornadoes were weak as winds were less than 100 mph and damage was mainly to outbuildings in the Farlington and Helper areas. This same event produced golf ball sized hail that damaged cars in Cherokee County.

One of the more remarkable storms was a straight line wind event that produced 80 to 90 mph winds in Crawford and Bourbon counties in early March. It wasn’t until May when significant severe storms produced hail to the size of golf balls once again in Cherokee County.

Otherwise, there were numerous other storms and flash floods throughout the year, but only minor impact were noted.

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Be a Force of Nature

Help Build a Weather-Ready Nation™

Do you know what to do in a severe weather emergency? Each year, people in this country are killed or seriously injured by all types of extreme weather, despite advance warning.

NOAA's Weather-Ready Nation (WRN) initiative is about helping our nation become more resilient to increasing extreme weather, water and climate events. NOAA is working to keep these threats from becoming disasters with greater accuracy in forecasts and warnings, evolving services to community decision makers, and better ways to communicate risk to stakeholders and the public.

As part of the WRN initiative, NOAA partners with emergency management officials, businesses, and the media to motivate individuals and communities to prepare for a potential weather disaster. And these actions can save lives – at home, in schools, and in the workplace.

What Does a Weather-Ready Nation Look Like?



A Weather-Ready Nation takes well-informed communities, businesses and individuals that are ready, responsive and resilient to extreme events. Key actions include:

- **Know your risk** by discovering the weather risks where you live and closely following National Weather Service forecasts and warnings.



- **Take action** by creating a family emergency plan and kit, and making sure you can receive emergency messages (e.g., NOAA Weather Radio, wireless emergency alerts).
- **Be an example** by using social media to share important hazard information.

How Your Organization Can Help Build a Weather-Ready Nation

Building a WRN requires the participation and commitment of a vast nationwide network of “Ambassadors” – organizations contributing in the best ways they can:

- Broadcasters advocating preparedness on-air
- Schools/universities teaching about the risks associated with severe weather and resiliency best practices
- Companies within the weather enterprise building the technological infrastructure for weather information and alerts
- Insurance companies providing discount incentives to policyholders who meet certain mitigation criteria

By becoming a **WRN Ambassador**, your organization can serve a pivotal role in affecting societal change by:

- Promoting Weather-Ready Nation messages
- Collaborating with NOAA
- Sharing your success stories
- Serving as an example



www.noaa.gov/wrn

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Do you have a NOAA Weather Radio?



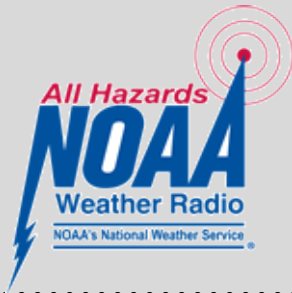
What is it?

NOAA Weather Radio (NWR) broadcasts National Weather Service warnings, watches, forecasts and other hazard information 24 hours a day.

How does it notify you?

Weather radios equipped with a special alarm tone feature can sound an alert and give you immediate information about a life-threatening situation.

During an emergency, NWS forecasters will send out a special tone to activate weather radios in the listening area.



Where do you get a NWR?

You can buy receivers at many retail outlets such as electronics, department, sporting goods, and boat and marine accessory stores and their catalogs as well as online at: <http://www.nws.noaa.gov/nwr/info/nwrrevr.html#residential>

How much does it cost?

Prices vary from \$20 up, depending on the model.

Options for those with special needs?

The hearing- and visually impaired can get these warnings by connecting weather radios with alarm tones or other such as strobe lights, pagers, bed-shakers, personal computers and text printers.

Public safety experts agree: a NOAA Weather Radio should be standard equipment in every home.

Lightning Safety

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



- **Outdoor Activities:** Minimize the risk of being struck by moving indoors or to the inside of a vehicle
- **Inside Activities:** Things to avoid
 - Corded phones
 - Computers
 - Other electrical equipment
 - Indoor pools
 - Tubs and showers and other things connected to metal

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