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The Topeka Tiller

National Weather Service Topeka, KS

Fall 2021 Volume 14, Issue 2

Winter Weather Travel Safety and Preparedness

By Chad Omitt, Warning Coordination Meteorologist

Living in Kansas you may assume that severe t-storms and tornadoes pose the greatest risk to your safety from Kansas weather. Believe it or not, the greatest risk to your safety actually comes from driving in bad weather including ice and snow during the winter season. We're not talking about the traditional blanket of heavy snow that you can see. The true road ice hazard is subtle and due to light snow or freezing drizzle, these are events that suffer from a lack of obvious visual cues and public awareness. It is these conditions that cause the biggest percentage of deaths and injuries and it doesn't take much to make roads icy enough for you to lose control!

Although numbers are largely underreported, here in Kansas at least 15 people lose their lives each year in automobile accidents where ice and snow play a role and that number may be much higher. So what can you do to lower your risk when driving on ice and snow?

1. **Know what to expect on your trip and plan accordingly.** If you know you need to travel through especially bad wintery conditions, be sure to check the weather forecast along your trip by visiting www.weather.gov. Also, visit Kansas Dept. of Transportation website to access information about your road conditions including webcams.

2. **Pay attention, slow down, and relax.** This is the most important rule to driving in bad conditions of any kind. And we're not just talking about speed — you want to do everything more slowly and more lightly than you normally would. Hitting your gas pedal or cranking your wheel too quickly is a surefire way to lose traction on an icy or wet road. *At the same time you cannot be distracted by a phone for any reason when driving, let alone when trying to drive in ice or snow…pay attention to the road!*

3. **If you start sliding, turn slightly into the skid and use your brakes.** Once you're already sliding, your tires have lost traction with the road. It seems counterintuitive, but in order to avoid a spinout you need to turn slightly into the skid, slowly let off the gas, and let your anti-lock brakes do the work for you.

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Inside this issue:

The Winter Storm Severity Index

By Sarah Teefey, Meteorologist

Developed recently by the National Weather Service's Weather Prediction Center (WPC), the Winter Storm Severity Index (WSSI) is a tool intended to assist meteorologists in assessing and conveying the potential significance of winter weather, and it is a tool that will be routinely used by NWS meteorologists during this upcoming winter season.

WPC's website shows the WSSI in a graphical format (see Image 2 below for an example). This index forecasts how impactful a winter storm may be in a region with both meteorological and non-meteorological elements considered. The "overall impact" from a winter storm is calculated and plotted after evaluation of several winter weather factors, including snow amount, snow load, ice accumulation, flash freeze potential, blowing snow, and ground blizzard potential. These meteorological factors can be viewed individually in order to see which ones are weighing into the overall impact more than the others. Non-meteorological considerations consist of local climatology, land use applications, and population density in an area.

Potential Winter Storm Impacts	
	No Impacts Impacts not expected.
	Limited Impacts Rarely a direct threat to life and property. Typically results in little inconveniences.
	Minor Impacts Rarely a direct threat to life and property. Typically results in an inconvenience to daily life.
	Moderate Impacts Often threatening to life and property, some damage unavoidable. Typically results in disruptions to daily life.
	Major Impacts Extensive property damage likely, life saving actions needed. Will likely result in major disruptions to daily life.
	Extreme Impacts Extensive and widespread severe property damage, life saving actions will be needed. Results in extreme disruptions to daily life.

Image 1. WSSI Classifications

Image 1 (above right) shows the classifications used when assigning impact level. Image 2 is an example of a recently issued WSSI forecast from October 18th regarding a winter storm expected in parts of Wyoming and South Dakota. This early season snowstorm was forecast to cause major and extreme impacts in many areas.

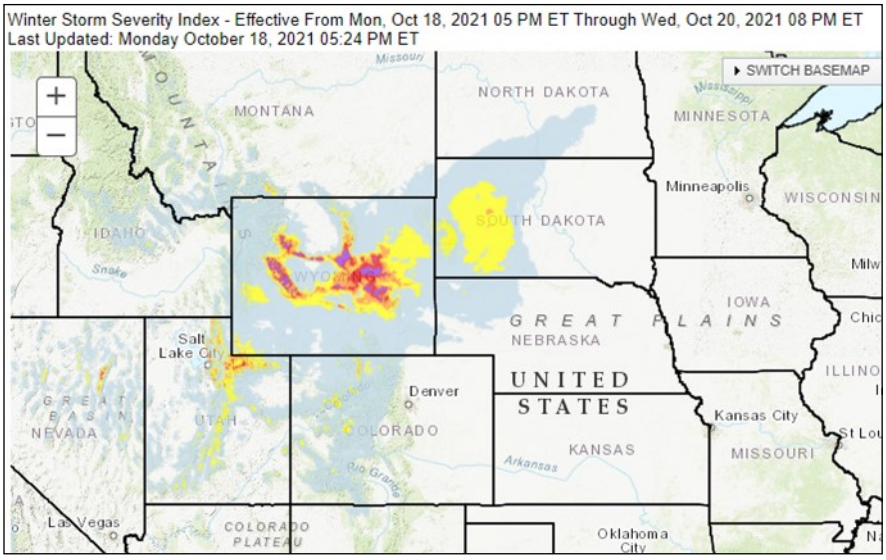


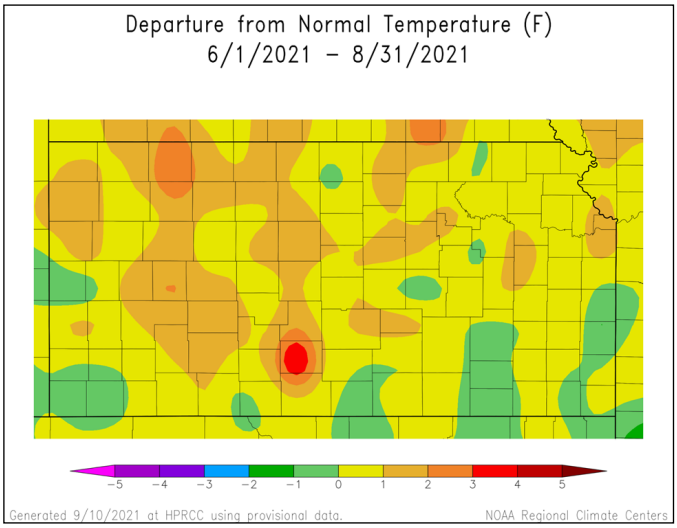
Image 2. WSSI Forecast Overall Impact for Days 1-3 Issued on October 18th

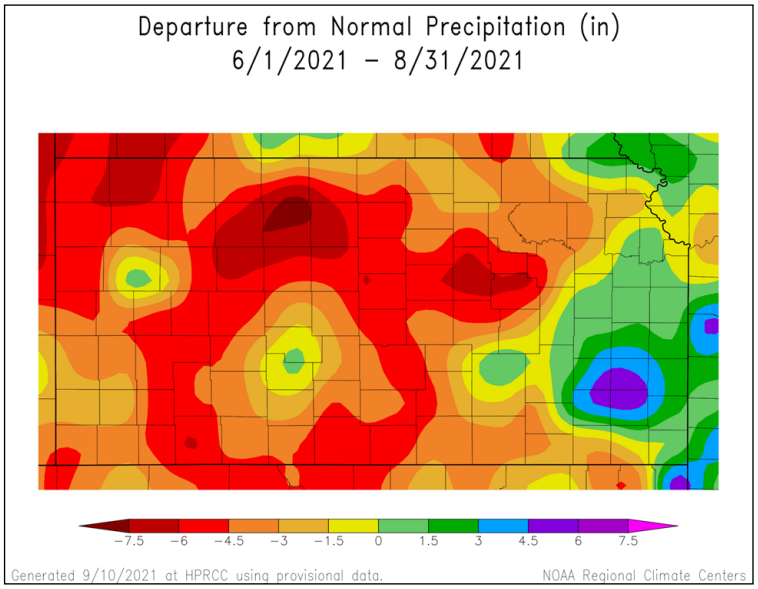
The WSSI can be found at the following web location and is a great tool for both NWS meteorologists and the general public who need information on winter weather impacts for decision making purposes: https://www.wpc.ncep.noaa.gov/wwd/wssi/wssi.php.

Summer Summary 2021

By Kyle Poage, Meteorologist

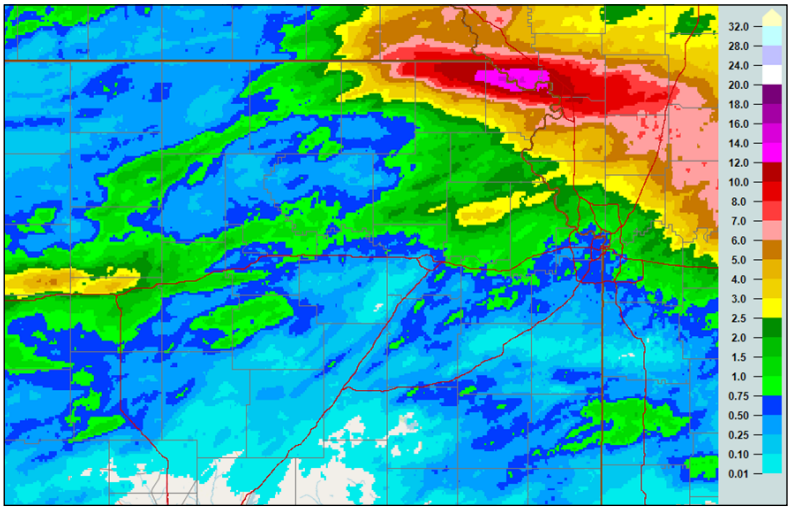
For the bulk of north-central, northeast, and east-central Kansas, summertime (June through August) temperatures averaged to be slightly above normal, while precipitation amounts varied from a few to several inches above normal southeast of the Kansas Turnpike to several inches below normal in Dickinson and Morris Counties. (See images below.)





Heat built in during the middle of June as temperatures reached triple digits in many locations, with some places not seeing such heat since 2018. A few record highs were also set. High humidity levels combined with the hot temperatures to produce heat index values of around 105 degrees at times. The early and middle portions of July were on the cooler side, although heat similar to that of mid-June returned at the end of the month. August saw periodic heat, though it was rarely as hot as earlier in the summer.

There were several bouts of severe thunderstorms through the summer, though overall the activity was lower than normal. A line of thunderstorms passed south along and east of Highway 75 on the afternoon of June 11 with wind gusts of 60 to 90 MPH, overturning a parked aircraft near Sabetha, blowing a house off its foundation in Fairview, and causing damage to the marina on Pomona Lake. Rainfall amounts of nearly five inches fell from this event in portions of Franklin County. Nearly exactly four days later, scattered thunderstorms moved southeast through east-central Kansas, producing a few instances of large hail and isolated wind damage, including 12-inch diameter tree branches blown down four miles southwest of Ottawa. Then in the pre-dawn hours of June 25, scattered thunderstorms tracked northeast across much of north-central, northeast, and east-central Kansas with some of them producing very strong winds. A gust of 77 MPH was reported at Topeka Regional Airport and a five-foot diameter tree was broken at its base three miles west of Oskaloosa.

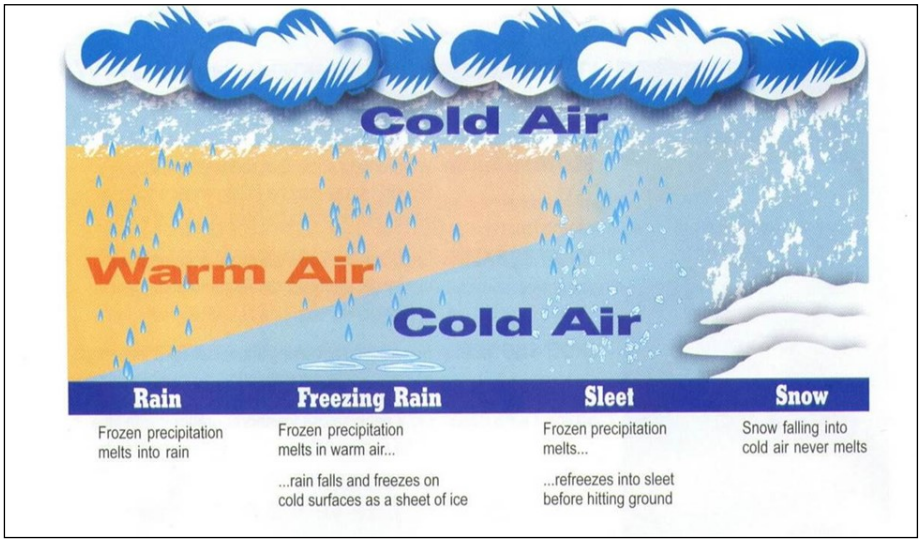


48-hour precipitation ending June 25 at 7 AM.

Article continues on page 9...

Freezing Rain, Sleet, Snow… Kansas Gets Them All, But How?

By Bryan Baerg, Meteorologist



As the calendar shifts from summer to fall, our attention turns to the upcoming winter season and the various types of precipitation the season can bring. While freezing or near-freezing temperatures at the surface level are always associated with wintry precipitation, temperatures above the surface play a pivotal role in which precipitation type we receive. We will discuss how these temperature profiles result in a variety of precipitation types.

We'll start with the most frequently occurring precipitation across our area, rain. Temperatures remain above freezing through a deep layer of the atmosphere, including at the surface. As a result, any frozen precipitation will melt as it falls through the warm layer, yielding liquid rain at the surface.

Next, we will transition to freezing rain. This particular precipitation type doesn't have a substantial temperature profile difference when compared to rain, but the one difference makes for tricky travel conditions. While temperatures remain above freezing through a deep layer of the atmosphere, temperatures within a shallow layer near the surface are below freezing. As a result, the liquid rain falls to the surface and freezes on impact. Freezing rain has been responsible for significant ice storms across the region, most notably the ice storm from December 10-11, 2007.

Transitioning into the next precipitation type, the depth of below-freezing temperatures expands from the surface upwards while the depth of above-freezing temperatures in the mid-levels of the atmosphere decreases. As a result, snowflakes fall into the warm layer, partially melting the snowflake. Then, the partially melted snowflake descends through the below-freezing layer and refreezes, yielding sleet.

Finally, the last precipitation type we will discuss is snow. The entire temperature profile of the atmosphere is below freezing and temperatures within the clouds are near or colder than -10 degrees Celsius (14 degrees Fahrenheit). That being said, there are some scenarios in which snow reaches the ground with surface temperatures in the middle to even upper 30s Fahrenheit. This warm layer near the surface is typically very shallow. It's quite typical for these temperature profiles to vary across the area during a winter storm, resulting in multiple precipitation types. These variations pose forecast challenges as any subtle changes in the temperature profiles can yield a change in precipitation types.

NOAA Official Winter Outlook

By Chad Omitt, Warning Coordination Meteorologist

NOAA's winter forecast for the U.S. favors warmer, drier conditions across the southern tier of the U.S. and colder, wetter conditions in the Northern Plains and Pacific Northwest, thanks in part to an ongoing La Nina.

Here in Kansas, La Nina is just one factor that can influence our wintertime weather. The relationship between La Nina and Kansas winter temperatures and precipitation is, on average, not as important as one may think.

In fact, when looking back at La Nina winters since the 1950s, that data shows that some years were warmer than average and some colder than average. The same can be seen in the precipitation data which shows that some La Nina winters were drier than average while others were wetter.

We can see the uncertainty or low confidence in the outlook graphics which use probabilities to try and convey the chances for certain conditions to prevail during the December through February period. In Kansas, odds slightly favor warmer conditions across the state with no meaningful signal either way for the expected precipitation.

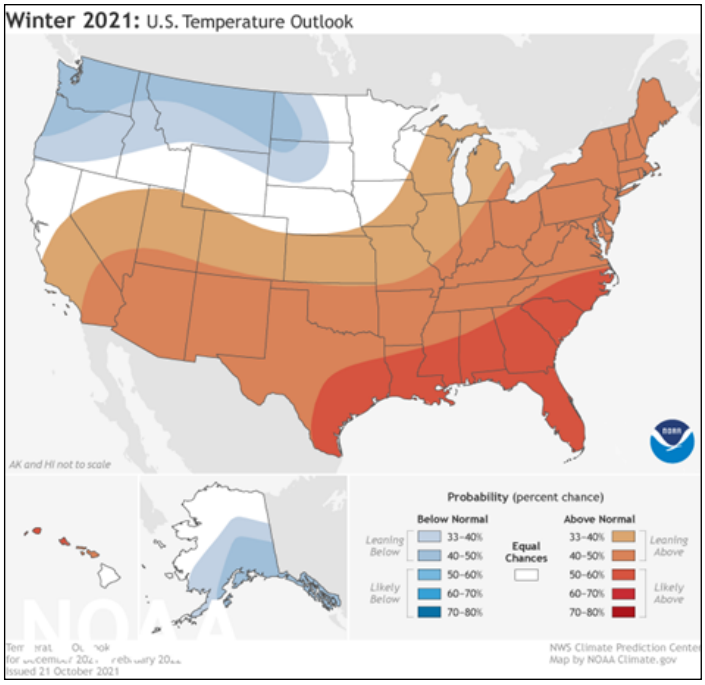
Why the low confidence and uncertainty even when La Nina is present?

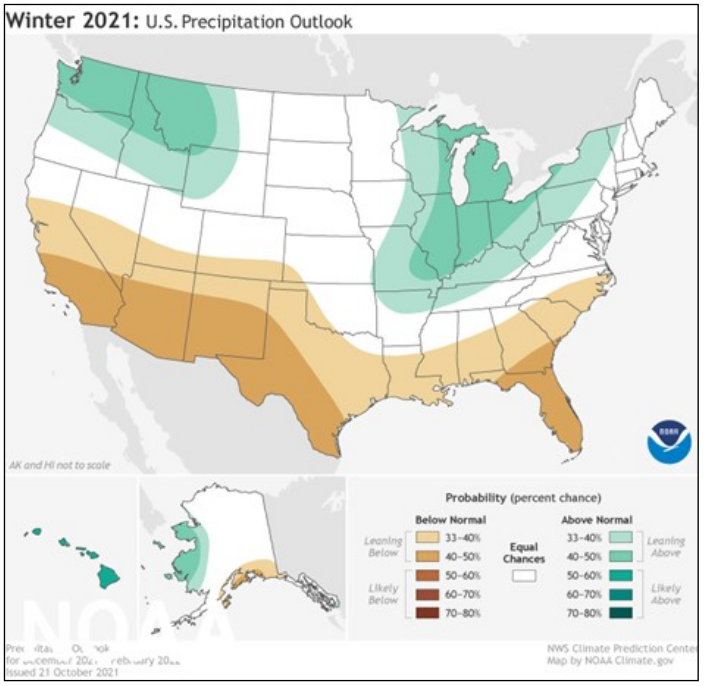
What makes long-term forecasting challenging is that other weather phenomena that are more difficult to forecast beyond about 2 weeks can influence and, at times, dominate the jet stream pattern and our weather across Kansas. What are those things?

For starters, the polar vortex and what's called the Madden Julian Oscillation, the Arctic Oscillation, and others can all influence the storm track or jet stream position across North America. As mentioned, these "oscillations" are hard to forecast beyond about 2 weeks.

What's the takeaway?

It's best to be prepared for a variety of winter weather this season. There will be wet periods and likely some dry periods too. Depending on the temperatures, that could translate into rain, sleet, snow, or the worst of all freezing rain.





Winter Weather Travel Safety and Preparedness (Continued…)

4. **Know when to quit.** Sometimes road conditions are simply too dangerous to drive in. If you can't see or you keep losing control, pull over. Never push your luck if you're unsure. It's not worth it to drive if you're jeopardizing yourself, your passengers, or other drivers on the road.

Even the smartest and safest drivers get into accidents. That's why it's crucial to be prepared for the possibility of any kind of collision or accident that could leave you and your passengers stranded on the side of a cold and possibly dangerous road. The first step is to build an emergency kit and place it in the trunk of your car.

Inside, you will want to include common car safety items like jumper cables, a flashlight, and a roadside visibility kit of either reflectors or flares. If you are stranded, a small shovel and bag of sand are must-haves. Below is a list of possible items you may want to have in your vehicle.

Points to remember:

- Wear your seat belt! Even though wearing your seat belt should already be a no-brainer at all times, during the winter it's even more critical. An alarming number of road ice fatalities occur with minor accidents where the vehicle occupants were not wearing seat belts.

- Take it slow! *You don't have the skill to drive at normal speeds on icy roads*. High speeds make it easy to lose control on ice and snow. Slowing down to below 45mph when icy roads are a threat is one of the best ways to avoid an accident.

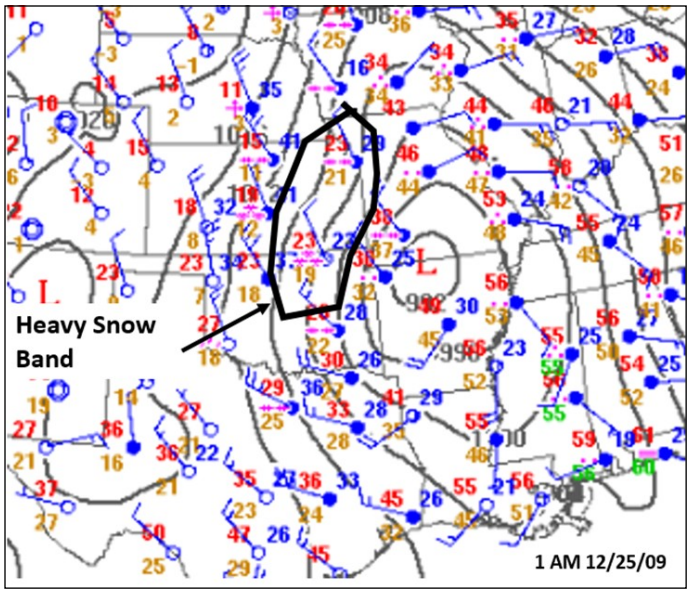
- Pay attention! Put your mobile device away and focus on the road with both hands on the steering wheel!

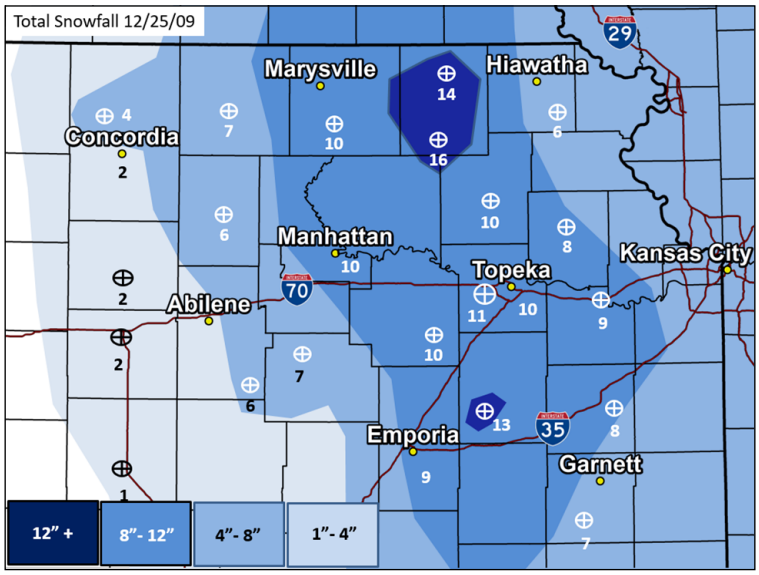
By remembering these few important points we hope that you can help keep yourself, your family, and fellow drivers safe this winter season.

Remembering the Christmas Eve Blizzard of 2009

By Bill Gargan, Lead Meteorologist

One of the more notable blizzards to affect portions of eastern Kansas occurred on Christmas Eve into Christmas morning of 2009. An upper-level low moved across northern TX and southern OK during the daylight hours of Christmas Eve. A heavy snow band developed across central OK and as surface low pressure deepened, surface wind gusted up to 50 to 60 MPH, which caused blizzard conditions across central OK. As the upper low tracked northeast into southwest and west central MO, the deep surface low moved from southeast OK into south central MO Christmas Eve night. The heavy snow band lifted north-northeast across south central, east central, and northeast KS (see image below, left). The tight pressure gradient in this same area, west and northwest of the surface low, caused winds to increase to 30 to 40 MPH with gusts up to 45 to 55 MPH across eastern KS. The upper low then lifted northeast into western MO Christmas morning. The eastern half of the NWS Topeka forecast area received 8 to 12 inches of snow, with some portions of Nemaha County receiving upwards of 16 inches of snow (see image below, right). The strong wind gusts caused considerable blowing and drifting snow, and some drifts were reported to be 4 to 5 feet deep. Visibilities dropped below one quarter of a mile to near zero due to heavy and blowing snow during the early morning hours of Christmas Day. This caused major travel problems for all the Christmas Day travelers.





Surface map with heavy snow band highlighted.

Location	Wind Speed	Date	Time
Topeka Billard Arpt	47 MPH	Dec. 25	1:47 am
Forbes Field	48 MPH	Dec. 25	1:36 am
Concordia	49 MPH	Dec. 25	2:11 am
Lawrence	45 MPH	Dec. 25	1:03 am
Emporia	54 MPH	Dec. 25	1:20 am

Peak Wind Gusts Early Christmas Morning of 2009.

Article continues next page...

Remembering the Christmas Eve Blizzard of 2009 (Continued…)

While working the forecast shift on Christmas Eve, I kept tabs on observations across central OK, noting the heavy snowfall and strong, gusty winds causing blizzard conditions. Most numerical models at the time were tracking the upper low along the Red River, then northeast into southwest MO. This track would bring the heavy snow band across the eastern half of the Topeka forecast area. Also noted was the rapid deepening of the surface low across southeast OK, which would track northeast into south central MO by early Christmas Day. The combination of heavy snow with strong wind gusts of 45 to 55 MPH would produce blizzard-like conditions across eastern KS. Therefore, I upgraded our winter storm warning to a blizzard warning for Christmas Eve into early Christmas morning.

I was scheduled to work Christmas morning as well, so I woke up 2 hours early to try to get to work. My subdivision streets on the west side of Topeka were drifted shut and I had to shovel my way a couple blocks to the major road, which fortunately was plowed. The roads were still snow-packed with drifting snow blocking half the roadway, but I made it to I-70, which was plowed better but still snow-packed. The average speed was only 35 MPH. I exited I-70 onto Madison Street and went north, but hit a large snow drift along the railroad tracks between the east and west bound lanes of 1st Street. The drift was 2 feet deep and caused a semi-truck to get stuck. I got out and shoveled a path through the drift, just large enough for my car to fit through it. The truck driver asked if I could shovel him out, but I had to say sorry, since I was already nearly an hour late to work. The snow emergency route along River Road into Oakland was plowed, so I was able to take Sardou Avenue to northeast Strait Street which led me to work at the Topeka National Weather Service. Luckily, the deeper snow had blown away from the west side of the parking lot and I was able to park my car. By the time I got to work around 9 AM, the worst of the storm was shifting northeast of the area and through the day the winds finally diminished.

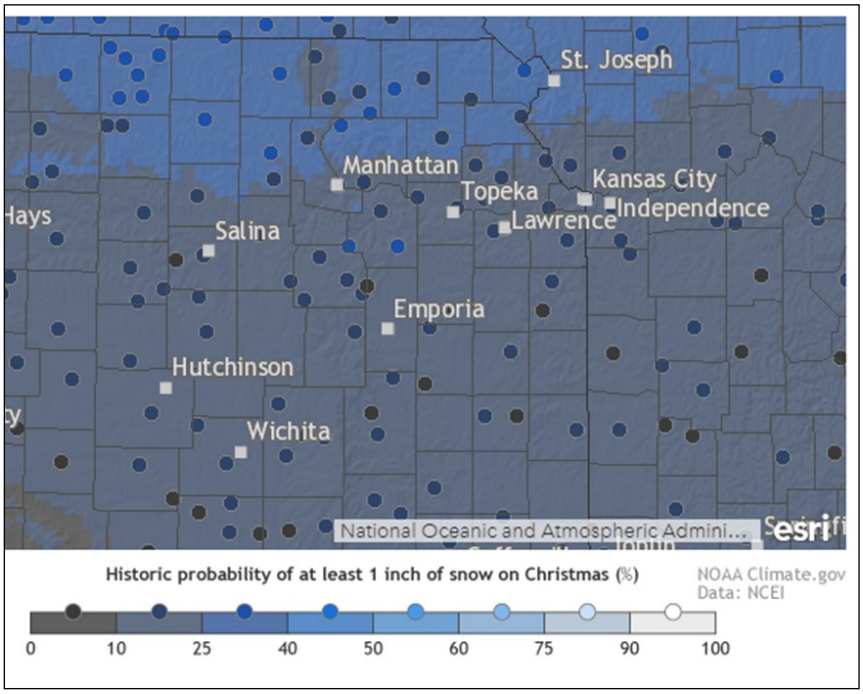
19" snow drift up to the front door of a residence in Lawrence, KS on Christmas morning.

Snow covered roads, like this one in Topeka, made travel very difficult on Christmas morning for much of northeast Kansas.

Article continues next page...

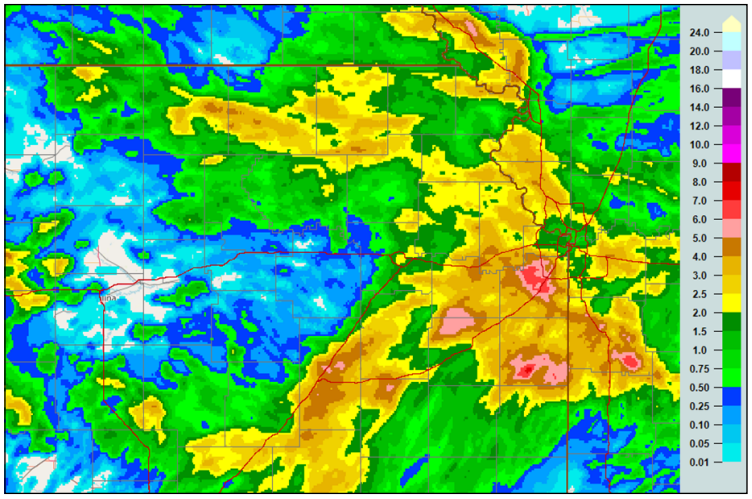
Remembering the Christmas Eve Blizzard of 2009 (Continued…)

At least the children got their wish for a white Christmas in 2009. As you can see below, the odds of having a white Christmas are fairly low for Topeka and much of east central KS. There is only a 10 to 25 percent chance of having a white Christmas across east central KS, which by definition is at least one inch of snow on the ground. Topeka only has a 22 percent chance of having 1 inch or more of snow on the ground on Christmas Day. The image below was obtained by using the NOAA climate.gov site, which has an interactive map to find the probability of having a white Christmas at any location across the country. https://www.climate.gov/news-features/understanding-climate/interactive-map-are-you-dreaming-white-christmas



Summer Summary 2021 (Continued…)

More thunderstorms developed that afternoon and evening with scattered reports of large hail and damaging winds across east-central Kansas. Very heavy rain fell in northeast Kansas from these two rounds of thunderstorms, with eight to ten inches in northern Brown County. Flooding was reported east of Reserve and water rescues had to be performed northwest of Sabetha. Rainfall amounts of over two inches were fairly common across northeast and east-central Kansas from thunderstorms late on August 12 into early August 13. Amounts in the five to six-inch range in portions of Douglas and Lyon Counties led to flooding of some homes near Emporia and a water rescue in Lawrence.



24-hour precipitation ending August 13 at 7 AM.

Employee Spotlight! Meet Adam Jones, Our Newest Lead Meteorologist

Greetings, northeastern Kansas! My name is Adam Jones, and I am the newest Lead Meteorologist here at NWS Topeka. I was born and raised in Kansas City, where I experienced several impactful weather events that would play a big role in shaping my desire to be a meteorologist. The floods of 1993 and 1995, and the 2003 EF-4 tornado that developed near the Kansas Speedway and blasted through the northland stick out in my mind. I had always been interested in the weather, but these events impacted my family personally and solidified my desire to be a meteorologist. Severe storms have long been an interest of mine, so I decided to pursue my passion for meteorology and severe storms at the University of Oklahoma. I had the fortune of being accepted into a NWS internship program while I was going to school. I worked at the NWS office in Pleasant Hill on breaks and during the summer. After college, I accepted a position at the NWS office in Bismarck, North Dakota. I spent the last nine years in North Dakota learning what it really means to be cold! I enjoyed the experiences and the relationships I built during my time up north, but I'm glad to be back home, and I'm looking forward to serving the people of the great state of Kansas!

Fun Facts: First Snowfalls in Topeka

By Chelsea Picha, Meteorologist

AVG	Nov 27	1.2"
2020	Oct 26	0.6"
2019	Oct 30	1.5"
2018	Oct 14	0.5"
2017	Oct 31	0.4"
2016	Dec 7	0.5"

AVG	Nov 27	1.2"
Earliest	Oct 9 (1970)	0.8"
Latest	Feb 10 (1922-23)	1.2"
Highest	Nov 9, 1888	9.5"
2nd Highest	Oct 22, 1996	8.0"
3rd Highest	Dec 5, 1999	6.0"

Interesting tidbits: The first measurable snowfalls (0.1" or greater) have been earlier than average for the Topeka area in the past four years. In fact, we have to go all the way back to 2016 to find a year when the first snowfall wasn't in October. The average first snowfall for Topeka is around November 27, with an average amount of 1.2 inches. There has not been measurable snow earlier than October for a fall and winter season. Particularly interesting of note, the latest first snowfall occurred on February 10, 1923 – meaning no measurable snow fell during the fall or early winter of the 1922-1923 season! There have also been three first snowfalls with 6+ inch amounts. The 9.5" accumulation from November 9, 1888 currently stands as the 8th highest one-day snowfall of all-time for the Topeka area.

COOP Corner Fall 2021

By Shawn Byrne, Observing Program Leader

Hi all! Well, the COVID-19 pandemic continues to affect the Cooperative Program and will likely continue into the spring. We have been granted permission to get out a bit more this year, so many of you I have already visited. I am planning a November trip out west, so the folks out in north central Kansas can expect me to call on them soon! If you need any supplies, do not hesitate to ask! We are allowed to stop by if there is an emergency regarding the equipment, but we are still not able to go inside residences at this time.

Summer started out rather wet again, and cool. May was very cool. However, August and a portion of September reminded us that summer was still in control as it got very warm.

Length of Service Awards for 2021 and 2020…

I will try to get these out as soon as we can! You all deserve to be recognized and thanked for the time you put in volunteering for us!

40 Years of Service

Maurice Heiman, Baileyville, KS

35 Years of Service

Claude Harwood, Glasco, KS

25 Years of Service

Wayne P. Griffin, Louisville, KS

20 Years of Service

Thomas J Ryan III, Valley Falls 3 SW, KS

Judy Lloyd, Fact, KS

15 Years of Service

Chris Mellies, Clay Center, KS

Lisa Keith, Emporia, KS

10 Years of Service

Phillip Cooper, Emporia Water Treatment Plant, Emporia, KS

Barry Finlayson, Washington, KS

Pamela Konen, Council Grove Lake, Council Grove, KS

Thank you all for your dedication and service!

As we enter fall, please make sure to bring your rain gauge funnels and inner measuring tubes indoors. Leaving them outside will cause the inner tubes to crack due to the ice, and the funnels are not large enough or deep enough to catch the snow properly. If you need any help with snow measurement, please don't hesitate to call the office at **1-800-432-3929** and we would be happy to help! Have a good and safe holiday season, everyone!

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