National Weather Service Dodge City Kansas

WILD WEST WEATHER

Spring/Summer 2019

IN THIS ISSUE

This newsletter is produced by the National Weather Service Office in Dodge City, KS. Comments & suggestions can be sent to:
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2018 IN REVIEW

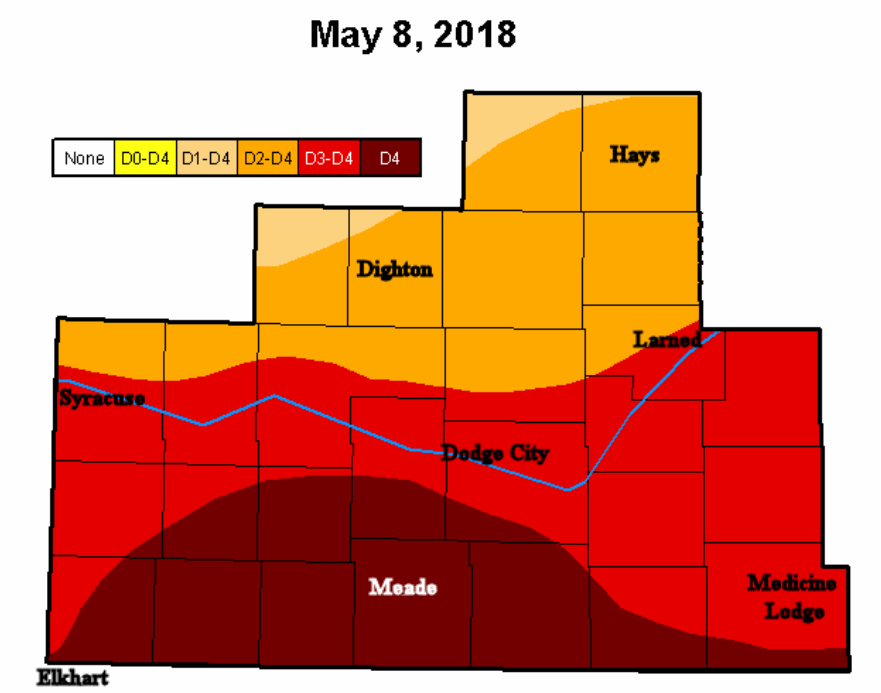


Figure1: Drought conditions across southwest Kansas by May 8, 2018.

By Jeff Hutton, Warning Coordination Meteorologist

For much of Kansas, 2018 had an extreme amount of variability throughout the year. An on-going and worsening drought was in place to start the year in the western half of the state. By mid-May, most of southwest Kansas was in an Exceptional drought with much of the remaining area in Extreme drought conditions (Figure 1). Conditions started to improve later in May and into June for many areas. For Dodge City, June of 2018 ended the 13th month in a row of below normal precipitation. From October 1, 2017 through April 30, 2018, only 2.56 inches of moisture was measured at the airport in Dodge City, which was only 31 percent of normal!

By the middle part of the agriculture-growing season, beneficial rains became more and more fre-

CONTINUED ON NEXT PAGE...

quent. However, excessive rainfall events also became more frequent. One of the more notable events occurred on September 3 when six to eight inches of rain fell across the Pratt county area. The Ninnescah River that runs through Pratt reached a record crest as a result from the excessive rainfall! Unfortunately, the KDWP fish hatchery was severely damaged by floodwaters.

The wetness continued into the Fall. October was exceptionally wet across many areas. At Dodge City, 6.45 inches of precipitation was observed for the month, which set a record. This smashed the previous record of 5.00 inches which was measured in 2008. For the entire region of western Kansas, 2018 ended up with a minimum of normal precipitation, but many locations far surpassed normal. The greatest amount was just south of Pratt with 46.82 inches (Figure 2).

Wind was another issue for 2018. Although the monthly average wind speed was above normal for only three months, there were numerous individual events of high wind. At Dodge City, winds were clocked at 50 MPH or greater on 39 separate days. Since 1992, the most ever recorded at the Dodge City airport was a mere 26 days (in 2008). The highest recorded wind speed in 2018 was 87 MPH measured in Stanton County on July 29.

The year ended on a wintry note. On December 27, a major blizzard impacted many areas of western Kansas. Snowfall of 6 to 12 inches, whipped by 60 to 70 MPH winds created blizzard conditions, which piled snow into drifts that were still evident in mid-February. The largest amounts of snow fell from western Stevens county, through Grant, into Finney and Scott counties, where average amounts were near a foot.

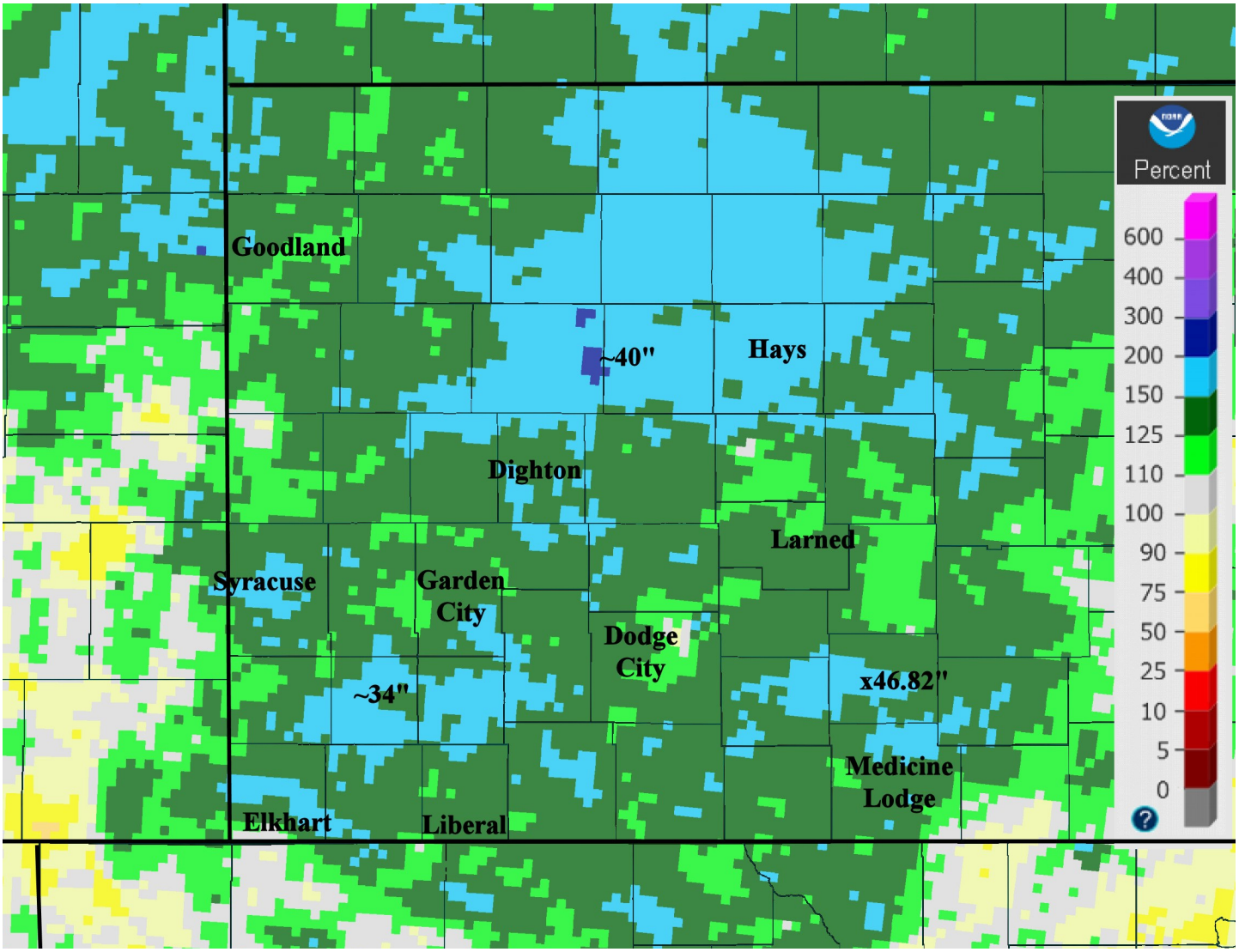


Figure 2: Percent of normal year-end precipitation for southwest Kansas. Many locations surpassed normal precipitation amounts across the region.

Radar Refurbishment at the Dodge City NWS

By Larry Ruthi, Meteorologist in Charge

A major overhaul of the mechanical components of the Dodge City WSR-88D Doppler radar began on 27 November and was completed on 15 December. The work was performed as part of the Service Life Extension Project (SLEP) for the network of radars that provide vital data for provision of forecast and warning service throughout the United States. This effort was the third stage of the SLEP and should allow the radar to operate without major mechanical failures for many years.

Removal of Dome from the Dodge City Radar

Removal of Pedestal from the Dodge City Radar Tower

The operational Doppler radar program began back in 1971 when the first Doppler radar for the study of severe thunderstorms was installed at the National Severe Storms Laboratory (NSSL) in Norman, Oklahoma. A second Doppler radar was installed at Cimarron Field west of Oklahoma City in 1973. Successes in identifying features such as mesocyclones and tornadic vortex signatures led to the formation of the Joint Doppler Operational Project in 1976 to explore the value of Doppler radar data in detection of severe thunderstorms and tornadoes. The first use of Doppler radar data by operational forecasters was accomplished in 1979 when a remote terminal was installed at the National Weather Service Forecast Office in Oklahoma City. Scientists from NSSL and forecasters at the National Weather Service worked together in real time to identify severe weather signatures. The Wichita Falls, Texas tornado on 10 April 1979 was clearly identified using this technology.

A contract for concept development of a network of Doppler radars was awarded to three companies in 1982. Testing of prototypes built by the two finalists was performed in 1986 and 1987, and the contract was awarded to Unisys Corporation in December 1987. Ten limited production WSR-88D radars were delivered to selected sites, mostly in areas with very active weather. The first limited production radar went to Oklahoma City in May 1991. The Dodge City radar was delivered on 12 December 1991 and was accepted for operational use on 6 December 1992. After a lengthy period of testing, the Dodge City WSR-88D was commissioned on 1 April 1994.

The radar was designed for an expected life of 25 years. There have been frequent upgrades to the radar system since its installation. However, a major overhaul of components, including the gears that allow the antenna to rotate at different elevation angles to sample the atmosphere in three dimensions, was needed to reduce the potential for a major failure during active weather. The pedestal refurbishment is the third major project of the SLEP, a series of upgrades that will keep our nation's radars viable into the 2030s. NOAA's National Weather Service, the United States Air Force, and the Federal Aviation Administration are investing $150 million in the eight year program. The first project was the installation of the new signal processor and the second project was the refurbishment of the transmitter. The fourth project will be the refurbishment of the equipment shelters. The Service Life Extension Program will be complete in 2023. Completion of the pedestal refurbishment at Dodge City involved removal of the 8000 pound fiberglass dome covering the antenna and pedestal, disassembly of the antenna, removal of the 18000 pound pedestal, and replacement of the pedestal with a remanufactured unit. Parts that were replaced or rebuilt included the gears and motors used to allow the antenna to rotate and change elevations. The remanufactured pedestal installed at Dodge City had been completely torn down at the contractor's factory. All components were tested and replaced as needed, and the pedestal was shipped to Dodge City for installation on the tower. The old Dodge City pedestal was sent to the contractor's factory for overhaul before being shipped to the next site.

The Dodge City radar was out of operation from 27 November through 15 December while the refurbishment was performed. Adjacent radars in Goodland, Pueblo, Hastings, Wichita, Amarillo and Vance AFB provided coverage of southwest Kansas, and there was no interruption in forecast and warning service while the radar was down. With the rebuilt mechanical components, the radar should continue to serve southwest Kansas reliably for many years.

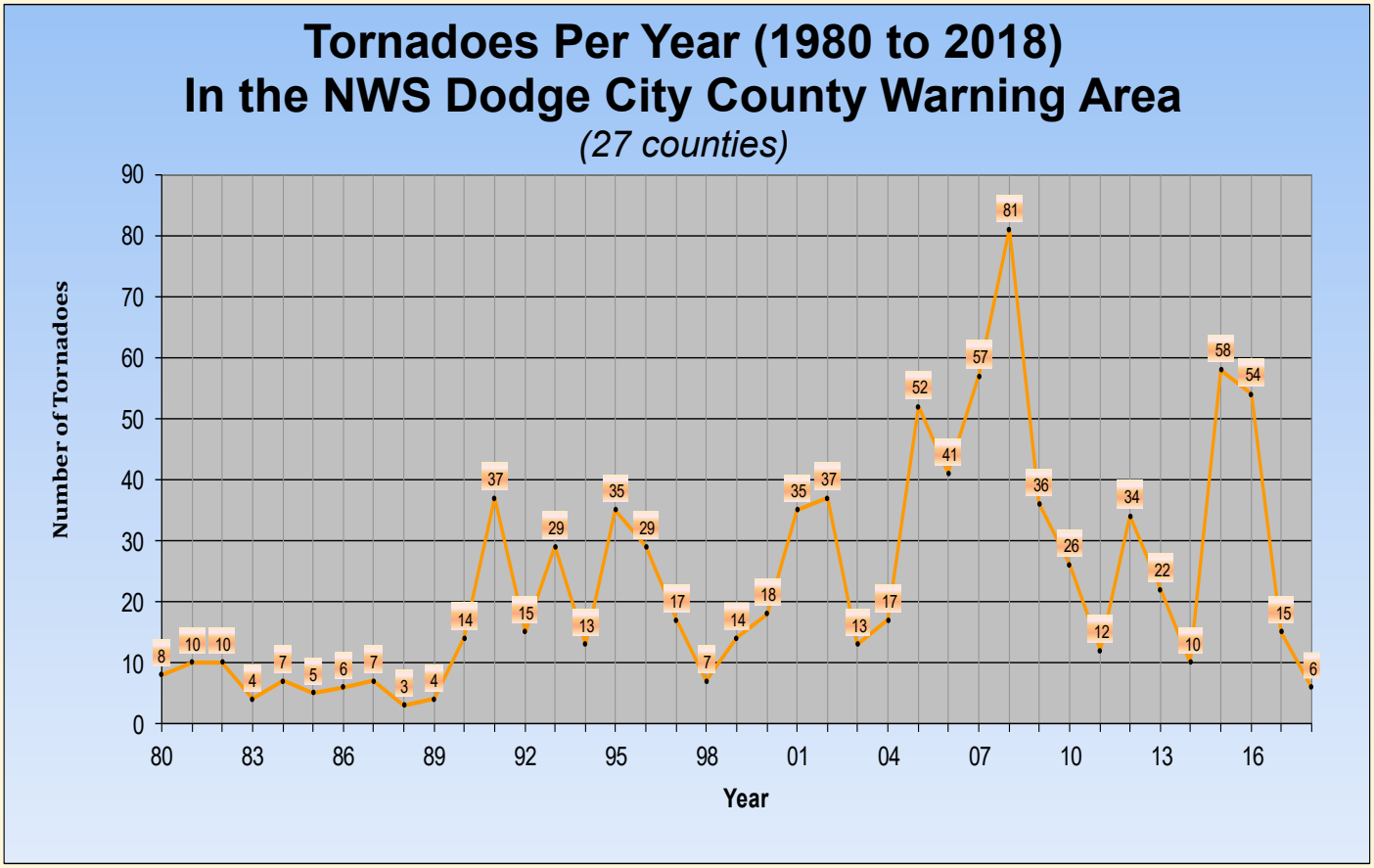


Figure 3: Graph shows the number of tornadoes per year across the NWS Dodge City County Warning Area since 1980

How many tornadoes occur in SW Kansas each year ?

By Jonathan Finch, Meteorologist

The short answer to this question is this: the number of tornadoes across southwestern Kansas is highly variable from year-to-year. When trying to put a number to this question, we have to take tornado statistics after the advent of Doppler radar in 1991. Prior to 1991, statistics aren't reliable due to lack of storm spotting and a lower priority placed on verification and documentation. (This is demonstrated in Figure 3 above with low tornado occurrences through the 1980s.) Since 1991, the number of tornadoes has varied, from six in 2018 to 81 in 2008. The average number per year since 1991 is 37, with May being the most prolific month in terms of tornado occurrences on the high plains of western Kansas.

Tornado Outbreak Days

In 2008, a record 81 tornadoes occurred, 75 of which happened between May 22 and May 26 due to several days with tornado outbreaks. The years with more tornadoes typically have one or two outbreak days with multiple tornadoes, causing the increased number.

"The average number per year since 1991 is 37, with May being the most prolific month in terms of tornado occurrences on the High Plains of western Kansas."

The Bigger Story

We need to keep in mind that the number of tornadoes that occur in one year does not tell the whole story. All it takes is one tornado to impact a town to make it a "bad" year for tornadoes, for example, the tornado in 2007 that hit Greensburg, KS. In contrast, a year that features many weak tornadoes won't likely be remembered.

Lower EF Ratings in the High Plains

The most common and practical way to determine the strength of a tornado is to look at the damage it caused. From the damage, the National Weather Service (NWS) can estimate the wind speeds. The "Enhanced Fujita Scale" was implemented by the NWS in 2007 to rate tornadoes in a more consistent and accurate manner. This new scale incorporates "damage indicators", such as building type, structures and trees, when assigning a wind speed rating to a tornado. A location with more damage indicators (more buildings/infrastructure) would more accurately rate a tornado as opposed to a location without a lot of damage indicators. This is why many tornadoes are likely under-rated across the High Plains, due to its vast farm fields and greater distances between towns.

2019 Weather Outlook

By Jeff Hutton, Warning Coordination Meteorologist

For much of Kansas during the past five or six months, there has continued to be an abundance of moisture. Going back to 1 October of 2018, there had been quite a few very wet storm systems. Figure 4 illustrates just how wet it has been. By the end of February of this year, many locations had observed precipitation more than twice what is consider normal since the fall. Several of those precipitation events came in the form of major blizzards, not just rain!

In any given season or year across the high plains, there is a high amount of variability of weather. Our area, considered to be in a semi-arid climate regime, can see an extreme amount of variability of precipitation. Forecasting specific details of weather months and seasons in advance is often futile because of the many unknowns that exist.

Theoretically, the laws that govern the physics of weather are fairly simple. Particles that create weather should be predictable, as long as we know the position of the particles and know how fast they are moving. The problem though is that there are around 100 tredecillion particles. That is a 1 with 44 zeros following! So, to make a perfect prediction, we would have to account for all of those molecules, plus solve atmospheric equations for 100 tredecillion particles – at once!

Weather patterns that develop each year will begin during the fall as the Jetstream strengthens across the northern hemisphere. Once the weather pattern of upper level winds develops, it will begin to repeat in a cycle. The cycle length of repeating jet stream configurations can vary from one year to the next, but in general the length is somewhere between 40 and 50 days. Have you ever heard that rain or snow falls 90 days after a foggy day? Is there something to this wives-tale? Perhaps the 90 days is related to that cycle length that develops during the fall.

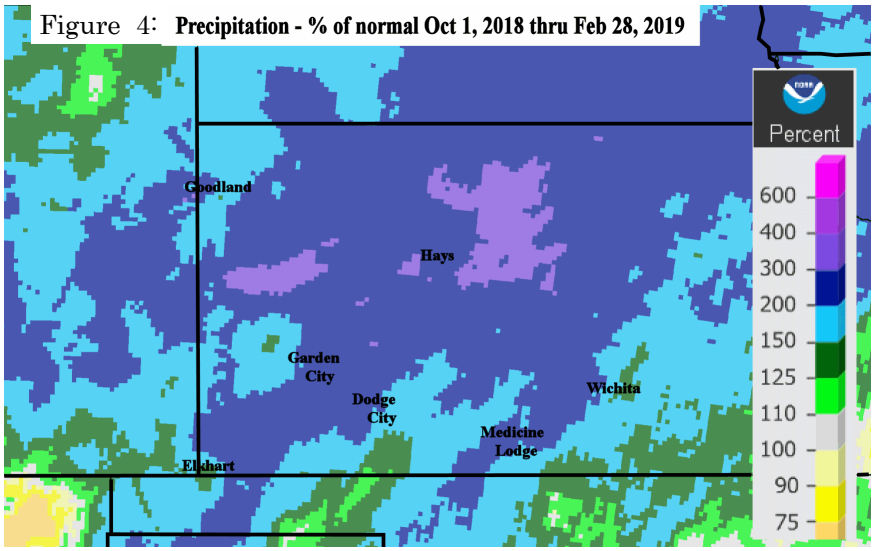


Figure 4: **Precipitation - % of normal Oct 1, 2018 thru Feb 28, 2019**

Many regions across the globe often "force" weather patterns that develop. Three main areas are the equatorial Pacific (El Nino and La Nina), the north Atlantic Ocean area, and the northern Pacific Ocean area. Seasonal variations are influenced or forced by tropical convection propagating from Africa through the Indian Ocean and into the western hemisphere (Madden Julian Oscillation). Other seasonal influences come from the Arctic region and also from the north Atlantic region, especially during the winter.

Regardless of the pattern that develops, there are other influences to the weather across the high plains, and these influences are always there. The biggest influence is the Rocky Mountains that exist from Mexico to Canada that usually prevents moisture coming from the Pacific. Another influence for the high plains is that we are so far west of the trajectory of moisture coming from the Gulf Of Mexico. That moisture tends to be deflected to the east. Many things have to come together to produce precipitation across western Kansas. For this year so far (and since the fall), it is obvious that everything has come together many times to produce conditions as wet as they are.

So the million-dollar question: Is the wetness going to continue? All things considered, the areas that have been influencing the weather pattern across the plains may persist well into spring. That should continue to produce opportunities for precipitation, which would continue the wet soil conditions. Temperatures will vary significantly at times. Averaging out all the days of spring, the probability of above normal precipitation and near normal temperatures seems to be the most likely outcome. Watch out for a late season cold snap though!

The probability of a shift to warmer and drier weather will increase going well into the growing season. Getting out of an extremely wet regime will often take time. But, odds should favor a slightly drier and hotter period once July arrives. Confidence of a "dry" summer is rather low but often we see an abrupt end to generous moisture once summer arrives. And we're not talking drought. Regardless, the amount of soil moisture should continue to be high for a while.

2019 Fire Season Outlook

By Jeff Johnson, Lead Meteorologist

Much like the past three years, the spring of 2019 looks to be yet another active fire season for much of southwest and central Kansas. An abundance of taller dry fuels remain present mainly due in part to exceptionally rainier periods that have produced above normal moisture across the region the past couple of years. Additionally, the three month outlook for precipitation potential in western Kansas (Figure 5) is slightly above normal through May with drier than normal conditions initially in the near term.

With that in mind, there is a heightened potential for aggressive wildfires once again this season as we move into a more active weather pattern in the upcoming month, typically February through May.

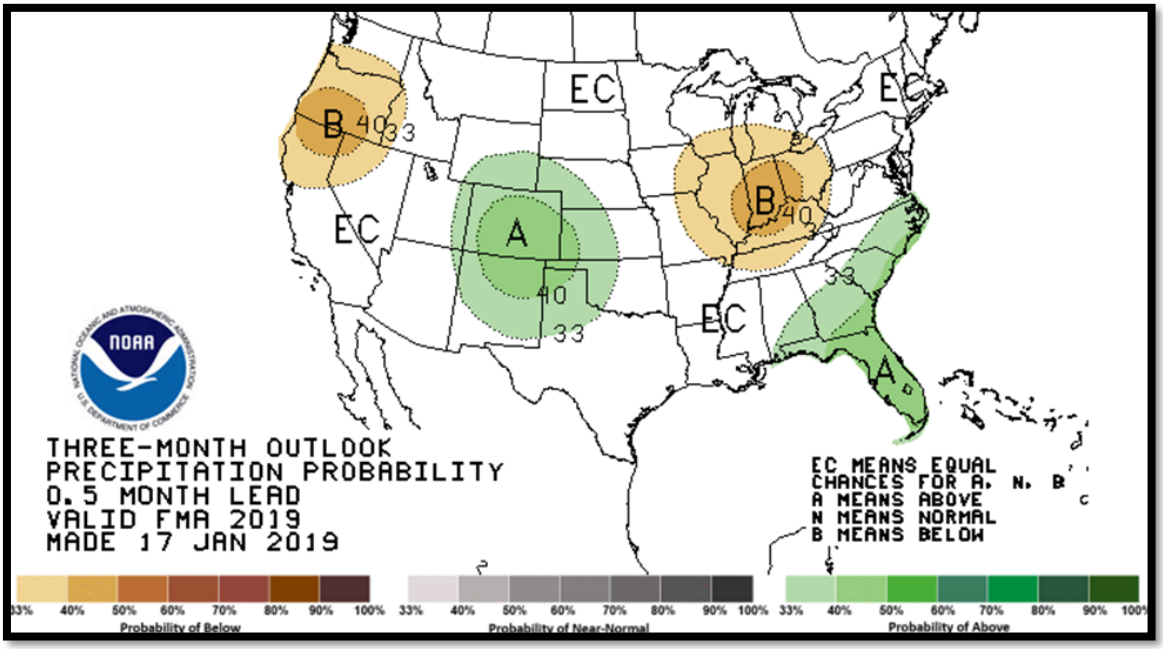


Figure 5: Three-month outlook for precipitation. Most of western Kansas will be 33 percent above normal in precipitation, with far western Kansas at 40 percent above normal.

New System in Place for 2019 Information Dissemination this Fire Season

By Jeff Johnson, Lead Meteorologist

The Hot Spot Notification Tool is being introduced at WFO Dodge City in 2019 to help get information out to customers in the fire community when potential fires, or 'hot spots', are detected by relatively new satellite technology (Figure 6) now being used by the National Weather Service. Once a detection is made, a forecaster is able to use a software program to generate a short, but detailed text message that can be transmitted to customers, such as emergency managers and/or fire personnel. The text includes a message detailing where a possible ignition is taking place within their area of responsibility and weather observation data from the nearest data collecting site. This should allow for quicker response times by emergency personnel, particularly in more rural areas where fewer people live and are less likely to notice and report a possible wildfire. This system has already been installed and used at other forecast offices across the region in the last year with favorable results.

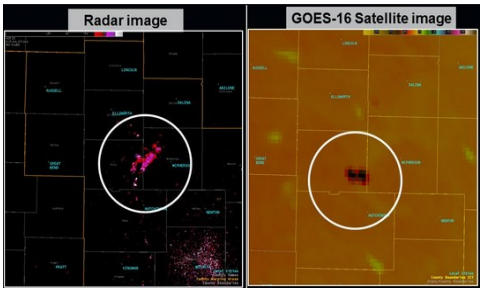


Figure 6: A large vegetation fire evident on both radar and satellite images

Cooperative Observers

This section is dedicated to information directed towards our Cooperative Observing Program

Station Visits

Annual station visits will be finished up this spring. The outside temperature units will be cleaned and the rain gauges leveled. The automated rain gauges will be summerized the first and second weeks in May. If you need any supplies or need equipment moved or worked on give us a call at 1-800-824-9943. Ask for Jesse Lee. If I am not in the office you can leave a message and I will get back to you. If you have any questions at all feel free to call or e-mail me. My e-mail address is jesse.lee@noaa.gov

Upcoming Length of Service Awards

- 75 years for **Ella Mae Julian** near Big Bow
- 70 years for **Joy Cudney** at Trousdale
- 20 years for **Patsy Austin** at Bucklin
- 10 years for **Ray Stegman** at Greensburg, **Sue Claassen** at Richfield and **Randy Evans** in Finney County

New Observers

Weston Winfrey near Pratt replaced Pratt County Emergency & Medical Services, **Darcy O'Toole** replaced Dan Frick at Ness City and **Jamie Miller** replaced Chris Lawless at the Merrill Ranch in Comanche County. Rush Center has a new station and the observer is **Brittany Oborny**. We welcome all the new observers to the program!

8 inch Standard Rain Gauges

You may put the inner tube back in the rain gauge and put the funnel on top when spring begins.

WXCoder

For those who do not use the weather coder program, you can use it if you have a computer with internet and want to report your weather data every day. This is a website where you can enter your data and it would allow us to incorporate your station data in our daily report. If you are interested in using this program please give me a call and I will set you up with an account. For those who routinely use the program and still mail in their weather forms, you do not have to mail in the form. We can download the form here at the office. At the end of the month when you are done, check over your data to see if you have any missing temperature, precipitation or snow data entries. Please enter those if you have the data that is missing. If it is missing, please enter a "M".

Jesse Lee, Observing Program Leader
National Weather Service, Dodge City KS

Want to become a weather observer?

Join CoCoRaHS! The Community Collaborative Rain, Hail and Snow Network

CoCoRaHS

We are looking for additional precipitation observers across Southwest Kansas for the CoCoRaHS program!

CoCoRaHS is a community-based network of volunteers who take daily measurements of precipitation, snowfall and snow depth, and share their reports online.

All you need is a high-quality rain gauge, which is provided for Kansas residents, and internet access to be a CoCoRaHS observer.

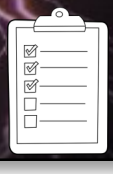
No experience is needed. Free training is provided online.

Sign up at www.cocorahs.org.

Preparing for severe weather is as easy as

1 Get Informed
Stay Informed

2 Make a Plan



3 Prepare a Emergency Supply Kit

Get Informed… Stay Informed

1 Since disasters can strike quickly and without warning. You could be anywhere—at home, at school, or in a car. Don't let bad weather sneak up on you! Get in the habit of checking weather.gov every morning before you go out. Make sure that you are ready for whatever the day may bring.

Be Weather Ready!

Make A Plan

2

There are lots of helpful tips to consider on the Ready.gov website to develop an emergency plan for your family. A few of the most important are:

- Have a well-stocked emergency supply kit on hand and ensure it is kept where you family can quickly find it.
- Determine your severe weather safe spot at home. (basement, interior closet or bathroom)
- Plan how you will get together if separated.
- Set up emergency contact list in and out of town.
- Make sure children know what to do if they are home alone.
- Plan for elders or disabled family members and neighbors.
- Include pets in your family emergency plan
- Keep emergency cash on hand.
- Take photos or videos of you home and its contents and keep them in a separate location like a relative's house or safe deposit box.
- Learn how to turn off gas, electric, water and heat at the main breaker switches.
- Have multiple ways to stay updated on the weather and news.
- Have battery backup power and plenty of batteries on hand.
- Review your plan with your friends, neighbors and family. Practice it at least twice a year. Show your kids where the emergency supplies are, where to find you, who to contact and how.

Emergency Supply Kit

3

Always make sure your emergency kit is ready to go!

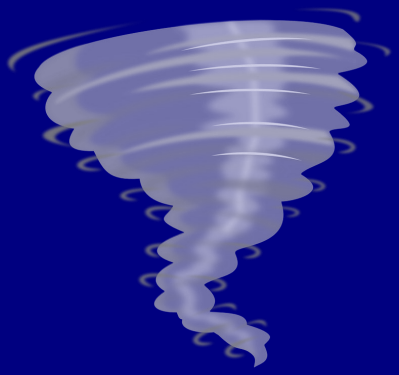
Understanding Severe Weather Hazards

Tornado	Tornadoes are violently rotating columns of air that can destroy buildings and cause significant injury or death ACTION: Take shelter immediately in a sturdy structure
Large Hail	Hail can damage vehicles, crops, buildings, and cause injuries ACTION: Move indoors away from windows
Strong Wind	Strong wind can knock over trees and damage buildings ACTION: Move indoors away from windows
Heavy Rain	Heavy rain can cause flash flooding ACTION: Avoid rising creeks and water-covered roads
Lightning	Lightning strikes can cause significant injury or death ACTION: Move indoors if you hear thunder

Weather-Ready Nation
National Oceanic and Atmospheric Administration

National Weather Service
weather.gov/tornado

95 average # of tornadoes per year in Kansas
(30-yr average 1988-2017)



Kansas is **2nd** in the country for tornado occurrences

Tornado Safety: *Preparation for tornadoes is key to staying safe and minimizing impacts*

- **Be Weather-Ready:** Check the forecast regularly to see if you're at risk for tornadoes. Listen to local news or a NOAA Weather Radio to stay informed about tornado watches and warnings.
- **Sign Up for Notifications**: Know how your community sends warnings. Some communities have outdoor sirens. Others depend on media and smart phones to alert residents of severe storms capable of producing tornadoes.
- **Create a Communications Plan**: Have a family plan that includes an emergency meeting place and related information. Pick a safe room in your home, such as a basement, storm cellar, or an interior room on the lowest floor with no windows.
- **Practice Your Plan:** Conduct a family severe thunderstorm drill regularly so everyone knows what to do if a tornado is approaching. Make sure all members of your family know to go there when tornado warnings are issued. Don't forget pets if time allows.
- **Prepare Your Home:** Consider having your safe room reinforced. You can find plans for reinforcing an interior room to provide better protection on the Federal Emergency Management Agency website.
- **Help Your Neighbor**: Encourage your loved ones to prepare for the possibility of tornadoes. Take CPR training so you can help if someone is hurt.

Tornado!?

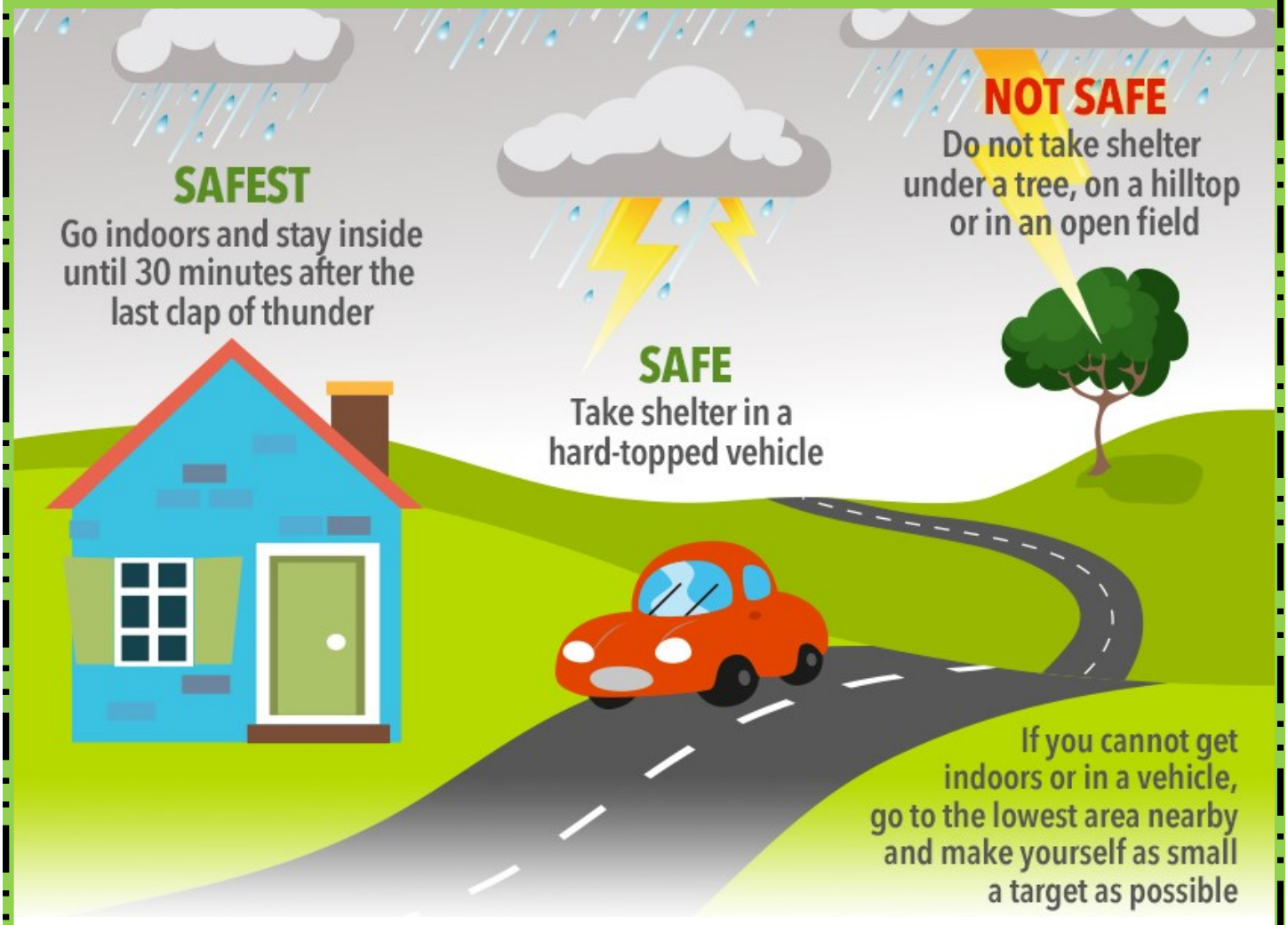
What to do if you aren't at home:

Outside: Seek shelter inside a sturdy building immediately if a tornado is approaching. Sheds and storage facilities are not safe.

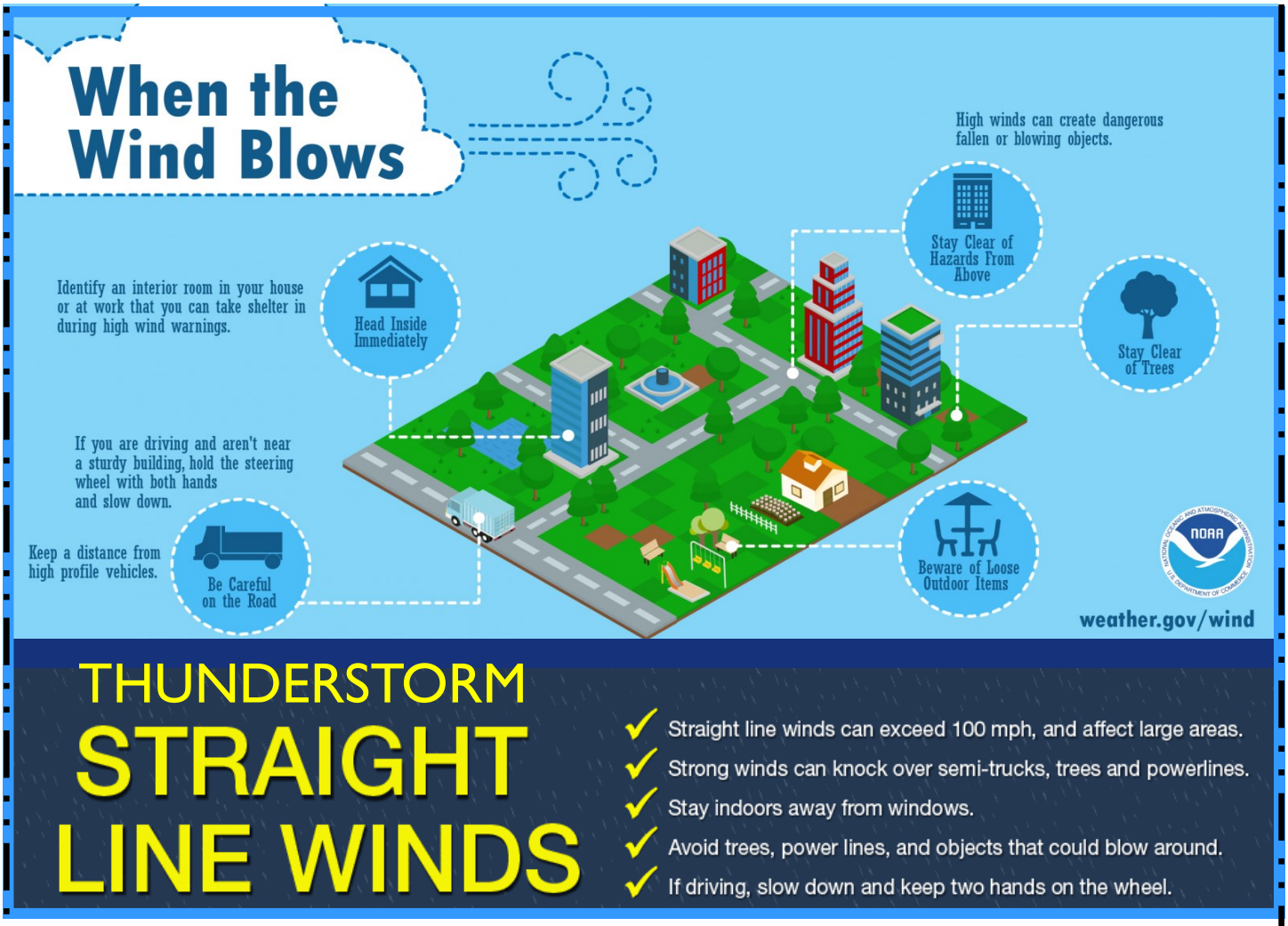
In a vehicle: Being in a vehicle during a tornado is not safe. The best course of action is to drive to the closest shelter. If you are unable to make it to a safe shelter, drive into a ditch, get as low as possible with your seatbelt attached, and cover your head.

At Your Workplace or School: Follow your tornado drill and proceed to your tornado shelter location. Stay away from windows and do not enter large, open rooms.

Lightning Safety



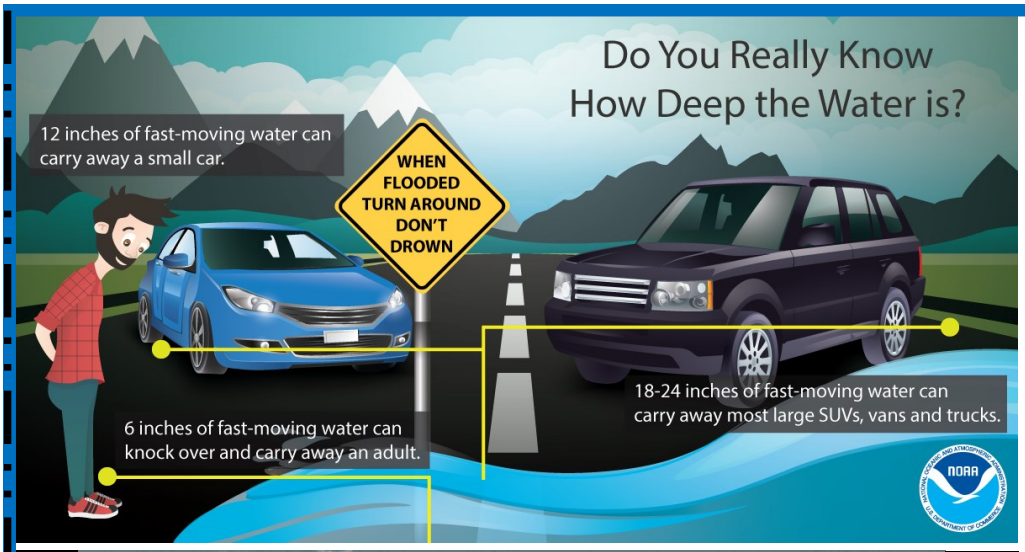
Wind Safety: Southwest Kansas is a windy place

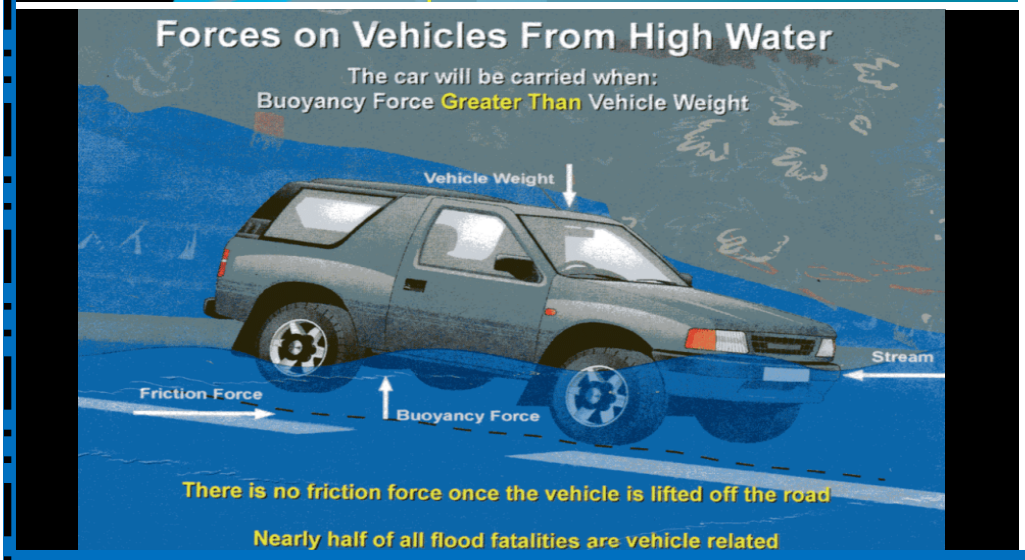


Hail Safety

- Take cover immediately before hail falls
- Cars provide shelter up to golf ball size
- Keep blankets in your car to protect yourself if the glass breaks
- Find an awning, a gas station overhang or an overpass (away from traffic and NOT during a tornado!)
- Canvas awnings and tents are not safe shelters

Heavy Rain Safety: Heavy rain can bring flash flooding





Flood Safety Tips

- Turn Around, Don't Drown
- Obey posted road closures
- A foot of moving water can sweep a car off the roadway

After A Flood—Safety Reminders

AVOID Flood Waters—Standing water can hid washed out roads, debris, or sewage.

HEED Road Closures—Do not attempt to drive around barricades (they are in place to protect you!!)

NEVER drive into water of unknown depth.

STAY INFORMED: Tune into your local news for updates on affected areas and the safety of your drinking water.

AVOID disaster areas: Your presence may hamper emergency operations

Section compiled/written by Ray Burgert, Lead Meteorologist

EMPLOYEE SPOTLIGHT ⋆ WARNING COORDINATION METEOROLOGIST JEFF HUTTON

In the formative years as a youngster, the Warning Coordination Meteorologist for the Dodge City office, had an idea of what he wanted to be when he grew up. Jeff Hutton was born and raised in Dodge City and has always loved the outdoors. Not only was he fishing by the time he was 4 years old, he also had a fascination for growing pumpkins by the time he was six years old, and then as a 7 year old he became extremely interested in weather!

The Garden City tornado of June 23, 1967 was the event that changed Hutton's life. As the local radio station was blaring the warning for the community 50 miles away, Jeff climbed the swing set to see if he could see what the announcers were discussing. Although he never saw the tornado, that one event set in motion what would eventually become a life-long career. It was on THAT day he decided to become a weatherman.

The following week at the library, after checking out many weather books to read up on tornadoes, Jeff began a decade or two of daily journaling of weather observations. When school started that fall, he even convinced his 2nd grade teacher that he wanted to give daily weather reports! Years later Hutton began his academic period of earning a degree in Meteorology. He attended Dodge City Community College before finishing at the University of Oklahoma. By the way, it is rare to see Jeff dressed in anything other than Sooner gear or colors. Boomer seems to be his favorite word!

Jeff's 542.5 pound pumpkin that earned 2nd place at the Kansas State Fair in 2017!

Jeff's professional career began with a weather company in Oklahoma City in 1983. He was then selected as an Intern for the Des Moines, IA office of the National Weather Service in 1989. Later in January 1992 he was selected as one of the first forecasters at the newly modernized office in Dodge City. Hutton was promoted as Warning Coordination Meteorologist in 1994. He is married with three children (2 girls and a boy), and three grandkids (2 girls and a boy) that have stolen his heart.

In his spare time, he still has that passion for fishing and pumpkin growing! The first year he grew pumpkins at six years of age, he and his brother grew four pumpkins that totaled 124 pounds – the biggest was 36 pounds. He was hooked! In addition to growing field pumpkins, Hutton got into growing Atlantic Giant pumpkins, off and on, about 10 years ago. The first few years the bigger ones ranged from 125 to 184 pounds. Recently he figured out a few things, one of which southwest Kansas weather is extremely harsh on growing giants! However, with luck, the right nutrients in the soil,

Jeff is a member of The Boothill Bass Club—the oldest B.A.S.S. affiliated club in Kansas!

and starting with seeds with the right genetics, heavier weights are achievable. In 2015, a Kansas State Fair record pumpkin of 1034 pounds was grown in Finney County. The following year Jeff grew his personal best at 542.5 pounds and that one earned 2nd place at the Kansas State Fair. The 2018 growing season was brutal weather-wise and there were numerous challenges. Jeff's largest pumpkin for 2018 was 510 pounds.

Fishing, especially for bass, is Hutton's other passion. Again, he started at a very early age. When Jeff moved back to Dodge City in 1992, he joined a local Bass Club. That organization, The Boothill Bass Club, is the oldest B.A.S.S. affiliated club in Kansas! Six monthly tournaments are held each season across mainly Kansas, although the club has fished other impoundments in Oklahoma and even New Mexico! During the 2018 season, Hutton finished in 2nd place. What is unique about the Boothill Bass Club is that the bass are returned immediately back to the water, after measuring. The five biggest are counted towards the weight to determine the winner of each tournament. To date, Jeff's personal best tournament occurred back in 2004 at Wilson Reservoir when his five biggest bass weighed a combined weight of 22.75 pounds! Two of those were smallmouth bass at 5 pounds and 14 ounces and 5 pounds and 12 ounces. The state record at the time was six pounds!

So, if you're at a Kansas lake and see someone in a bass boat with Sooner colors and that guy is yelling Boomer, it's probably Jeff. If you go to the Kansas State Fair and see a giant pumpkin, it might be his. And, if you ever see someone at a meeting talking about the weather, it's probably Jeff Hutton.

Dodge City NWS Office News

High Plains Conference

Several members of NWS Dodge City attended the 2018 High Plains Conference, hosted by NWS Hastings, NE. Highlights included keynote speakers Jeff Piotrowski (Storm Productions, Inc), Mark Robertson (EM Coordinator for the University of Nebraska) and Jared Guyer (Storm Prediction Center), as well as NWS Dodge City's own Aaron Johnson and John Stoppkotte (NWS North Platte) conducting a Tornado Warning Improvement Project workshop.

Dodge City Days Trike Races

NWS Dodge City participated in the 2018 Dodge City Days Trike Races. Meteorologists Marc Russell, Matt Gerard, Wes Hovorka and Greg Tatro had a great time; however, they were eliminated after the first round. They are hoping for better luck this year!

Goodbye to Curt Lutz

Curt Lutz left NWS Dodge City in early January to take a promotion as a Electronic Systems Analyst at NWS Monterey. For the past 2 years, Curt had been an electronics Technician in Dodge, and previously was an Electronics Technician at NWS Riverton. We miss you Curt, and wish you the best of luck!

Updated E19s

Every 5 years NWS Dodge City updates river gauge reports, called E19s. This is a big undertaking as it requires site visits for all 33 river gages in NWS Dodge City's county warning area. The reports contain detailed station and flood history information for river gage stations. Lead Meteorologist Matt Gerard is tasked with this job, and will be out and about visiting river gauges this spring!

Severe Weather Identification and Storm Spotter Training

The National Weather Service in Dodge City provides storm identification/ spotter training sessions each spring. These sessions are done in cooperation with county Emergency Management agencies across the area.

All training is FUN, FREE, and open for anyone to attend!

For more information visit: www.weather.gov/ddc/2019_spotter_talks

3i SHOW

We will be attending the 3i show in March. Stop by our booth to learn about lightning safety with the Van de Graaff generator, meet our meteorologists and talk all things weather!

March 21-23 | Western State Bank Expo

Summer Weather Word Search

By Wesley Hovorka, Meteorologist

Find these meteorological terms!

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

Clouds: A cloud forms as a result of condensation of water vapor, if enough condensation nuclei exist.

Rainbow: A luminous arc featuring all colors of the visible light. It is created by total reflection and the dispersion of light. The bow is always observed in the opposite side of the sky from the sun, when it's shining through air containing water spray or raindrops.

Thunder: The temperatures of lightning can rise to 20.000 degrees Celsius in microseconds, resulting in a violent pressure wave, which causes the thunder.

Lightning: Lightning is a sudden and visible discharge of electricity between clouds or between cloud and ground. It occurs during a thunderstorm as a result of a electrostatic charge of the drops in the clouds or rain drops.

Rain: Precipitation in the form of liquid water drops that have diameters greater than 0.5 mm, or, if widely scattered, the drops may be smaller.

Wind: Air in motion relative to the surface of the earth. Wind always develops by balancing between two areas with different air pressure. The air flows from the high to the low pressure area.

Temperature: The temperature is a physical parameter and a measure for the kinetic energy of particles in a system and it is measured in several scales.

Tornado: A violently rotating column of air in contact with the ground, usually pendant to a cumulonimbus.

Hail: Showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud.

Jetstream An area of strong winds that are concentrated in a relatively narrow band in the upper troposphere. It is caused by the changes in air temperature where the cold polar air moving towards the equator meets the warmer equatorial air moving polarward. It usually reaches wind speeds between 250 and 360 km/h.

Front: Front means the transition zone or interface between two air masses of different densities. Meteorologists differ between cold front, warm front and occlusion. Cold front means cold air flowing towards warm air, warm front means warm air moving towards cold air and occlusion means merging cold and warm front.

Climate: The slowly varying aspects of the atmosphere–hydrosphere–land surface system. It is typically characterized in terms of suitable averages of the climate system over periods of a month or more, taking into consideration the variability in time of these averaged quantities.

National Weather Service

Dodge City

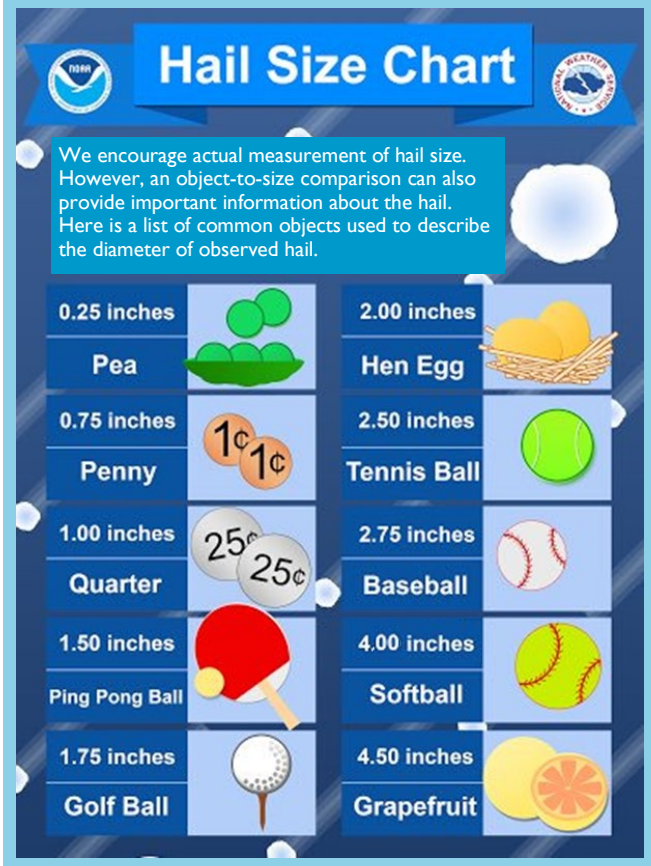
104 Airport Rd.

Dodge City, KS 67801

620-225-6514

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

Reporting Severe Weather to the National Weather Service



We need your report!

During severe weather and winter storms, the NWS uses reports from the public and trained spotters as ground truth to supplement tools such as satellite and radar, giving decision makers added confidence as they issue warnings. Reports also help the NWS verify warnings and improve future warning techniques.

Type of reports we need:

- Tornado
- Funnel Cloud
- Rotating Wall Cloud
- Flash Flooding
- Hail 1-inch Diameter or Larger
- Precipitation Type
- Rainfall Amounts
- Snow/Ice Accumulations
- Wind Speed Greater than 58 mph
- Storm Damage

What we need when you report:

- Images preferred!
- Your report
- Location (as exact as possible)
- Time event occurred

Reports can be submitted to:

- Twitter: @NWSDodgeCity
- Facebook: Facebook.com/NWSDodgeCity
- Online Portal: https://inws.ncep.noaa.gov/report/
- mPing: Submit using the mPing App
- https://inws.ncep.noaa.gov/report