THE RADAR POST

NWS GOODLAND'S NEWSLETTER SINCE 2017

Volume 5, Issue 2 **Fall 2022**

Message from the MIC

My time in the Tri-State Region will soon be coming to an end as I am moving to Iowa the first week in November. I want to thank the entire staff at WFO Goodland and the people of the Tri-State Region. Over the past three years we continued to improve our operations, even during the Covid-19 pandemic.

I have a greater appreciation for the people who live in this part of the country because of the variety of weather you have to overcome throughout the year. I also have a greater respect for the wind. This is by the far the windiest location that I have been stationed at.

The outstanding and dedicated staff in Goodland will continue their great services to the people and partners in this region. I would also really like to thank all the Emergency Managers in our County Warning Area (CWA) as they have some of the toughest challenges.

As I depart, I would like to leave you with this final thought: if you stay positive and work together, anything is possible to achieve. Thank you for these three years and I appreciate meeting and visiting all of you in the Tri-State Region.

-Ed Holicky, Meteorologist-In-Charge

INSIDE THIS ISSUE

NWS Goodland Provides Support to County Fairs Across the Tri-State Area

By: Matt Chyba

The 2022 county fair season was a prime time for NWS Goodland staff to provide decision support services (DSS) to fair officials and emergency managers across the Tri-State Area. This weather information helped fair attendees stay safe during hazardous weather. Counties which received support from NWS Goodland included Cheyenne, Decatur, Logan, Sherman, & Thomas in Kansas; Kit Carson & Yuma in Colorado; and Red Willow in Nebraska. Leading up to these county fairs, the NWS Goodland staff provided the fair officials and emergency managers with event specific forecast information. During the fair NWS Goodland staff monitored weather conditions and provided updates if severe weather started to threaten the fair. For instance, a thunderstorm developed within 20 miles of the Red Willow County Fair in McCook, NE on July 22nd. When the storm was spotted by the NWS Goodland staff, they immediately informed the Red Willow County emergency manager about the storm, and what it was capable of producing before the storm could impact the fairgrounds. The emergency manager was able to pass along the information to prepare fairgoers for the impending storm, which helped him tremendously in keeping people and property safe.

NWS Goodland is able to provide weather support for any size of community event venue. Basic support services include daily morning phone briefings, and heads-up phone notifications on threatening weather approaching events. Extra services are also available if requested. If you have a community event that may need weather support, please feel free to contact your county's emergency manager. Your emergency manager will be able to relay the support request to NWS Goodland who in turn will let you know how they may be able to help you. We look forward to providing weather support for your events in the future!

NWS Goodland Attends County Fairs

By: Jesse Lundquist

Tyler Trigg (left) and Jesse Lundquist (right) staffing the booth at Burlington, CO.

As the summer came to a close, many communities were in the midst of fair season. This is a great time for the NWS to interact and reacquaint people with the services we can provide them by participating in local fairs.

"Letting people know we are still here to serve them was the primary reason we wanted to attend a few of the local fairs," said Tyler Trigg, the forecaster who led the endeavor. Tyler scheduled a day that the office could have a booth at a couple local county fairs, which was a challenge given some of the scheduling conflicts he had to work around. However the effort paid off, with the office being able to attend a fair in Colby, KS and Burlington, CO. To attract attention to the booth, weather balloons were set on display as well as a radiosonde and a slideshow of recent tornado, wall cloud, and shelf cloud pictures. Weather safety brochures were available for people to take who visited the booth. Many people stopped by to visit with either Tyler, Jesse Lundquist, or Grady Bonsall (the office ESA) during these two fairs. The questions varied from what the forecast was for that particular night of the fair, to how to access forecast information online, or how the radiosonde helps us forecast the weather. Many people thanked the staff for being able to come be a part of the fair. Toward the end of the Burlington, CO fair, Tyler was asked to conduct an interview with KNAB, a local radio station, discussing why the NWS had a booth at the fair, and Jesse was able to touch base with the manager of the radio station to understand how the Goodland WFO can continue to improve our services to our media partners.

Tyler and Jesse's goal for next summer is for the Goodland WFO to be a part of more fairs in their CWA.

NWS Goodland Attends Burlington Backyard Kids Camp

By: Kalitta Kauffman

On August 2nd, two NWS Goodland meteorologists participated in the Burlington Conservation District's Backyard Kids Camp. Children varying in age from three to ten years old were taught about the different types of weather we experience in the High Plains, and how to keep safe when bad weather occurs. In the week prior to the camp, notable weather occurred in Kit Carson County, Colorado including four tornadoes and heavy rainfall. Those recent events led to an increased interest in how tornadoes work, and which cloud type thunderstorms form from. To help the children better understand the concepts taught, they were able to help out with seven hands-on activities involving crafts, a Van de Graff generator, and everyone's favorite…the tornado machine! To bring the fun home, each child was given a goody bag filled with fun and informational items including weather safety handouts, instructions for the hands-on activities, and they were able to take home their hand-made cloud charts for future sky watching. NWS Goodland appreciates the opportunity provided by the Burlington Conservation District to talk about weather, and hopefully inspire a new generation of meteorologists.

Courtesy of:
Jennie McCasland

If you are interested in having a meteorologist visit to discuss weather and weather safety with your group, or to arrange a National Weather Service tour, feel free to contact us at (785) 899-7119 or nws.goodland@noaa.gov.

Measuring Evaporation at NWS Goodland

By: Jesse Lundquist

Did you know that dust storms are the deadliest weather phenomena of the Tri-State Area? To help become more aware of what causes dust storms, forecasters at NWS Goodland have been conducting research into what forecast parameters to look for to help anticipate the conditions favorable for dust storms. This research has helped the office begin highlighting dust storm conditions days out, which in turn has helped improve preparedness of dust storms by residents of the Tri-State Area.

As an extension of the ongoing research for dust storms, the office recently installed an evaporation pan. The evaporation pan also has a mesonet station (to the right of the pan in top picture). The mesonet station measures:

- Solar radiation
- Soil moisture at various depths
- Soil temperature at various depths
- Air quality
- Wind odometer
- Rainfall

Each morning a staff member adds water to the evaporation pan (or removes it if enough rain falls) until the metal pin in the middle is at the top of the water's surface. The amount of water added or removed from the pan is measured in hundredths of an inch. (The water that is lost is a measure of the amount of evaporation that occurred.) The high and low temperature of the water and the air, any precipitation, and the distance the wind has blown (in miles) is collected.

This data is used to help us understand the relationship between soil moisture, evaporation, precipitation, temperature, and wind speed. These observations continue through October 15th. The end goal is to improve our ability to anticipate dust storms with this information.

Meet Our New Mets!

By: Clint Alexander

This summer, the Weather Forecast Office (WFO) in Goodland had two new meteorologists join the team! They have been spending the summer learning about the responsibilities that forecasters have in Goodland, and meeting some of the core partners the office works with.

Clint Alexander is one of the two new meteorologists to arrive at WFO Goodland. He started in early June and hit the ground running. Clint grew up in rural northwest Missouri, and then spent four years in the United States Air Force as a Vehicle Operator and Dispatcher. After the Air Force he enrolled at the University of Missouri - Columbia (Mizzou) where he graduated this past May. Clint earned his B.S. in Environmental Sciences, with an emphasis in Atmospheric Sciences, a minor in Geography and certificates in Geographic Information Systems and Geospatial Intelligence. When not in school, Clint was working as a Pathways Student at the Missouri Basin River Forecast Center (MBRFC). While at the MBRFC, he was able to experience the day to day operations of river forecasting, become acquainted with the tools and methods they use to create forecasts over such a large area, and work on a handful of projects including the celebratory 75th Birthday StoryMap for the MBRFC. Clint is happy to be in Goodland, working with an amazing team and away from big cities!

Cori Cook is the other new meteorologist to arrive at WFO Goodland. Cori's hometown is Choctaw, Oklahoma. She attended the University of Oklahoma where she received her B.S. in Meteorology in 2018. Prior to starting at the WFO in Goodland, Cori worked in Utah for 3 ½ years as a Department of Defense (DoD) civilian with the Meteorology Branch at Dugway Proving Ground. While there, she gained experience in forecasting, fielding and troubleshooting meteorological instrumentation, as well as querying and analyzing data. Cori's interest in meteorology was sparked by watching lightning storms as a child from the big window in her parents' house, and being fascinated by the lightning. Tornadoes were something which terrified Cori when she was younger – to the point she would be in tears when tornadic storms were occurring on the other side of the state. However, anytime Gary England's broadcasts of severe weather coverage came on, Cori's fear turned into curiosity. Cori recalls experiencing everything from severe thunderstorms and tornadoes to ice storms, blizzards and wildfires in Oklahoma. Cori knew she wanted to learn more about what caused significant weather events, so she started to look more into meteorology!

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Cori also enjoys baking, watching TV and movies, and playing video games. A lot of her free time is spent with her dog, a 3-year-old frisbee-obsessed German Shepherd. She also likes to visit family back home in Oklahoma and watch OU football!

Welcome Clint and Cori! We are glad to have you as part of the team here at WFO Goodland!

La Niña: A Brief Introduction

By: Kyle Knight

You may have heard the term La Niña mentioned recently, or in the past few years. This is because the Tri-State Area, along with much of the rest of the world, has been under the effects of La Niña for the past few years. With that being the case, it is worth talking about what La Niña is and what it's impacts are.

La Niña is one phase of what is called the El Niño Southern Oscillation (or ENSO for short). ENSO is driven by an anomaly (or difference from average) in the Pacific Ocean sea-surface temperature along the equator. ENSO is an ongoing area of study, so future findings may lead to other indicators or conditions which contribute to the formation of ENSO. Based on our current understanding, one of the main elements used to measure ENSO is the sea-surface temperature. ENSO has two different phases, El Niño and La Niña. El Niño refers to the warm episodes, or time periods when the sea-surface temperature is warmer than average. Conversely, La Niña refers to cold episodes when the sea-surface temperature is cooler than average. Below is an image showing the anomaly measured on October 5th of this year. Notice the blues near the equator (solid horizontal line) showing colder temperatures, suggesting we are still in La Niña.

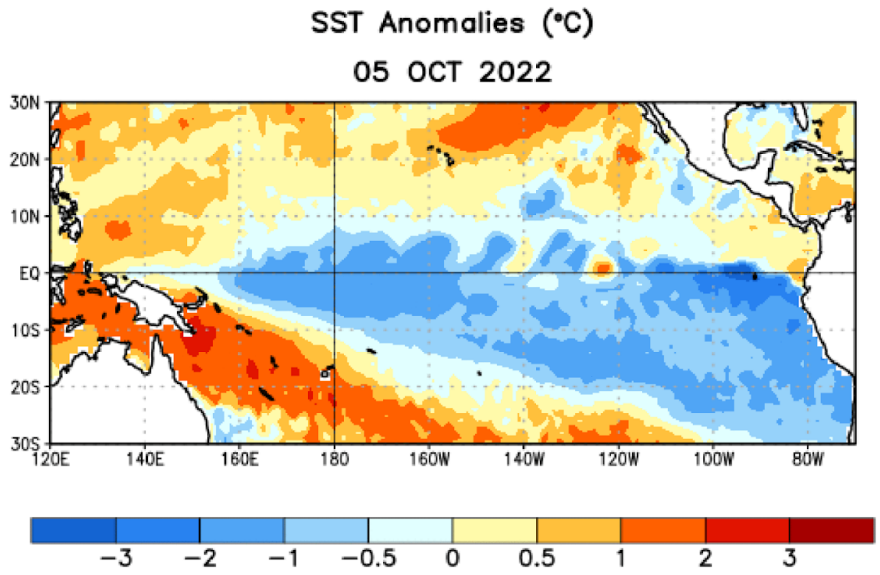

Figure 1. Average sea surface temperature (SST) anomalies (°C) for the week centered on 5 October 2022. Anomalies are computed with respect to the 1991-2020 base period weekly means.

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So how does a La Niña impact the Tri-State Area, considering we are talking about sea-surface temperatures thousands of miles away? The impact depends on the strength of the La Niña. Both phases of ENSO have varying strengths, from weak to strong, which are based on how large the anomaly in sea-surface temperatures are. Weak La Niñas tend to be more subtle with the changes to weather patterns, while strong La Niñas tend to have greater impacts on weather patterns across the globe. As a whole, La Niña means the Tri-State Area will be drier than average regardless of season, though the winter months are often closer to average for precipitation. For temperatures, summer is often warmer while winter is either near average or cooler. Typical La Niña impacts for the winter are shown in the image below. As for why we are affected thousands of miles away, the short answer is that weather is affected by many circulations in the atmosphere and ocean across the globe. A change in one circulation often impacts the other circulations across the globe.

In conclusion, La Niña has affected our weather for the last several years, and may continue to do so through the upcoming winter season as current predictions give around a 75% chance for La Niña to linger. The good news, as seen on the image below, is the impact to the weather pattern for the Tri-State Area during the winter is low. Though there would probably be no complaints if we could sneak in some of those wetter conditions to the east.

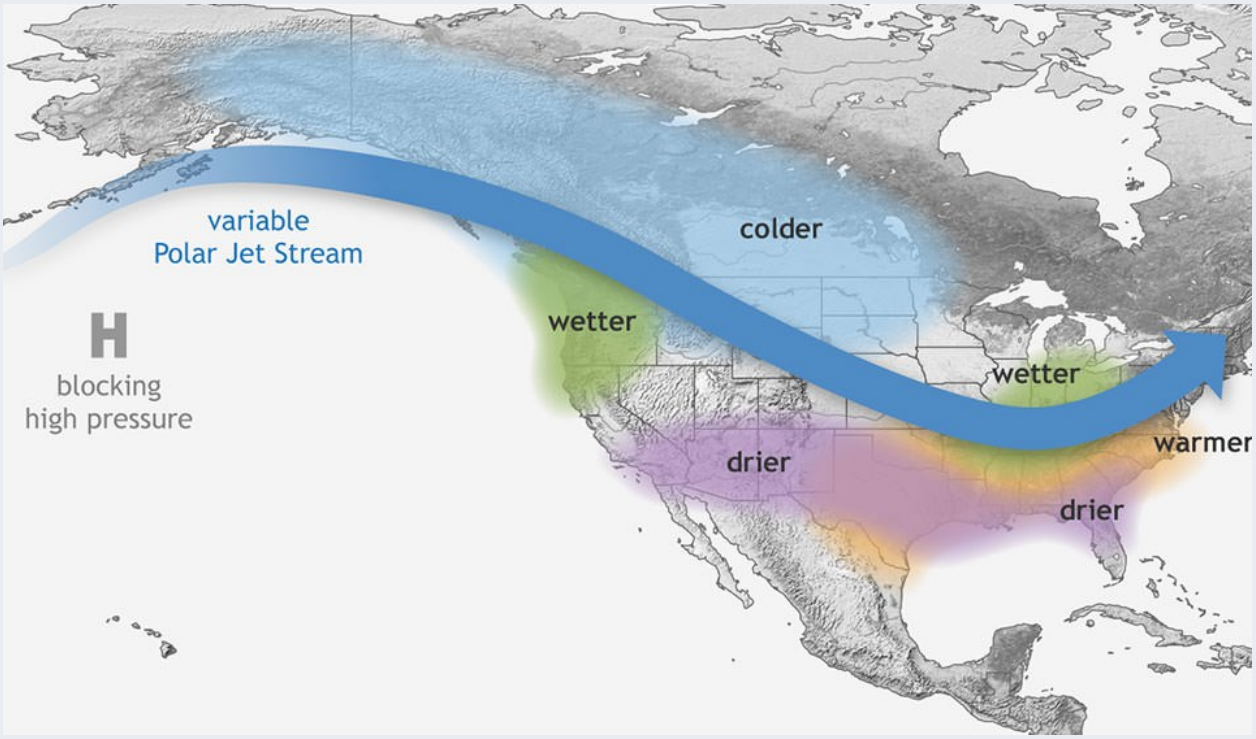
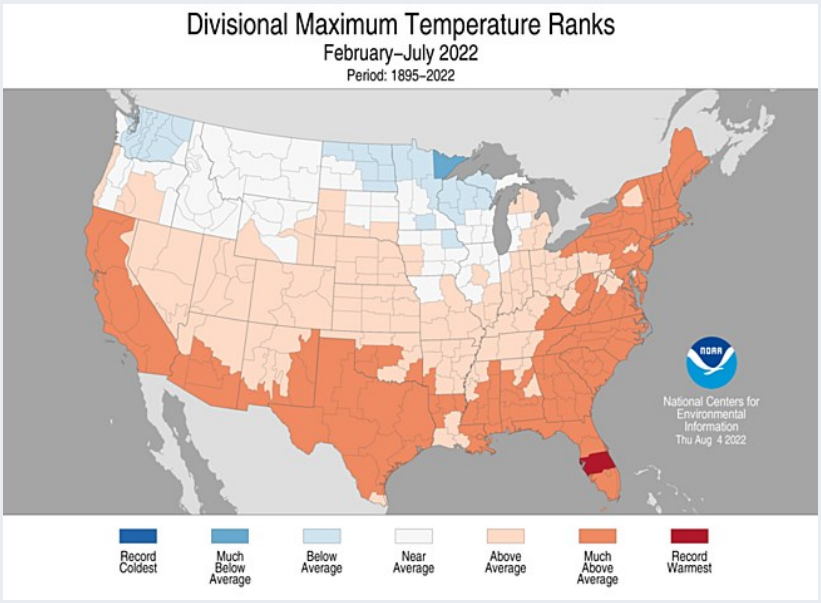


Image of typical changes in the weather pattern for the winter months in the United States during a La Niña.

A Brief Look At Spring And Summer 2022

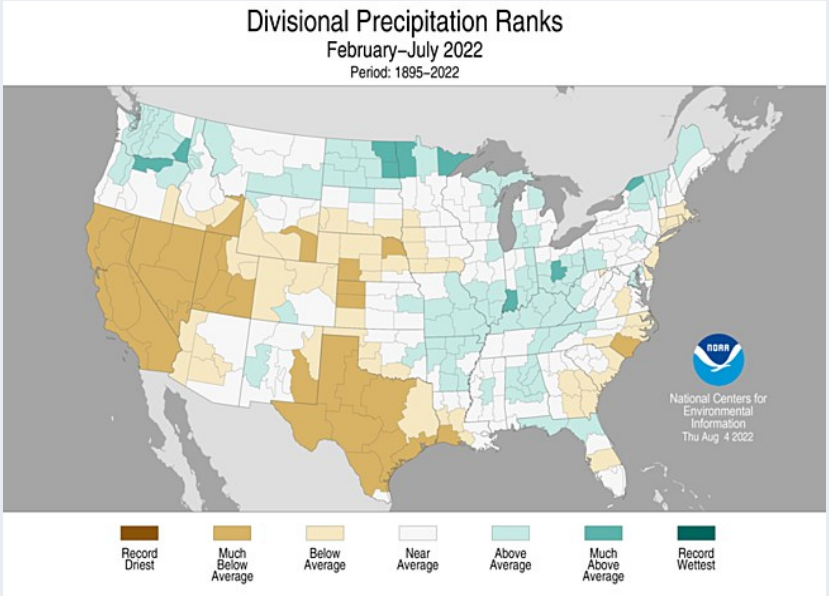
By: Kyle Knight

For the spring and summer, the Tri-State Area saw generally warmer and drier conditions than average. However, the conditions ended up being average for the La Nina that was in effect, as La Ninas tend to bring drier and warmer conditions to the region. While the La Nina did keep the area drier, a few bouts of severe weather moved through and even a case or two of flooding. For the spring, winds were stronger than usual with a few metrics suggesting April was the windiest April on record. This included a major wind event on April 22nd. Conversely, summer had near average to lighter than average wind speeds, with more than a handful of days observing nearly calm winds.



As the maps show, this year followed a typical La Nina pattern. It is worth remembering this refers to the overall weather pattern, as there were a couple brief instances of cooler and wetter weather. May tried to go against the pattern, with a few instances of cooler weather both at the start and near the end of the month. Highs were 60 degrees or less in those instances, but the month as a whole and the rest of summer saw near to above average temperatures.

As for precipitation, most of the area was drier, with locales like McCook, NE having one of the driest summers on record. Eastern Colorado on the other hand managed to be wetter than average. It wasn't so much that Eastern Colorado had more days with rain than average, but the storms that did move through produced high amounts of rain. There were multiple instances of rain totals around 2-5 inches as the storm systems moved through.



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Some of these heavy rain producing storms moved through the same areas in consecutive days. This led to some areas having saturated ground, and one instance where the Flagler Dam area was filled in a single rain event (for reference it is generally dry there). However, these heavy rain producers often fell apart close to and just past the Colorado border, which is one of the reasons why the rest of the Tri-State Area was drier.

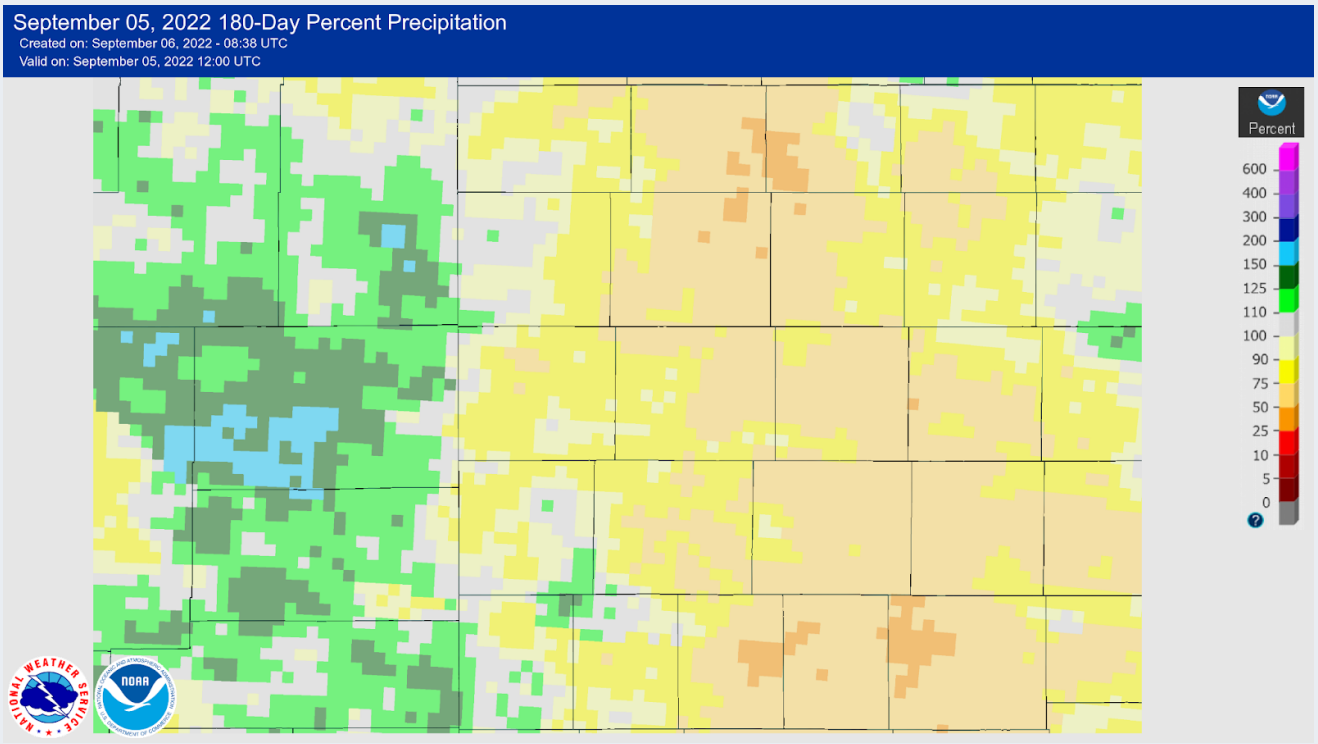

Image of percent of precipitation received compared to average for the six months leading up to the beginning of September. Yellows/Oranges means below average rain while Greens/ Blues mean above average rain.

Generally speaking, the Tri-State area is known for being a windy place. Spring lived up to that reputation with slightly above average winds through much of the season. April even ended up being the windiest on record at Goodland by a couple of metrics, such as average wind speed (17.7 mph) and number of days with peak sustained winds above 30 mph (18 days). April 22nd also brought high winds and thunderstorms with a powerful storm system, with many gusts between 60-80 mph and a peak gust of 82 mph near Trenton, Nebraska. While spring was windier than usual, the high winds didn't persist into summer, but instead had more average wind speeds. August ended up even being slightly below average, with Goodland averaging a speed of 9.9 mph; which it isn't very common for Goodland to average below 10 mph for a month.

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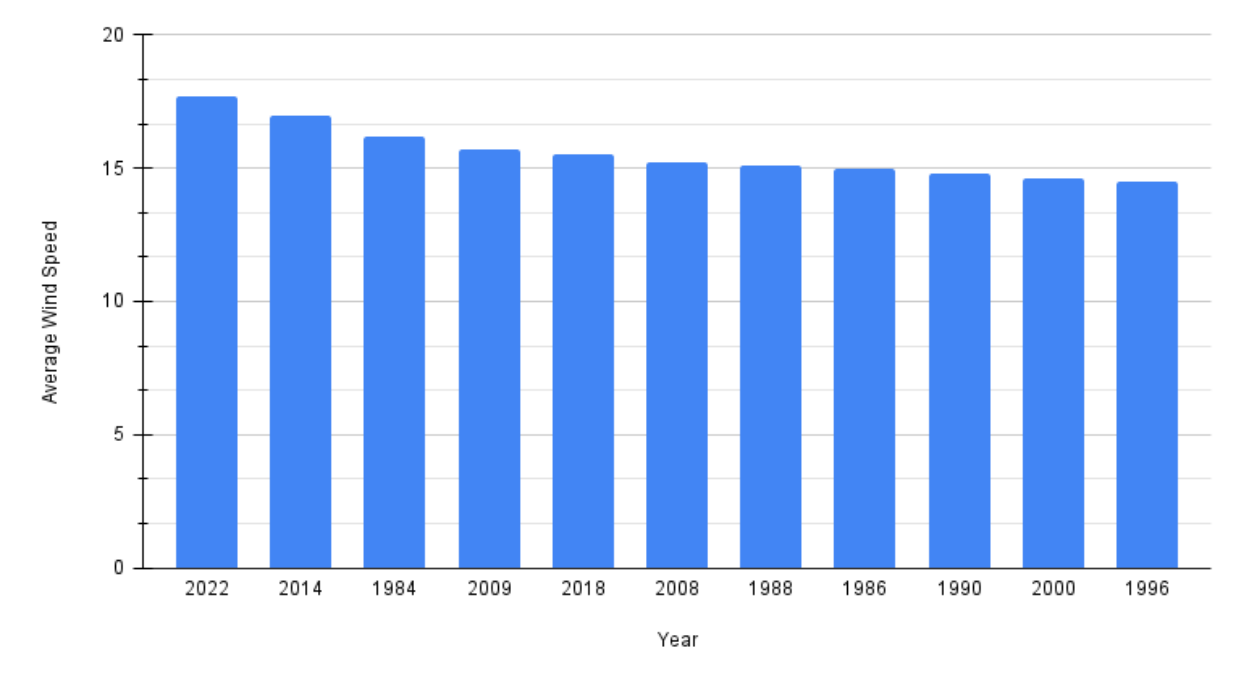

Image of top 11 average April wind speeds for Goodland, Kansas.

Finally, what would a review of the warm season be without a look at severe weather. In terms of severe weather, it was another relatively muted season with only a few surveyed tornadoes, a dozen or so landspout tornadoes, 138 severe hail reports and 113 severe wind gust/damage reports. This may seem like quite a few reports but is actually near to below average for the Tri-State Area across the board, especially on tornadoes. That's not to say there weren't significant storm reports, as there were at least six reports of 75 mph wind gusts, 38 reports of two inch or larger hail, including a four inch hail report near McCook, and at least one EF2 tornado.

	Tornado Reports	Severe Thunderstorm Wind Reports	Large Hail Reports
2022 Season	**17**	**113**	**138**
Average Season	**23**	**100**	**250**

Table of 2022 season severe reports compared to average reports per season. Landspout tornado reports not included.

Hydrology Review Across The Tri State Region

From April 1st Through September 18th

By: Jason Neilson - Hydro Program Manager WFO Goodland

The following is a summarization of hydrologic conditions around the Tri-State Area resulting from the precipitation and temperature regime which occurred from April 1st through September 18th (the writing of this article).

Below are tables of the four climate Automated Surface Observation System (ASOS) sites. They are located at the airports in Goodland, KS, Hill City, KS, Burlington, CO, and McCook, NE. The amounts listed on the left are observed precipitation for each month for each site. The number on the right is the amount the monthly total is above/below normal, color-coded GREEN for (+) and RED for (-).

	April		May		June	
Goodland, KS	0.04	-1.65	2.93	0.12	1.35	-1.61
Hill City, KS	0.35	-1.62	2.73	-0.61	1.70	-1.09
McCook, NE	0.15	-1.66	2.50	-0.58	1.85	-1.24
Burlington, CO	0.04	-1.53	2.64	0.09	1.77	-0.99

	July		August		September(thru the 18th)
Goodland, KS	2.88	-0.20	0.58	-2.48	0.02 / -0.87 below normal
Hill City, KS	2.01	-1.60	1.06	-1.89	1.38 / 0.11 above normal
McCook, NE	1.32	-2.00	0.20	-2.93	0.89 / -0.10 below normal
Burlington, CO	2.88	-0.07	0.77	-2.28	Trace / -0.77 below normal

On the next page is a table showing the year-to-date through Sept. 18 precipitation for all four ASOS sites, the climatological normal, and the precipitation for this time last year for comparison. As a side note, most of the below normal data listed occurred mainly during the April to September timeframe.

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Readings are in inches			
	Thru Sept 18, 2022	Abv/Blw Normal	Thru Sept 18, 2021
Goodland, KS	9.69	-6.47	12.89
Hill City, KS	10.63	-7.23	15.07
McCook, NE	8.09	-8.89	14.25
Burlington, CO	10.81	-4.05	15.40

Flood/Flash Flood Warnings issued:

April……..None

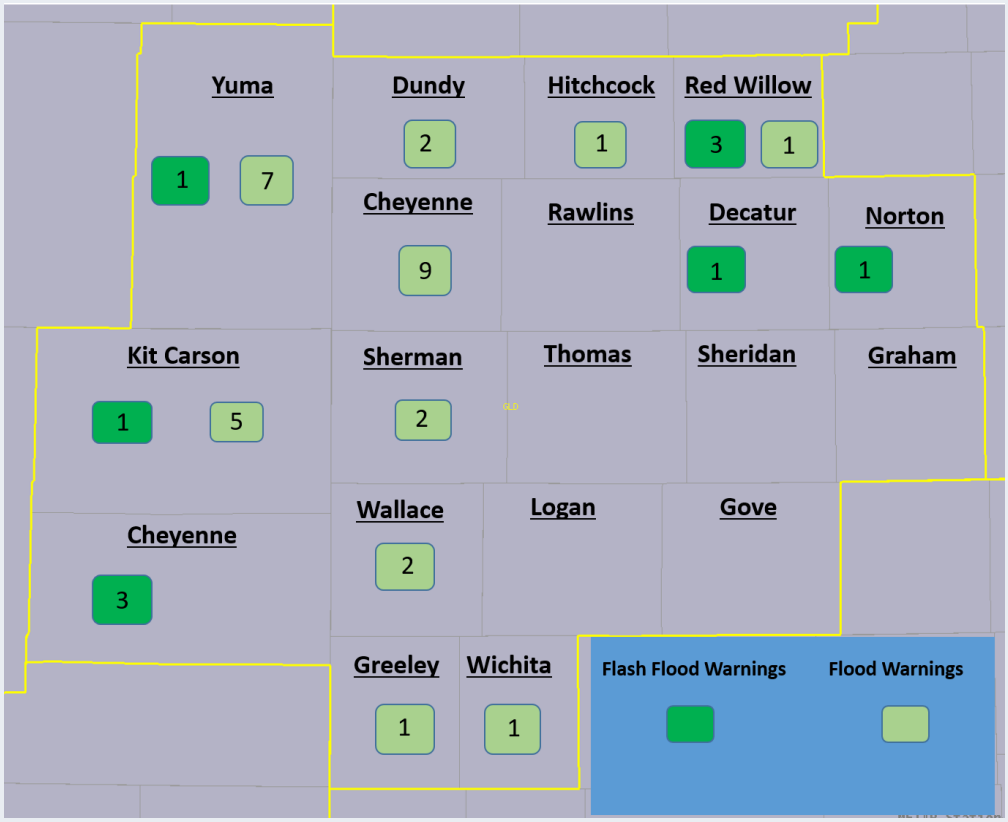
May……2 Flood Warnings/1 Flash Flood Warning

June……1 Flood Warning/4 Flash Flood Warnings

July……7 Flood Warnings/3 Flash Flood Warnings

August……..7 Flood Warnings

September…….None



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From all the information above, the result through the summer has been a toll on our area's rivers and streams. With a predominant low flow in all channels beginning in April, along with persistently hot, above normal temperatures, much of the rainfall received was either fully absorbed by area soil(s) or evaporated soon after the rain came.

Below are some area photos of various river gauges around the Tri State Region. Most were dry, but a few contained a “small” amount of water in them. These pictures were taken from June through early September.

(Top Left) Prairie Dog Creek northeast of Clayton, KS.

(Top Right) Frenchman Creek west of Culbertson, NE.

(Bottom Left) Republican River southeast of McCook, NE.

(Bottom Right) Sappa Creek northeast of Norcatur, KS

In conclusion, as we head further into the Fall, the more predominantly dry months will only further enhance the drying around the area. While any/all rainfall that occurs over the next couple of months will help in the short term, a broad weather system is needed to bring area-wide rainfall to positively impact the dry conditions currently seen around the region.

Fire Weather Terminology

By: Jesse Lundquist

As the fall season unfolds we will be moving into the windier time of year. Due to the dry vegetation, the increased wind causes fire potential to become more of a concern. To help communicate the potential for rapid fire growth for a given day, several somewhat similar sounding terms will be used. To help alleviate confusion, the different terms describing fire weather conditions will be defined. For reference, rapid fire growth conditions are a day with 15% Relative Humidity and wind gusts of 25 MPH occurring for at least three hours.

Fire Weather Hazards

Fire Weather Watch: Issued 12-72 hours prior to the onset of a day for potential rapid fire growth.
-Forecasters need to have moderate confidence that conditions for rapid fire growth will be met.

Red Flag Warning: Issued 12-24 hours prior to the onset of a day for rapid fire growth.
-Forecasters need to have high confidence rapid fire growth conditions will be met.

Fire Weather Terms

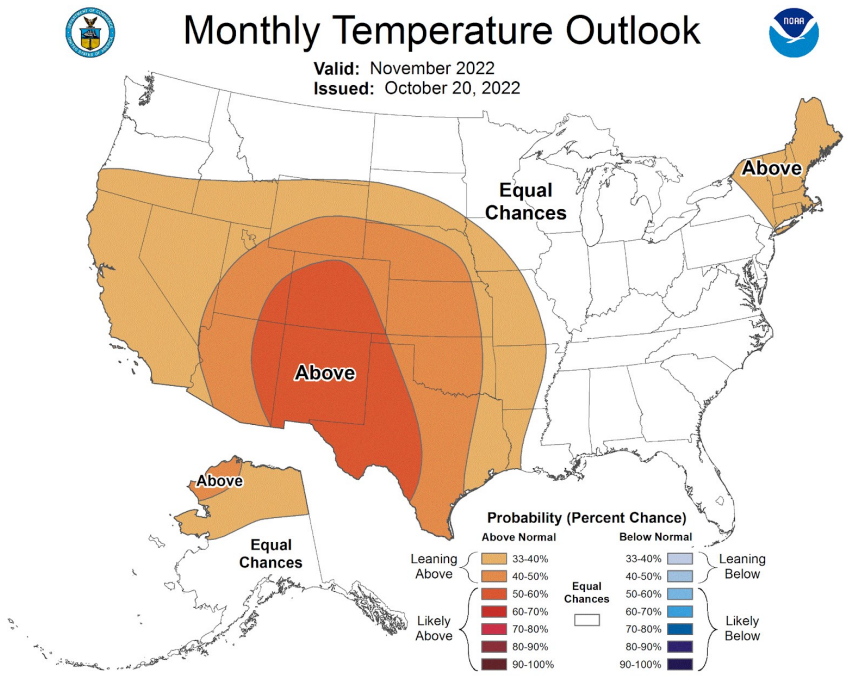
Critical: Red Flag criteria is expected to be met.

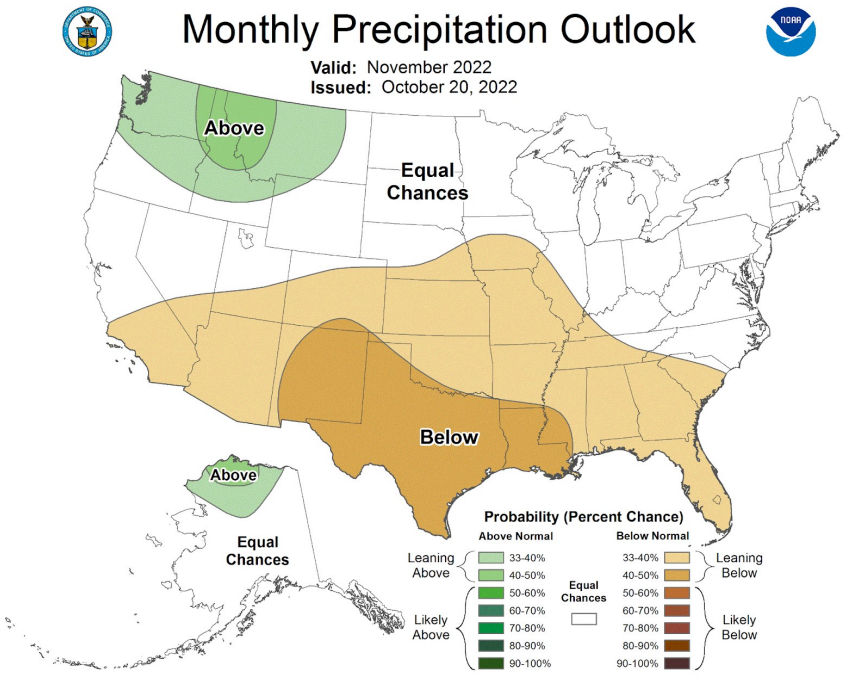
Near-Critical: The relative humidity or wind criteria for a Red Flag Warning will be met, but not both. Fire Weather Watch or Red Flag Warning are not expected to be issued.

Elevated: Neither relative humidity nor wind gusts will meet criteria, but one or both will be close to criteria.

Courtesy of:
James McHenry

Climate Corner





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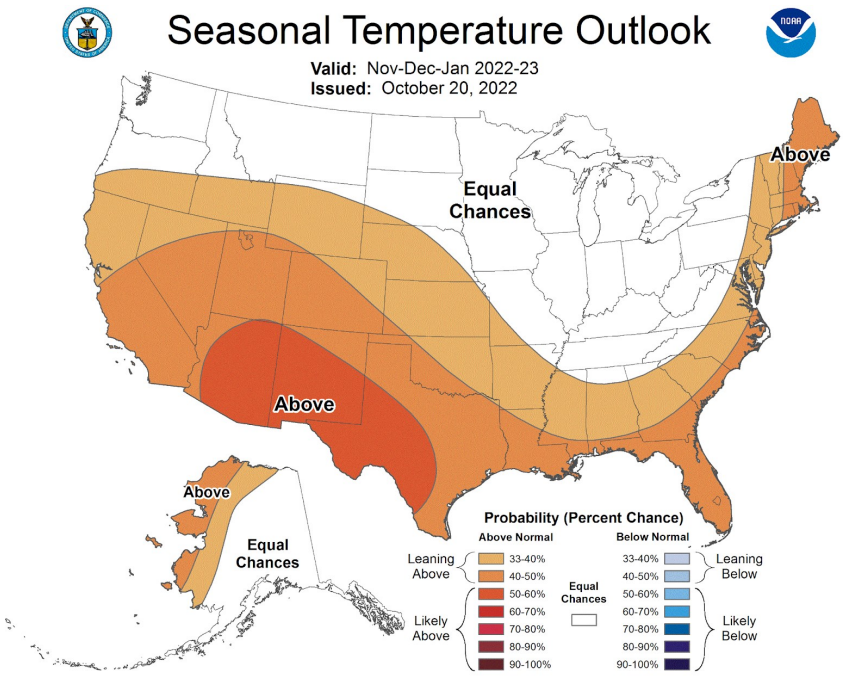
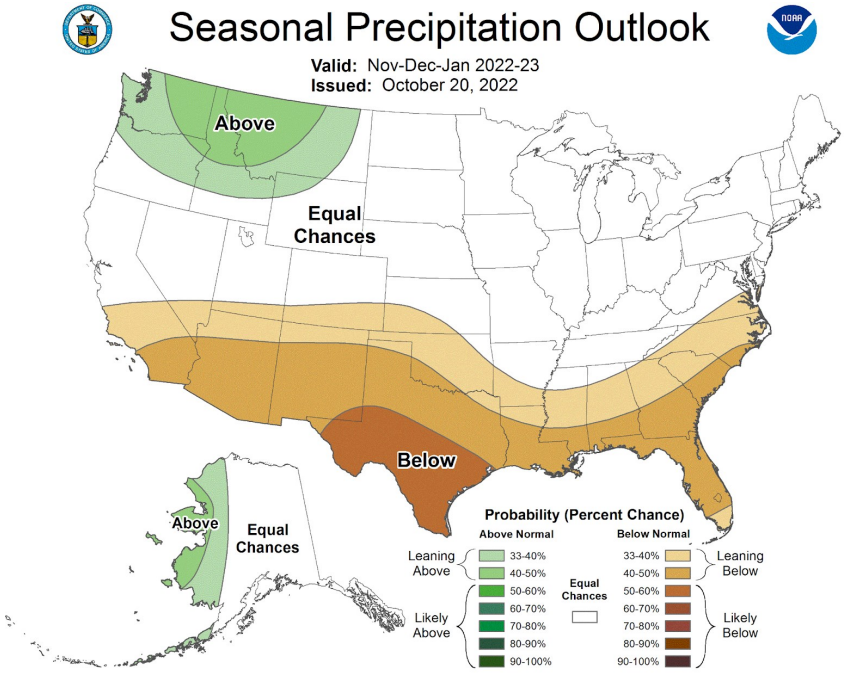
One Month Summary

The outlook calls for above average temperatures and below average precipitation for the month of November. The area averages around a half of an inch of precipitation and highs in the low to mid 50's.

Climate Corner





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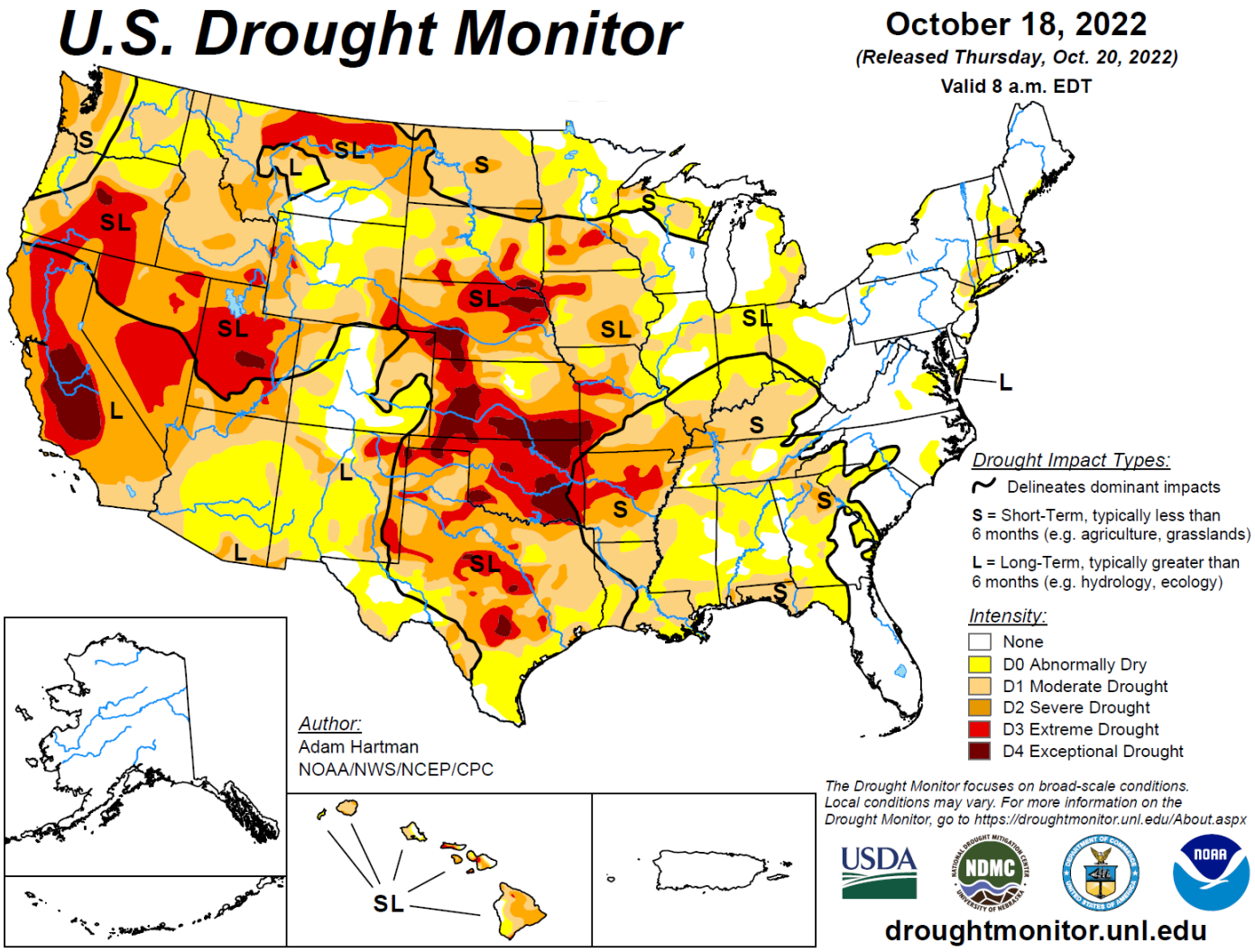
Three Month Summary

The three-month outlook calls for above average temperatures and an equal chance of below/ above average precipitation across the area.



City	Year to Date* Precipitation (in.)	Normal Year to Date* (in.)	Departure from Normal (in.)
Goodland	10.43	17.65	-7.22
Burlington	11.41	16.05	-4.64
McCook	9.27	18.57	-9.30
Hill City	11.81	19.74	-7.93

Data as of October 20, 2022

Interested in Contributing to the U.S. Drought Monitor?

Did you know that you can submit reports on drought-related conditions similar to submitting rain reports through CoCoRaHS? The Condition Monitoring Observer Reports (CMOR) system allows you to do just that! When you submit a report through CMOR it becomes part of the permanent record for the National Drought Mitigation Center based at the University of Nebraska-Lincoln. For more information on the CMOR system, visit https://droughtimpacts.unl.edu/Tools/ConditionMonitoringObservations.aspx.

Want to view your report or find reports for near your location? Reports are available immediately on the CMOR interactive website (https://unldroughtcenter.maps.arcgis.com/apps/MapSeries/index.html?appid=c95262d1b63646bcae8286e5f7fbf171).

Kids Korner: Make an Anemometer

By: Kalitta Kauffman

Materials:

- Five 3 oz. paper cups
- Two plastic soda straws
- One pencil with unused eraser
- Single-hole paper punch
- One push pin
- Scissors
- One marker

What the completed anemometer should look like.

Process:

1. Take four of the paper cups and punch two holes in each, about ½ inch below the rim and opposite each other. Use the push pin to add a small hole on the bottom of each cup.

2. Take the fifth cup and punch two holes in it, directly opposite from each other, about ½ inch below the rim. Next punch two more holes in the cup, each ¼ inch below the rim that are equally-spaced between the first two holes.

3. Using the push-pin and the scissors, make a hole in the center of the bottom of the cup with four holes in it. The hole should be just large enough for a pencil to fit through it.

4.Using the four-hole cup, put one straw through a set of holes and the other through the remaining set to form an "X" in the center of the cup.

5. Take one of the two-hole cups and add it to one end of a straw. Continue with the other three cups, making sure the opening of one cup faces the bottom of the one in front of it.

NOTE: you may need to apply small pieces of tape to the outside of the cups where the straw sticks out to keep the cups from sliding off the straws.

Here is how the straws should form an "X" and the additional cups be added to the straws.

6. Insert the pencil, eraser end first, through the hole in the bottom of the cup so that the eraser is touching the intersection of the straws.

Kids Korner cont.

7. Poke a push pin through the two straws and barely into the eraser.

NOTE: you may need to wiggle the pin around in the eraser to reduce friction if the cups do not spin!

8. Place an "X" on the bottom of one cup to help keep count of the number of spins (revolutions).

9. Take the anemometer outside and hold it in front of you. As the cups spin, count the number of times it spins completely around over a period of 10 seconds. Use the table below to estimate the wind speed. Be sure to hold the pencil loosely for it to spin correctly!

Revolutions in 10 seconds	Wind Speed in Miles per Hour (MPH)
2-4	1
5-7	2
8-9	3
10-12	4
13-15	5
16-18	6
19-21	7
22-23	8
24-26	9
27-29	10
30-32	11
33-35	12
36-37	13
38-40	14
41-43	15
44-46	16
47-49	17
50-51	18
52-54	19
55-57	20

WRN Ambassador News

Message from the WCM

Traditionally, Fall is a quiet weather season across the High Plains…or is it? From a storms and moisture perspective, yes it is. The deep, rich moisture that supports severe thunderstorms is usually cut off from the Tri-State Region once the cold fronts start moving through. While severe weather events can still happen with the right environment (i.e. September 2016 supercell that struck Goodland, October 2017 tornadoes that moved across Gove County), these days are much less common. Rainy days are certainly possible, but not nearly as frequent as during the summer. Average rainfall for September is 1.40 inches and even less in October, which averages 1.10 inches. These amounts are much less than May through August when all months average 2.45 inches or higher.

Even though the Fall contains a much lower threat for severe storms, and flooding as well with less precipitation in general, there are some threats we must pay attention to. The first threat is high winds, which typically come with cold fronts and the following day or two after the front passes. Strong winds from the north or northwest can create hazardous crosswinds on area highways, in addition to potentially causing damage such as shingles blowing off, loose objects being blown away, downed fences and farm outbuildings, and tree and tree limbs snapping.

The second weather-related threat in the Fall will be the potential for blowing dust. Local research indicates that the Fall, and more specifically October, has the highest frequency for reduced visibility due to blowing dust in our region. This is due to the return of windy days as the strong cold fronts move through. In addition, due to a lack of rainfall and still experiencing warm days, the soils can dry out quickly, allowing the dust particles to be lofted into the atmosphere. Blowing dust can reduce visibility to near zero, creating dangerous conditions for area travelers. In fact, blowing dust is the biggest killer in the Tri-State Region due to the accidents these conditions can cause. We encourage everyone that if blowing dust is in the forecast, consider alternate travel plans including traveling on a different day if at all possible. If you encounter blowing dust, pull off the roadway as far as you can and wait it out. Some dust storms may last a few minutes to an hour if it is more like a “wall of dust,” but other dust storms may last from mid-morning through the afternoon, or when the winds are typically the strongest.

Finally, fire weather is another large concern across the High Plains during the Fall. As crops dry down, or all the grasses go dormant because of dry conditions or killing freezes, conditions become quite favorable for area vegetation to carry fire. When you combine these fuels, or dry vegetation, with dry air and windy days, then conditions become quite favorable for large fires to occur. In particular, winds gusting 50 to 60 mph can support fires spreading forward at rates over five miles per hour, if not more depending on how dire the weather and fuel conditions are. With rates of spread that high, these fires become extremely dangerous to our local agriculture, fire fighters, and farmsteads, and could even threaten our towns. Please heed any local burning restrictions in your county…it could be the difference in saving you and your neighbors farmers, property, and livelihoods.

- Ryan Husted, Warning Coordination Meteorologist

WRN Ambassador News

2022 Weather Ready Nation Ambassador of Excellence

By Ryan Husted

Burlington, CO Conservation District

This year's 2022 Ambassador of Excellence for the NWS Goodland, KS Forecast Area is The Burlington Conservation District! The Burlington Conservation District has been a fantastic ambassador for building a Weather-Ready Nation. Each year during the summer, the agency hosts a children's camp and ensures that the National Weather Service is involved. Both the Conservation District and NWS Goodland view this as a great opportunity to teach kids about weather and safety. A three hour weather and safety education is set aside each year where the kids can learn about a variety of weather fundamentals, how weather can impact them, what the main threats are in our area, and most importantly, how to stay safe when disaster strikes. By involving kids, we are also promoting discussions among families in the area and building a community that is prepared and resilient to disaster.

To see all recognized organizations across the region or past winners, visit: https://www.weather.gov/wrn/ambassador_recognition

Interested in Joining Weather-Ready Nation?

For information on how to become a Weather-Ready Nation Ambassador, please contact the Warning Coordination Meteorologist, Ryan Husted (Ryan.Husted@noaa.gov) or the NWS Goodland meteorologists (nws.goodland@noaa.gov or 785-899-7119). To learn more about this national initiative, visit the Weather-Ready Nation website (www.weather.gov/wrn), or the NWS Goodland WRN website (https://www.weather.gov/gld/WRN_Ambassadors).

WRN Ambassador News

April 22nd, 2022 High Winds, Dust, and Severe Weather

By Ryan Husted

On April 22nd, 2022, the Tri-State Region was hit by an intense weather system that brought a variety of threats. As a low pressure system approached the region, very strong south winds developed across the area. During the day, winds as high as 75 miles per hour were measured by several observations sites. Unfortunately, due to the extremely dry weather experienced prior to this system, large wildfires and dust storms occurred during the late morning and early afternoon hours. One fire in particular, named the "702 Fire", began in extreme northwestern Decatur County, Kansas and rapidly moved north-northwest across Red Willow and Furnas counties in Nebraska. Unfortunately, one person died as a result of trying to warn neighbors of the incoming blaze. Other large fires were able to start in Dundy, Wichita and Yuma counties. At least 5 counties reported dust storm conditions with visibilities less than one quarter mile. A few tractor trailers were blown over on local highways due to the strength of the winds. Finally, during the afternoon hours, a few storms were able to move across northwest Kansas, producing hail to the size of golfballs and baseballs as well as damaging straight-line winds.

A variety of hail stones in Leoti, KS.

Courtesy of Kris Casper

Dust storm in Hitchcock County, NE.

Courtesy of Ellie Palmer

Later that night, a

Continued next page...

WRN Ambassador News

April 22nd, 2022 cont.

strong weather disturbance moved across the area, causing thunderstorms to erupt along the dryline in eastern Colorado. These intense storms quickly formed into a line and spread across northwest Kansas and southwestern Nebraska. The main threat with this line of storms was another wave of damaging winds, but in addition, these storms contained the threat for tornadoes. One tornado was able to develop just southwest of Sharon Springs, moving northeast through town and producing substantial damage to several structures. The tornado was rated as an EF-1 with maximum winds around 110 miles per hour, just shy of EF-2 strength. Several buildings were destroyed, including the CHS facility and a KDOT station. At least four other tornadoes were later confirmed across Logan, Gove, Sheridan, and Decatur counties.

Tornado damage in Sharon Springs, KS. Courtesy of Marshall Unruh

Tornado damage near Selden, KS. Courtesy of NWS Goodland Damage Assessment Team

WRN Ambassador News

NWS Goodland Visit Partners in Nebraska

By Tyler Trigg

An outreach/partner visit was made to Lincoln, Nebraska to visit the High Plains Regional Climate Center (HPRCC), State Emergency Management Office, State Department of Transportation (DOT) office, and National Drought Mitigation Center (NDMC) at the end of August.

Meeting with the HPRCC was very beneficial as they presented a "Water Deficit" tool. The big takeaway from this visit was the ability to overlay the Drought Monitor over the Water Deficit tool so one can easily see where any changes may need to be made to the Drought Monitor. The Water Deficit tool will also be beneficial as it shows visually where areas are lacking or exceeding in precipitation. They also mentioned the newest data for the Water Deficit tool comes in every Wednesday. Overall our partnership is working well with them as they consider us "testers" for their tools, and they would appreciate any feedback for any of the tools and products that they send out.

After the HPRCC, I visited with the NDMC to inquire about additional ways to address the ongoing drought. I also wanted to have a better understanding of the Drought Monitor, including all the effort that goes into collaborating with different entities, and how they publish a great and easy to read product. Over the next several weeks, I look forward to posting some of the new information I learned about to help the public and partners understand the extent and magnitude of the ongoing drought.

Stops at the Nebraska DOT and State Emergency Management (EM) offices were made as well on this outreach trip. Both entities stated that all the offices in the state's DSS (Decision Support Services) packets highlighting important event details such as hazards, timing, location, etc… have dramatically improved over the past 5 or so years, with the state emergency manager saying, "it shows that we are actually listening to our partners needs and are acting on it". They also said they attend any weather briefings we present (assuming higher impacts aren't occurring elsewhere in the state) and that we provide great and helpful information. As far as areas of improvement for NWS Goodland, they each said nothing immediately comes to mind. Everything we provide and do for them is fantastic, from providing input about any deployments to fires, to our weather briefings for upcoming impactful weather. A couple of interesting tools shown to me include how quickly the DOT message boards are updated, and that any warning we issue is sent to the message board immediately. At the EM office, I was shown the mobile Emergency Operations Center (EOC) unit, which was most recently deployed to the Road 702 Fire on the Red Willow/Furnas County border. It was very interesting to see how confined the area in the mobile EOC is and how responders can provide great service and assistance to those impacted.

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WRN Ambassador News

Partner Visits cont.

In conclusion, at the end of August I took an outreach trip to Lincoln, Nebraska to meet with several of our office partners such as HPRCC, DOT, State Emergency Management and NDMC. The main takeaways from the visits were the introduction of the Water Deficit tool and gaining some insight into potential ways to address the ongoing drought. It was also insightful to hear some of the behind the scenes aspects of the DOT and the state Emergency Management office along with the feedback for communicating potential hazardous weather with them. The visits were very beneficial and positive for not only myself but for the entire NWS Goodland office, as this provides us with feedback to better serve the public and our partners.

WRN Ambassador News

Winter Weather Travel Tips

By Tyler Trigg

As we move out of summer, one on the High Plains has to begin thinking of potential winter weather impacts. Chances for snowfall can begin as early as September, when many people around the Tri-State area will recall the accumulating snow that occurred Labor Day weekend in 2020. The most hazardous of all winter driving events are the ones that are not as widespread and well known; primarily intermittent icing and freezing fog events. These are the most hazardous due to lack of visibility and public awareness.

What should you do if you find yourself driving during these hazardous conditions?

1) Reduce Your Speed - High speeds make it both easy to lose control and difficult to stop. You should never be driving faster than 45mph in any vehicle when roads are icy - not even on highways! You can slide off of the road on certain types of treacherous icing - like black ice - at 10mph or less! If you're fishtailing or sliding at all, it means you are going too fast for the conditions.
2) Wear your Seatbelt
3) Relax - Being tense can cause you to overcorrect and wreck.
4) Know When to Quit- Sometimes road conditions are just too dangerous to drive in. If you can't see or find yourself losing control, just pull over, it's not worth jeopardizing yourself, your passengers, or others on the road.
5) Pay Attention! - Put away the mobile device

Use caution when going out this winter.

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WRN Ambassador News

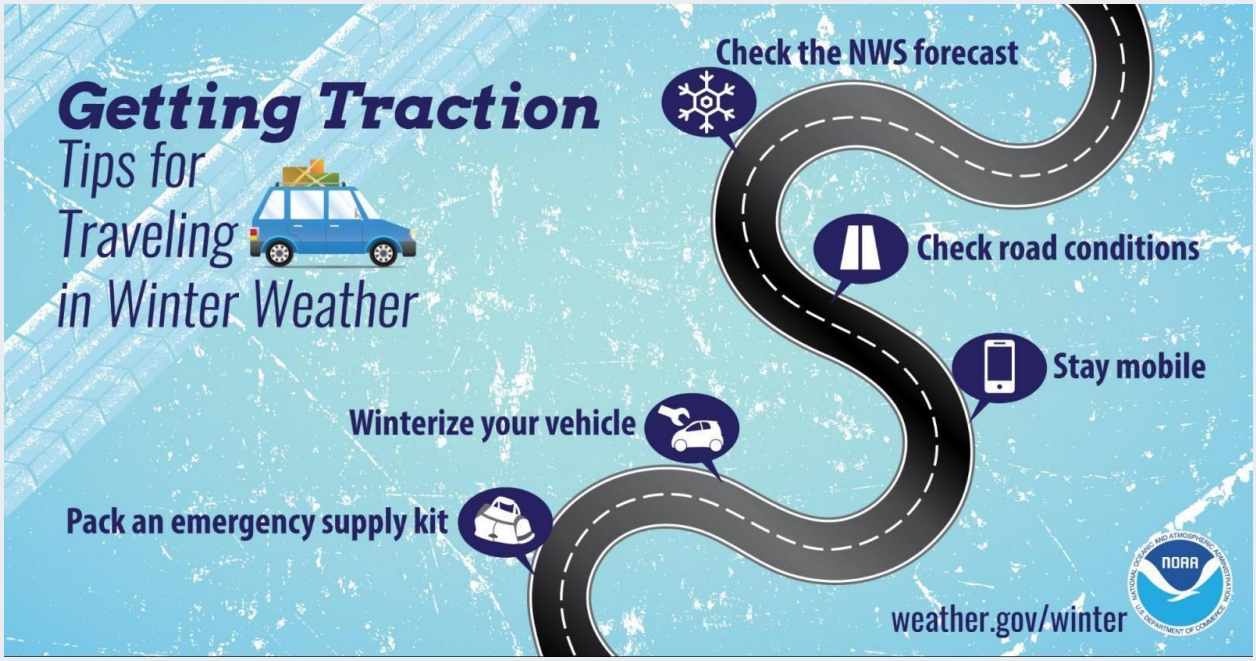
Winter Safety cont.

and focus on the road with both hands on the steering wheel.

There are several steps that you can take to avoid being caught off-guard during winter travel.

- Utilize your local National Weather Service Office
- Check the road conditions along your route
- You can dial 511 for road conditions in Colorado, Kansas, and Nebraska
- Make sure you have mobile.weather.gov for updated advisories and warnings
- Winterize your vehicle
- Have a winter weather emergency kit.

Getting ready for traveling in winter weather



When driving this winter, follow these tips to help you get from Point A to Point B.

Before winter weather begins it may be a good idea to pack a winter weather emergency kit for your vehicle. A well prepared vehicle has winter weather condition tires, tire chains, shovel, sand/cat litter for traction, and windshield scraper/brush. These are just some of the main items that may be needed. An additional list can be found here https://www.ready.gov/car.

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WRN Ambassador News

Winter Safety cont.

While on the road always keep an eye out for high-profile vehicles and plows.

If traveling is a must it's very important to know a few guidelines if worst case scenario your car gets stuck during a storm:

- Stay in the vehicle!
- If you leave your vehicle, you could become disoriented quickly in wind-driven snow.
- Run the motor about 10 minutes each hour for heat.
- While running the motor, open the window a little for fresh air to avoid carbon monoxide poisoning.
- Clear snow from the exhaust pipe to avoid carbon monoxide poisoning.
- Be visible to rescuers.
- Turn on the dome light at night when running the engine.
- Tie a bright colored cloth, preferably red, to your antenna or door.
- After snow stops falling, raise the hood to indicate you need help.

Main points to remember when traveling this winter

- 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 crucial. An alarming number of road ice fatalities occur with minor accidents where the vehicle occupants were not wearing seat belts.

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WRN Ambassador News

Winter Safety cont.

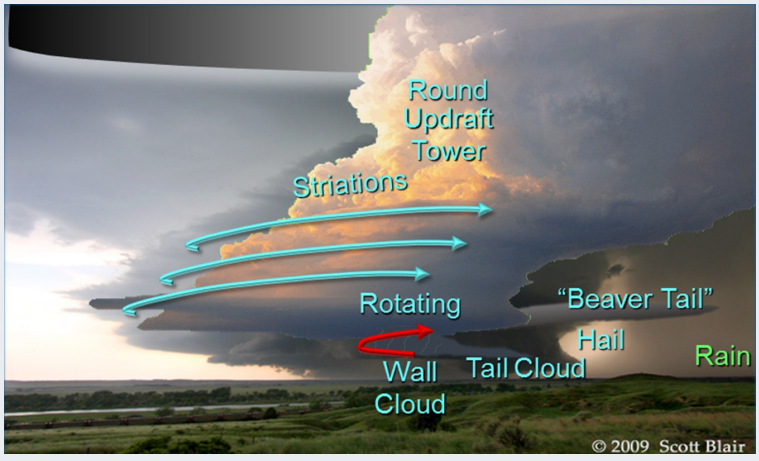
- Take it slow! You might not have the skill to drive at normal speeds on icy roads. High speeds make it easy to lose control on ice and snow. Slowing down when on icy roads is one of the best ways to avoid an accident.
- Pay Attention! Put your mobile device away and focus on the road with both hands on the steering wheel!

If you remember these tips we hope that you can enjoy and be safe during any trips that you may take this winter weather season. If any additional information is needed on winter safety please visit https://www.weather.gov/safety/winter or contact the National Weather Service Goodland, Kansas.

Storm Spotter Training Coming Soon!

By Clint Alexander

The National Weather Service in Goodland is preparing to have the annual Storm Spotter Training classes in-person early next year. These classes will take place in various locations across Northwest Kansas, Southwest Nebraska, and East Central Colorado. Each class lasts up to two hours, and they typically occur in late February through March. The exact locations and times for these training events will be announced early next year via social media and local newspapers.



The annotated image shows an example of what is taught during the Spotter Training class. Courtesy: Scott Blair

The National Weather Service (NWS) needs trained storm spotters to verify what our instruments are telling us. Storm spotters are the eyes in the field for the NWS. During each class attendees will learn how to identify severe weather, what types of reports the NWS needs, and how to make those reports. It is also a great time to ask us any questions about the NWS and what we do!

Impact-Based **Snow Squall Warnings**

Snow Squall Warnings (SQWs) are brief (30-60 minutes) warnings issued for short duration intense bursts of snow & wind leading to whiteout visibility & possible flash freezes on roads.

Implementation Timeline

The NWS will begin to implement the use of Impact-Based Warning (IBW) Tags for SQWs on or after November 7, 2022. All NWS Weather Forecast Offices will transition to issuing SQWs with IBW Tags by February 2023.

WEA Trigger

Currently, all SQWs trigger Wireless Emergency Alerts (WEAs), which are free notifications delivered to your mobile device.

Once IBW tags are implemented for SQWs, WEAs will be limited to only those high-impact SQWs with the Snow Squall Impact Tag of "Significant."

Public perception is that the NWS over-alerts SQWs and overuses WEA. This change ensures WEA activation is reserved for high-impact events. The NWS has noted a need to issue SQWs at night without triggering WEA.

With this addition of IBW tags, the NWS is aiming to improve the public response to SQWs by providing machine-readable information and issuing WEA alerts only for snow squall events that pose a substantial threat to safe travel.

Snow Squall Warning Tags	Explanation
IMPACT TAG	
General (No Tag)	To be used frequently for snow squall conditions, but mitigating actions, combined with societal context, will reduce the threat to safe travel.
Significant*	Used only when snow squalls pose a substantial threat to safe travel, such that WEA is warranted to alert all devices in the path.
SOURCE TAG	
Radar Indicated	Evidence on radar and near storm environment is supportive, but snow squall conditions are not confirmed.
Observed	Snow squall conditions are confirmed by ASOS, spotter, webcam, law enforcement, emergency management, or other visibility observations.

Up to 2 Impact-Based Warning Tags will be appended to the bottom of Snow Squall Warnings.
**Category utilized for a Wireless Emergency Alert (WEA)*

National Weather Service weather.gov/safety/winter-snow-squall

Example of Snow Squall Warnings with Impact-Based Warning Tags

Impact-based warnings contain hazard, source, and impact information, including machine-readable tags to communicate the source of the information and severity of the impact. On the right is a sample impact-based warning that would trigger a Wireless Emergency Alert.

Hazard, Source, and Impact Information

Each Snow Squall Warning (SQW) will contain individual lines that clearly state hazard, source, and impact

Tags

Tags will appear at the bottom of SQWs.

```
...A SNOW SQUALL WARNING REMAINS IN EFFECT UNTIL 630 PM EST...

At 540 PM EST, a dangerous snow squall was located near Owls
Head, moving east at 40 mph.

HAZARD...Flash freeze on roads and rapidly falling visibility
         due to intense bursts of heavy snow and gusty winds.

SOURCE...Radar indicated.

IMPACT...Dangerous and life-threatening travel conditions are
         expected to develop rapidly in the warning area.

Locations impacted include...
Chazy, Mooers, Altona

PRECAUTIONARY/PREPAREDNESS ACTIONS...
Slow Down! Rapid changes in visibility and road conditions are
expected with this dangerous snow squall. Be alert for sudden
whiteout conditions.
&&

LAT...LON 4467 7395 4479 7419 4489 7403 4500 7380
TIME...MOT...LOC 1815Z 259DEG 51KT 4512 7345 4501

SNOW SQUALL...RADAR INDICATED
SNOW SQUALL IMPACT...SIGNIFICANT
$$
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National Weather Service weather.gov/safety/winter-snow-squall

Useful Links

· Storm Prediction Center
- www.spc.noaa.gov
· Weather Prediction Center
- www.wpc.ncep.noaa.gov
· Climate Prediction Center
- www.cpc.ncep.noaa.gov
· Climate Data
- www.ncei.noaa.gov
· CoCoRaHS
- www.cocorahs.com
· Weather Models
- www.ncep.noaa.gov
· Space Weather
- www.swpc.noaa.gov

SciJinks
-scijinks.gov/

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