THE RADAR POST

NWS GOODLAND'S NEWSLETTER SINCE 2017

Volume 4, Issue 3 Fall 2021

Message from the MIC

Fall is here and we will soon transition into the winter season. NWS Goodland operations continue non-stop whether it be snow, dust, wind, severe weather, COVID, etc. Nothing will stop the dedicated staff at Goodland from providing life-saving weather information or helping the people in the Tri-State Region.

Currently, our office is in the middle of a major project. Beginning October 25th, 2021, the WSR-88D radar operated by NOAA's National Weather Service in Goodland, Kansas will be down for approximately two weeks for an important upgrade. Technicians will refurbish and replace the pedestal, one of the most critical components of the radar, which is necessary for antenna rotation and positioning to capture data in all directions. The components are extremely heavy and will require the radome to be removed by crane and replaced when the work is completed.

The radar and pedestal were designed to last 25 years, and this radar has exceeded its life-span. This refurbishment is necessary to keep the radar functioning for another 20 years or more.

The pedestal refurbishment is the third major project of the NEXRAD Service Life Extension Program, a series of upgrades that will keep our nation's radars viable into the 2030s. 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.

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INSIDE THIS ISSUE

All SLEP photos courtesy of Ed Holicky

Intense Microburst Impacts Burlington on September 1st, 2021

At 8:12 PM MDT on September 1st an intense series of microbursts associated with a decaying thunderstorm developed near the Kit Carson County airport and continued to the northeast into the eastern sections of the community of Burlington. The most intense damage occurred near the airport and near the Kit Carson Correctional facility with estimated winds speeds of 100 to 115 mph based on the damage caused. These winds speeds would be the equivalent of a high end EF-1 to low EF-2 tornado.

The National Weather Service in Goodland dispatched meteorologists to Burlington the next morning to perform a damage survey. Damage was logged and mapped onto a display to determine the following:

- Where damage occurred.
- How was the damage oriented.
- How strong were the winds to cause damage.
- Path length and width.
- Determine if damage was a tornado or straight line winds.

A rain foot is visible in this undated image from the National Weather Service in Norman, Oklahoma. A rain foot is where the leading edge of the damaging winds are located.

Upon examining the damage, it was noted that nearly all damage was laid out in a northerly pattern with a general spreading out of the damage, consistent with winds spreading out from a microburst. These types of wind events are relatively common in the drier climates of the High Plains region and are difficult to detect on radar as it occurs at the surface as storms are collapsing. While tornadoes are often the first thing one thinks of when one thinks of storm damage, straight line winds such as microbursts can produce equivalent damage equivalent to EF-2 tornadoes.

What exactly is a microburst and how do they form? A microburst is a localized area of intense winds due to the rapid spreading out of a thunderstorm downdraft. In a lot of ways they form in an opposite way to how the thunderstorm itself forms. As precipitation such as rain, snow, hail fall towards the ground, evaporation and melting causes the air to cool. If the air is cooler than the environment it will actually accelerate its motion toward the ground. As this cool, dense air reaches the ground it has to spread out in all directions, resulting in dangerously strong winds.

Unfortunately the precursors to a microburst are difficult to see visually while observing storms. While storm spotting, you may see a feature called the rain foot with an approaching storm (see photo above). When you see this feature, you are seeing the rain actually spreading out from the downdraft. If this storm is coming towards you, you should prepare for strong winds!

Why are Spotter Reports Important?

Tree damage caused by a lightning strike in a Nebraska park.

The Goodland National Weather Service office provides weather forecasts, watch and warning information and weather support to nineteen counties across Eastern Colorado, Northwest Kansas and Southwest Nebraska. Staff at the Goodland weather office work around the clock, monitoring the weather and warning of impending hazards. During times of inclement weather, meteorologists rely on eyewitness accounts from those living in the area to get an idea of what is happening on the ground. Satellite and radar, though useful tools, cannot make up for the storm reports provided by spotters, law enforcement and the public.

Why are these accounts crucial? Rainfall reports give forecasters an idea of how much rain has fallen in an area. This information can assist in determining whether flash flooding may be possible, assessing drought conditions and determining whether grasses and other vegetation pose a fire risk. Hail reports can give forecasters an idea of how large the hail with a storm is. Radar can give warning forecasters an idea of how large the hail could be. The ground truth provided through photos and reports helps forecasters calibrate what they see on radar to what people are seeing on the ground. These reports can also be included in future warnings to help inform others of impending hazards.

Storm spotter reports and photos such as the one above give meteorologists valuable ground truth and an idea of what a storm is doing.

Wind speed, wind damage and tornado reports are also crucial to the warning process. Forecasters rely on your reports to assess what a storm is doing and what implications there are for those in the path. Snowfall and ice accretion reports allow us to see what a storm is doing and give us a chance to improve our warnings through an event. Your reports help us verify the information in our warnings and can be used for future research.

Not sure how to send us a report? Let us know the location the weather event occurred and what is going on. If you can include a time the event is occurring, this is helpful. Let us know the magnitude of the hazard, such as the size of the hail falling, an estimate of wind speed or a measurement of how much snow has fallen. Your safety is important to us. If you plan on sending in a report, do so from a safe location. The National Weather Service will never ask you to put yourself into harm's way to get a storm report. For more information on what to report, how to measure weather or how to send a report, check out our YouTube channel: https://www.youtube.com/user/NWSGoodland.

NWSGoodland **facebook.com/NWSGoodland** **@NWSGoodland**

New Nebraska Mesonet Site Comes to Dundy County

The Nebraska Mesonet announced on August 30th, 2021 that they have established a new weather observation station in Dundy County. This new Mesonet site is located 10 miles southwest of Enders, NE within Dundy County. Nebraska Mesonet weather stations provide valuable hourly data such as temperature, dew point temperature, relative humidity, 4-inch soil temperature, incoming solar radiation, wind speed with direction, mean sea level pressure, and precipitation.

Weather observation data from stations such as this one is ingested into National Weather Service data systems to help improve forecast model data as well as make meteorologists aware of current conditions and micro-climates (wind and precipitation patterns, unique temperatures) for an area. NWS Goodland's ability to service the public in the Tri-State area improves as the number of reliable weather observation stations grows within the area. If you are interested in viewing weather data from the new Dundy County station or any of the other 68 stations that make up the Nebraska Mesonet, please visit https://mesonet.unl.edu/.

Stations such as the new Dundy County Mesonet Station (shown above) provide important weather information such as temperature, dewpoint and relative humidity data. This information helps improve forecast model data and verify current weather conditions.

What Does it Take to Become Radar Certified? RAC!

Radar Certification means you have gone through the appropriate lessons and practice to be able to issue convective storm warnings such as tornado and severe thunderstorm warnings. Being hired into the National Weather Service does not mean you'll instantly be put onto the radar desk and begin issuing warnings. Instead, you have to watch (and help with) local events and also take part in something called RAC.

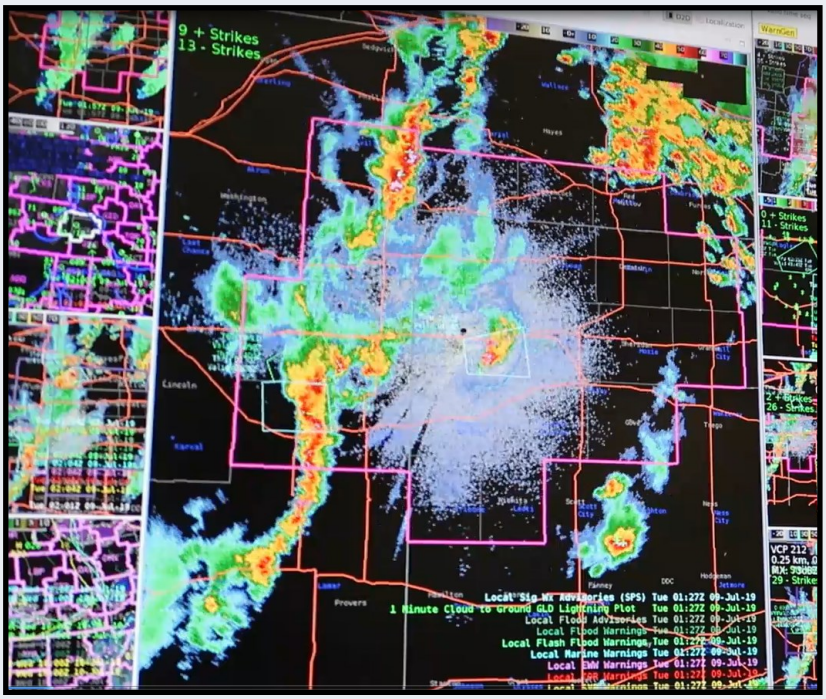
RAC stands for Radar and Applications Course which is a course taken by all National Weather Service forecasters. The goal of this course is to train forecasters on what to look for during severe weather days to better equip them to issue proper warnings. The course is broken up into a few sections. The first section is conducted through distance learning. This section is a set of modules and lessons that teach the different concepts of warning on severe storms. Some of the topics are what radar signatures to look for, what environments are favorable for certain severe threats, and how to issue proper warnings.

The second section is instructor led training. This is meant to provide real-time learning and interaction while also giving new forecasters a chance to ask questions. Upon completion of all the distance learning and instructor-led training, the final section of RAC is conducted through simulations.

For an entire week, trainees from across the nation participate in simulations of previous weather events. During these simulations, the participants practice by doing real time analysis and issuing warnings. This gives them a sense of what working a real event will feel like and allows the instructors to provide timely feedback on how each participant is doing.

After completing RAC, forecasters continue to work with their local offices to become better familiar with local phenomena and severe events. This will eventually allow them to become the primary warning forecaster.

The RAC experience provides forecasters with the tools and concepts needed to issue effective warnings.



A radar image of thunderstorms moving across the Goodland county warning area. Meteorologists learn from past severe weather events, using radar data and spotter reports to train for future events in a safe setting.

NWS Goodland had four new forecasters go through RAC in 2021. They got to meet forecasters from across the United States and learn different perspectives, including challenges that other regions face. The new forecasters in Goodland will continue to improve their abilities to better provide service and warnings for those across the Tri-State area.

Fall and Winter Webinar Series

The National Weather Service in Goodland is happy to announce our on-going free webinar series! The series, occurring this fall and winter, will cover a variety of topics from careers in meteorology to how weather is used in the aviation and agriculture industries. All of the webinars will be hosted via Facebook Live from the NWS Goodland Facebook account at 6:30 PM MT/7:30 PM CT.

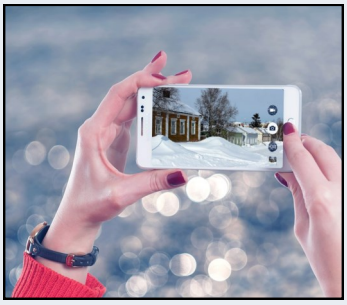
Fall Webinar Series:

- 10/05 - Careers in Meteorology with Special Guest Ross Janssen
- 10/19 - Travel and Winter Weather Safety
- 11/09 - Measuring/Reporting Winter Weather

Winter Webinar Series:

- 01/18 - Weather and the Agriculture Industry
- 01/25 - Photographing Weather
- 02/01 - Weather and Aviation

Miss a video? All videos will be posted on Twitter and YouTube.



Message from the MIC, cont.

The Service Life Extension Program will be complete in 2023.

During the downtime, adjacent radars will be available, including: Dodge City, KS, Blue Hill (Hastings), NE, Thedford (North Platte), NE, Denver (Boulder), CO, and Pueblo, CO.

As we continue to move forward and assist the people in the Tri-State Region, do not hesitate to call our office if you have a weather question. Our staff is working for you around the clock to provide you with the best weather information possible.

Ed Holicky, Meteorologist-In-Charge

Photo courtesy of Ed Holicky

Winter Weather Safety

As we move out of summer, we should begin thinking of potential winter weather impacts.

Getting ready for traveling in winter

Before winter weather begins it is 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 wind-shield 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

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 and ave a winter weather emergency kit

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

- Reduce Your Speed - High speeds make it both easy to lose control and difficult to stop. You can slide off of the road on certain types of treacherous icing - like black ice - at 10 mph or less!
- Wear your Seatbelt
- Pay Attention!- Put away the mobile device and focus on the road with both hands on the steering wheel.
- Know When to Quit- Sometimes road conditions are just too dangerous to drive in. If you can't see or you find yourself losing control, just pull over. It's not worth it to jeopardize yourself, your passengers or others on the road.

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

- Stay in the vehicle! If you leave your vehicle, you can get 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 gas 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.

Continued next page...

Winter, cont.

Main points to remember when traveling this winter:

- Wear your seat belt! An alarming number of road ice fatalities occur with minor accidents where the vehicle occupants were not wearing seat belts.
- Take it slow! 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 any additional information is needed on winter safety please visit https://www.weather.gov/safety/winter or contact the National Weather Service in Goodland, Kansas.

Kids Korner: Weather 101 Experiments

Are you looking for some fun and educational activities for you and your children? Well, a team of meteorologists at the National Weather Service in Goodland have you covered. Coming soon, we will release a four-part video series of weather-related experiments on our social media accounts.

Topics include:

Experiments with Density:

Discover how density works in our atmosphere with two short experiments. Learn why oil and water do not mix and see what happens when you combine hot and cold water.

Creating Frost:

Have you ever wondered how frost is formed? Check out this fun experiment where you create your own frost on a can.

Make Your Own Convection:

Want to learn how storms develop and make your own? Check out this cool experiment that uses scientific principles learned in the Experiments with Density video to make your own colorful convection.

Creating Fog in a Jar:

We have our fair share of dense fog in the Tri-State area, but have you ever wondered how it forms? Check out this experiment where you can make your own fog.

Meet A Met-Jesse Lundquist

Where are you from originally?

I grew up on a farm in North Central Kansas, near Clyde, Kansas.

Where did you go to college?

I started at Cloud County Community College in Concordia, Kansas and then earned a bachelor's degree at the University of Kansas.

How long have you worked at the NWS?

13 years.

What types of things do you like to do in your spare time?

My family lives on a small farm, so there isn't much "spare" time. In a given week, I may work on anything from fixing a fence, to performing minor repairs on a vehicle, or fixing something that broke in the house. If I have time to do something fun, I enjoy wrestling with the kids or watching a movie with the family.

What would your “perfect weather” day be like?

A typical spring or fall day. A crisp morning starting out in the 50s, warming to the 70s with a light breeze. Having an evening thunderstorm with prolonged rainfall and a few deep rumbles of thunder would be a great way to cap off the day.

What is the scariest weather situation you’ve ever been through?

While driving to work to help with severe weather I was overtaken by a thunderstorm. The storm was so tall that the clouds were black. The heavy rain came with gusts of 60-70 MPH, which turned to golfball size hail. For the few minutes in my truck this was quite scary as the hail battered the outside. I really questioned my decision not to leave the house sooner. Fortunately no windows were broken. I only found one dent on the hood from that storm.

Do you have any heroes or people that inspire you?

MacGyver. His ingenuity to solve any problem no matter the circumstance is inspiring and challenging. I use that philosophy to deal with problems that arise.

Continued next page...

Meet A Met-Jesse Lundquist

Favorite band or singer?

Mercy Me and Casting Crowns

Favorite book or author?

Louis L'Amour.

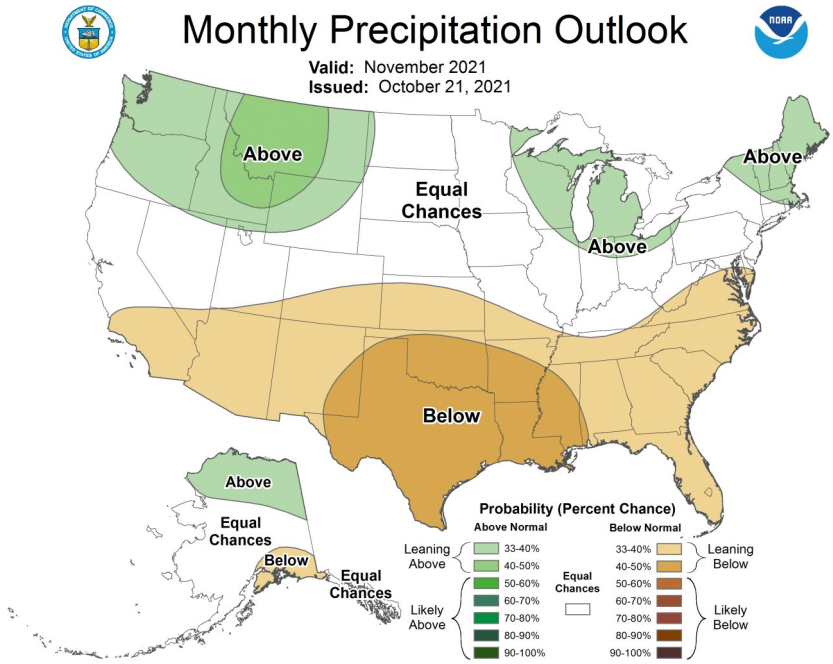
If you could visit anywhere in the world, where would it be?

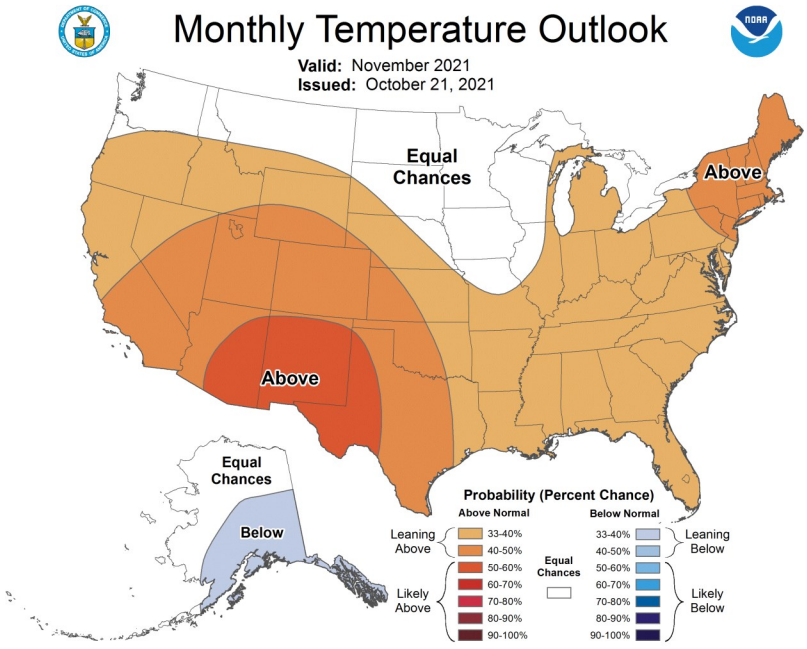
Alaska. I find the mountains to be amazing and would enjoy being able to see another part of the country with a similar wilderness feel to Wyoming, where I lived for a year and a half.

How did you become interested in meteorology?

I became interested in meteorology after living through and seeing the aftermath of a derecho move through Northern Kansas in the early '90s. We had no power for 10 days after that storm. Seeing the devastation wind could do was awe inspiring. My interest increased further after seeing a short film about storm chasers at the I-Max theater in Hays, Kansas not long after this storm. However, I made the commitment to become a meteorologist after I saw Twister. Ever since then I knew I wanted to be involved in the weather industry. In high school, my dream job changed from being a storm chaser to working for the National Weather Service, when I realized that making a living as a storm chaser was much more difficult than being a forecaster.

Climate Corner

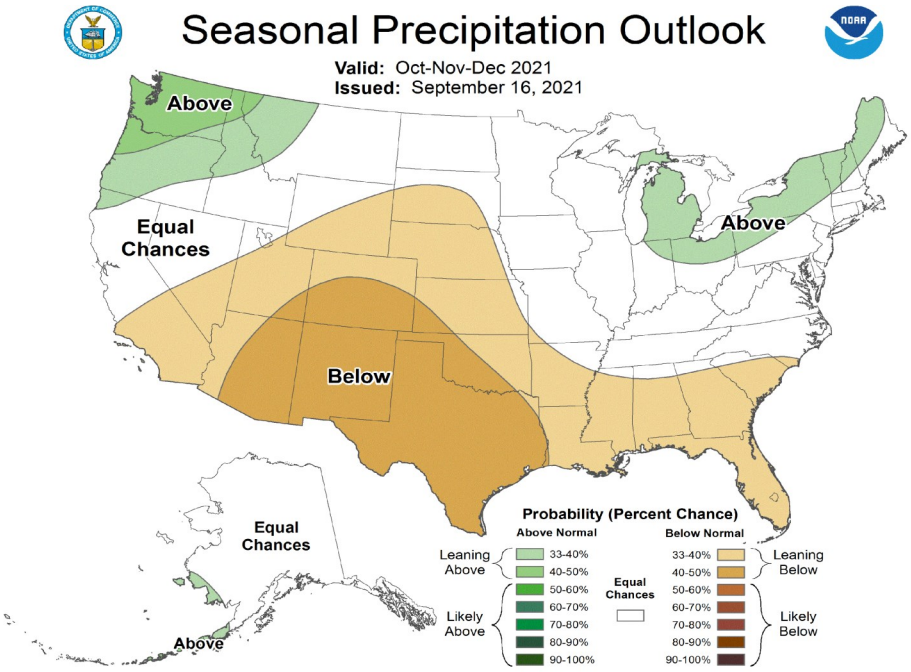


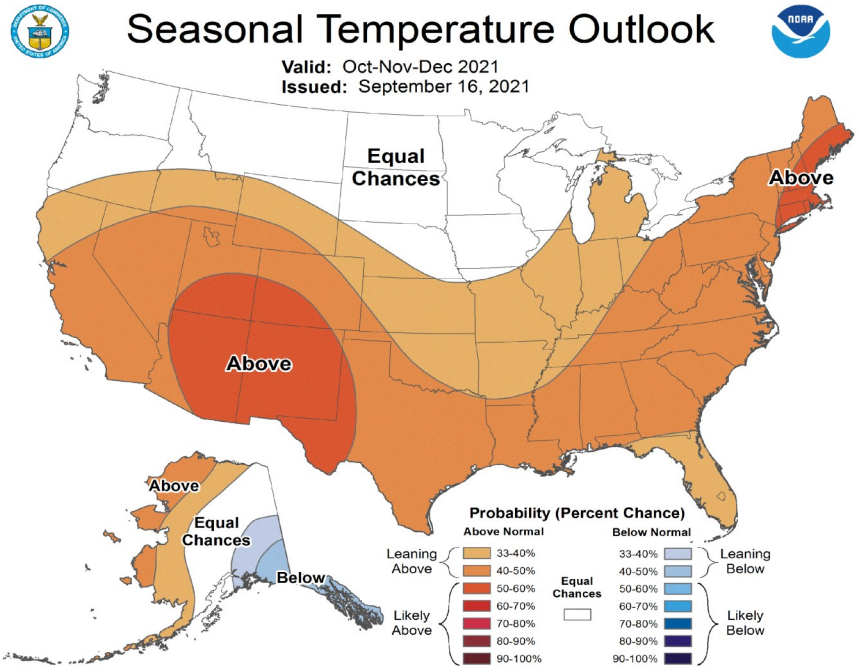


<u>One Month Summary</u>

The one month outlook shows the chance for above normal temperatures and equal to below normal precipitation.

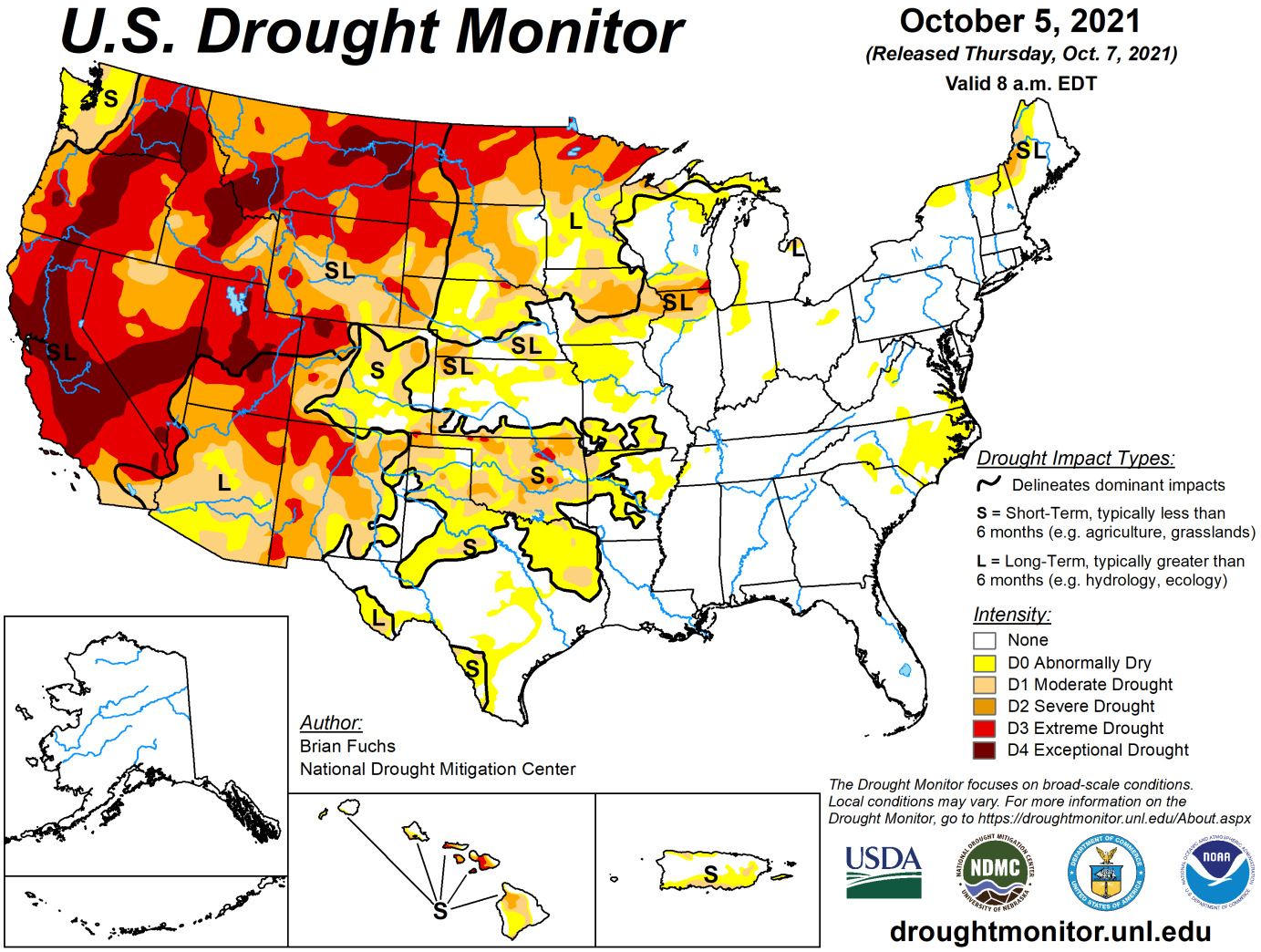
Climate Corner





Three Month Summary

The three-month outlook shows the possibility of above normal temperatures and below normal precipitation.



City**	Year to Date precip (in.)	Normal Year to Date (in.)	Departure From Normal (in.)
Goodland	12.89	16.67	-3.78
Burlington	14.60	15.30	-0.70
McCook	16.24	18.58	-2.34
Hill City	16.87	17.57	-0.70

**Data as of October 1, 2021

WRN Ambassador News

Message from the WCM

I have some good news, and unfortunately some bad news. Let's start with the bad news…winter is coming. While we (usually) no longer need to worry about tornadoes, hail, and flash flooding, winter brings a variety of new threats to the High Plains. These threats include winter storms, blizzards, ice storms, freezing drizzle, high winds, and dust storms. We cannot rule out an occasional wildfire as well, especially with the drought conditions intensifying across the High Plains.

The good news is that through preparation and awareness, we can overcome these threats! Over the coming months, NWS Goodland will be providing a variety of weather safety campaigns to help you prepare for winter weather. These will include local Winter Weather Preparedness Week, the national Fall and Winter Safety Campaigns, and then preparation/safety graphics as we approach hazardous weather events. This information will be provided via the NWS Goodland website, through social media, and through emails directly to our local community leaders/decision makers.

In addition, we ask for your help in sharing these weather safety messages as this helps the word spread further and louder in our communities! This is what it will take to build a Weather-Ready Nation, one that is prepared and resilient in the face of disaster. By helping to distribute our graphics and social media posts, we will reach more people than NWS Goodland could ever reach by ourselves. So, we need YOU, our local avid weather followers and core partners, to spread the word! Furthermore, we commit to sharing information that you provide, including reports of inclement weather, or other safety reminders that we might miss. For example, one thing NWS Goodland has made sure to stress lately is the danger to travelers posed by deciding to drive around barriers in winter weather. Not only does this put themselves in danger, but also our local first responders…and we commit to sharing messages just like this to further ensure safety in our communities.

We thank you for your help and support! We cannot express our appreciation enough for your service and all that you do, and we look forward to many more years of partnership in hopes of ensuring the safety, preparedness, and resilience for future disasters across the High Plains!

Ryan Husted, Warning Coordination Meteorologist

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 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

2021 Ambassador of Excellence

By Ryan Husted

This year's 2021 Ambassador of Excellence for the NWS Goodland, KS Forecast Area is Roger Brown, Emergency Management Director for the Office of Emergency Management of Yuma County, Colorado. Roger always goes above and beyond to share important weather safety information, especially leading up to dangerous weather events. At all times, Roger can be counted on to be a significant driver of weather safety in his community.

This year, Roger took a big leap forward to cater weather information to ALL members of his community by fixing an information gap with the growing Hispanic population. According to Roger, over 30% of the population in Yuma County is now Hispanic; however, there was little to no translated weather safety information readily available and shareable. To address this potentially deadly problem, Roger worked in partnership with NWS Goodland meteorologists, Trisha Coberly (Yuma County Webmaster), and Sadie Martinez (State of Colorado Department of Homeland Security and Emergency Management, Access and Functional Needs Coordinator) to translate the Yuma County OEM website (http://oem.yumacountysheriff.net/) into Spanish (http://oem.yumacountysheriff.net/es/). In addition, translated safety materials posted to the website were sourced from other agencies (FEMA, Colorado DHSEM, NWS), or developed and translated by this collaborative effort. Finally, NWS Goodland social media pages were also linked to the Yuma OEM website, an important step since NWS Goodland warning graphics are automatically translated into Spanish, providing instantaneous, life-saving weather updates. Together, these efforts catered toward the Hispanic community will greatly improve safety for all residents, especially for those that speak Spanish.

Thank you, Roger, for selflessly serving others, taking ownership of a potentially life-threatening problem, and leading the charge in fixing an issue that was hurting the preparation and resilience of Yuma County. These efforts will be a model for catering to underserved communities across the High Plains, and for how to effectively share messages to create a Weather-Ready Nation!

Wireless Emergency Alerts for Severe Thunderstorm Warnings

By Jesse Lundquist

Not every severe thunderstorm has the same intensity as another, yet all severe thunderstorm warnings alert the same way. To differentiate the higher end severe thunderstorms from lower end ones, the National Weather Service recently completed an update to severe thunderstorm warnings to improve how we communicate the intensity of thunderstorms in the warning. The table below summarizes the upcoming changes. A warning only needs to have the hail or wind meet the considerable or destructive wording for the warning to fall in the considerable or destructive category (the warning will default to the higher intensity category).

Continued next page...

WRN Ambassador News

Wireless Alerts, cont.

Tags	Base	Considerable	Destructive
Hail Size	Quarter (1”) Half dollar (1.25”) Ping pong (1.5”)	Golf ball (1.75”) Two inch Tennis ball (2.5”)	Baseball (2.75”) Three inch Softball (4”) Grapefruit (4.25”)
Wind Speed	60 MPH	70 MPH	80 MPH 90 MPH 100 MPH
Safety Statements	Standard	elevated	

WEA Message

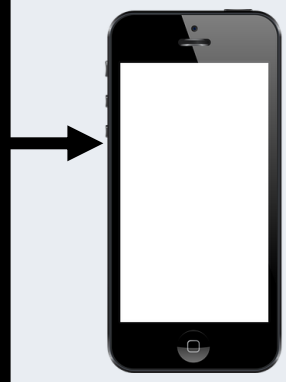
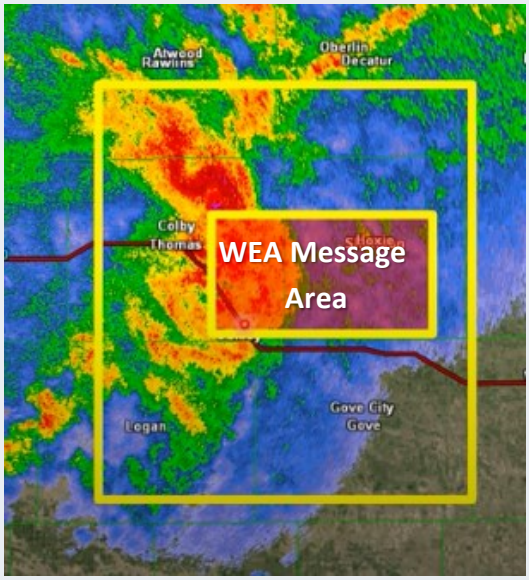


Table of criteria for severe thunderstorm warning damage threat tags. The tag category may be determined with either the wind, hail, or both meeting the criteria.

To help minimize the area that would receive a Wireless Emergency Alert (WEA) on a cell phone, you may see a smaller severe thunderstorm warning within a larger one. Only those within the severe thunderstorm warning that meets the WEA criteria will receive the WEA message on their cell phone. An example of this is below.



Example of a smaller severe thunderstorm warning with a destructive tag within a larger severe thunderstorm warning.

The warning itself will also show what category the warning is. This can be found at the bottom of the warning. A label will also show whether the wind or hail was observed or radar estimated at the bottom of the warning, along with the strongest wind gust and largest hail size.

THUNDERSTORM DAMAGE THREAT...(Considerable or Destructive)
(no damage threat if threat is in the “Base” category)

HAIL THREAT...(Observed or Radar Indicated)
MAX HAIL SIZE...
WIND THREAT...(Observed or Radar Indicated)
MAX WIND GUST...

For more information on WEA, visit https://www.weather.gov/wrn/wea.

WRN Ambassador News

Promoting Fall Safety

By Jessica Husted

September means the fall season has begun! This time of year brings all types of weather to the region, including high winds, drought, blowing dust, wildfires, and even the start of winter. Each of these types comes with its own set of hazards that can impact our communities and livelihoods. Just like severe weather season, it is important to be proactive and prepare for hazardous fall weather ahead of time instead of waiting to take action when it is already occurring. You can support our mission of protecting lives and property by helping us share weather safety information! Whether it is on social media, through print, or by word of mouth, you have the ability to pass along life-saving tips and guidance that can make a difference in our region. Not sure where to start? Visit our Fall Safety website at www.weather.gov/wrn/fall-safety for infographics, videos, presentations, and more! Also, stay tuned for our Tri-State Winter Weather Preparedness Week from October 17th through 23rd. Lastly, don't forget to follow us on Facebook and Twitter to get the latest weather graphics.

The National Weather Service Fall Safety website provides safety and preparedness information for hazards common during the fall months.

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/

Contact Us

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785-899-3501

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w-gld.webmaster@noaa.gov

Website:

http://www.weather.gov/gld

Facebook:

http://www.facebook.com/nwsgoodland

Twitter:

https://twitter.com/NWSGoodland