National Weather Service Winter 2023

The High Plains Drifter

NATIONAL WEATHER SERVICE
NORTH PLATTE, NE

http://www.weather.gov/northplatte

What's Inside

2023 North Platte Severe Weather Spotter Training

By Shawn Jacobs
Warning Coordination Meteorologist

The National Weather Service Forecast Office in North Platte, in coordination with county emergency managers, offers storm spotter classes at several locations to prepare for severe weather season. If you would like to assist your local community by becoming a volunteer storm spotter and reporting severe weather to the National Weather Service, or if you simply want to learn more about severe weather, consider attending one of our classes. Basic and advanced classes are normally held in the evening and can last up to two hours.

Attendees are taught the basics of thunderstorm development, storm structure, the features to look for, and where to find them. What, when and how to report information as well as basic severe weather safety are also covered.

If you have any questions about a scheduled class date or location, please contact the National Weather Service or visit with your local county emergency manager. The training is free, though you will have to pre-register for virtual spotter training. If you have additional questions, email nws.northplatte@noaa.gov . A schedule is provided in the link below.

https://www.weather.gov/lbf/2023StormSpotterSchedule

WHAT'S IN A NUMBER??

BY JOHN STOPPKOTTE– SCIENCE AND OPERATIONS OFFICER

During the winter months, as we try to move along in our daily lives in coats, boots, gloves, etc., most of us in the Plains always have one eye on the weather forecast, since the impacts related to winter weather can be significant. As forecasters in the NWS, trying to inform the public and key community leaders of the potential of these impacts is paramount to what we do, despite the immense challenge.

As you may know, forecasters rely on weather models (one computer weather model is really a series of thousands of mathematical equations) that approximate the atmosphere. The models are initialized with the current state of the atmosphere, with satellite, radar, surface observations, weather balloon observations, and many other observations (including past model forecasts) that give the model a place to start. In the end, one model provides hundreds of fields a forecaster can look at, for a weather system that possibly hasn't even developed yet!

Now – what if I told you there are over a hundred of these weather models? That's right, many models are part of an ensemble system, where slight, but intended, variations of the model equations can yield a different outcome (think different snow amounts, or location of heaviest precipitation, for example). Why is this needed? Well, remember that these models only approximate the atmosphere, since no person, computer, etc. can explicitly predict the future. Therefore, having a range of possible outcomes of a particular weather event that will come in the future is the best way to know what the potential could be.

What does this look like to a forecaster? Can one person even look at and process all that data? In short, the answer is no –well not in an easy way that is. So, in order to look at all this data, we have other programs that run statistic analyses of all of these models, to try and make sense of where the models differ, where they are the same, and what that means for the overall sense of the forecast.

WHAT'S IN A NUMBER??
(CONTINUED)

In (**Fig.1**), we see that there is a "range of possible solutions" from some of these models, ranging from 4" total to over a foot, and everything in between. But what if we run a statistical analysis to get a sense of what the most probable range is? To do this, the data can be broken into even "boxes" called quartiles (**Fig. 2**). In statistics, the 50th percentile represents the median – half of the data lies above this line, half below. The 25th percentile represents a in which ¾ (75%) of the data points would lie above. So in this example (**Fig. 2**), there is a 75% chance that snowfall will be above 1". The 75th percentile (4" in this case) represents a value in which ¾ of the data points lie below. Again, for this case, a 75% chance that the snowfall amount would be this value or less. If we take the interquartile range (25th -75th percentile range), statistically this is considered to be the most likely range a particular forecast data point would be in. Again, in (**Fig. 2**) that most likely range is between about 1" to 4" for this hypothetical case.

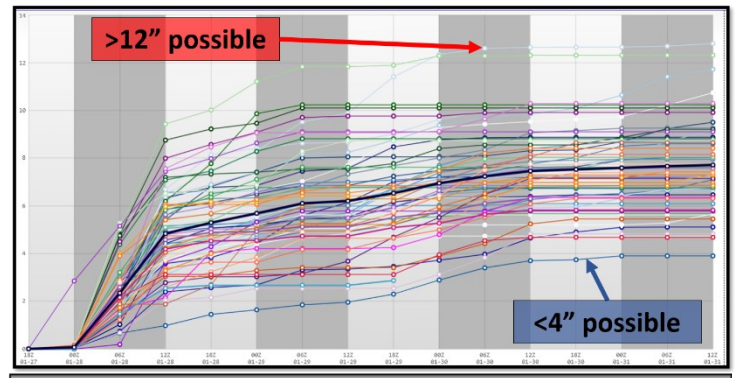


Figure 1. An example of how much snow each model is generating for Valentine, NE, for a particular snow event that occurred. There are about 60 models represented here; about half of what NWS forecasts might look at every day.

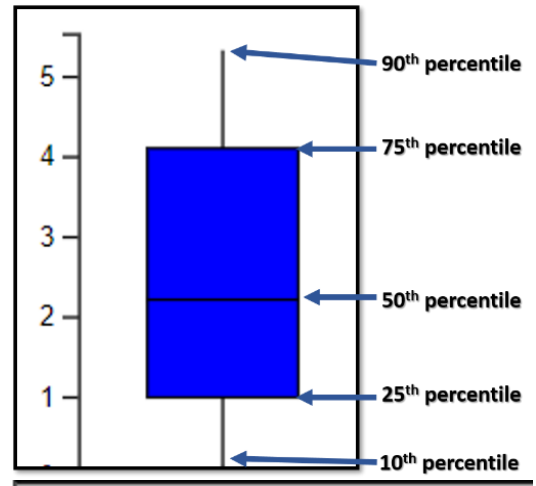
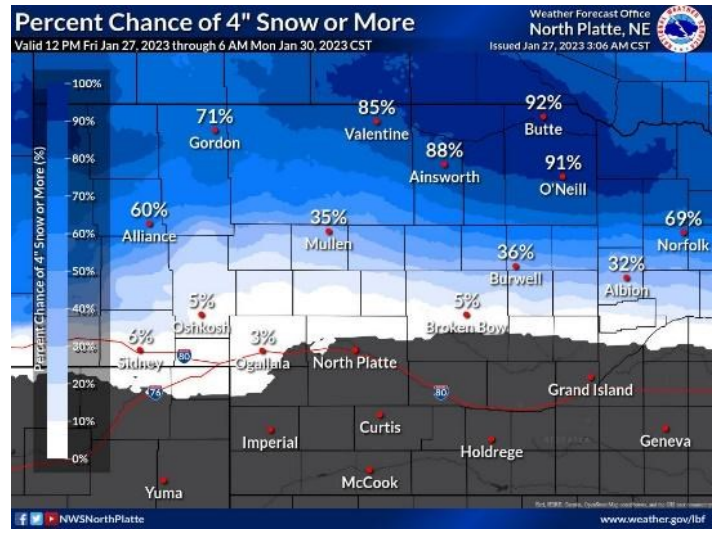


Figure 2. Example of quartiles.

This interquartile range may be a suitable forecast for some winter events, but in some cases the range of possible outcomes can be, well, all over the place! In that case, the interquartile range may be large (say 3" to 10"), and this is more typical for further out in the forecast period. In a general sense, a larger interquartile range represents a greater uncertainty in the forecast. Similarly, a smaller interquartile range suggests better certainty, although there can still be winter events that produce snowfall outside of that range.

WHAT'S IN A NUMBER??
(CONTINUED)

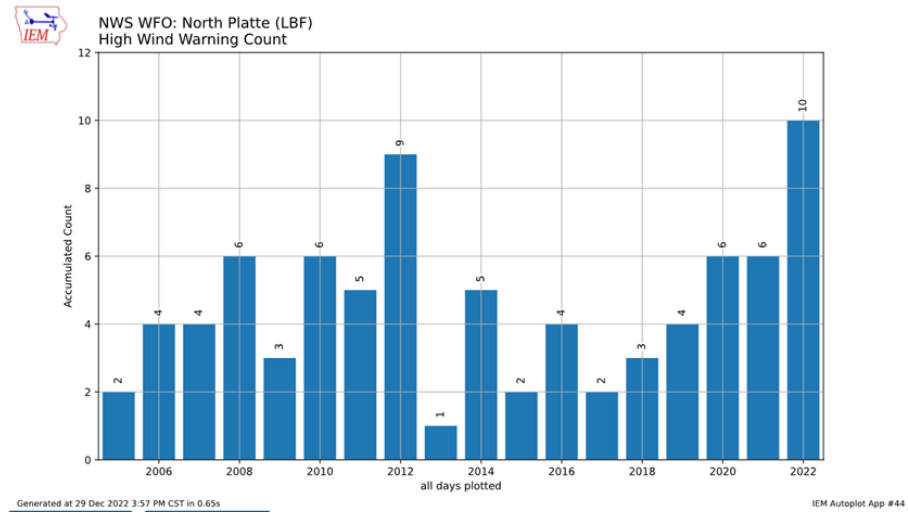
In the NWS we communicate the forecast in a variety of ways to meet the needs of all of our partners. Some, such as department of transportation or airport crews, need to know the likelihood of certain amounts being reached or surpassed, so that they may plan their staffing levels accordingly. Technically this called the probability of exceedance, or in other words, what is the probability we will see over 4" of snow, as an example. This percentage will come out of all of those models we talked about earlier, into a single number such as "there is a 65% chance we will reach or exceed 4" of snow". If this is something you would like to know, you're in luck! You can simply go to our winter weather Probabilistic Snowfall Forecast page at www.weather.gov/lbf/winter to look at not only the basic snowfall forecast, but to see what the ***high end*** *outcome could be (90th percentile, or a 1 in 10 chance that the snowfall amount would be more than this), the* ***low end*** *potential (10th percentile, or a 1 in 10 chance that the snowfall amount would be less than this), as well as the* ***likelihood*** *of various amounts.*



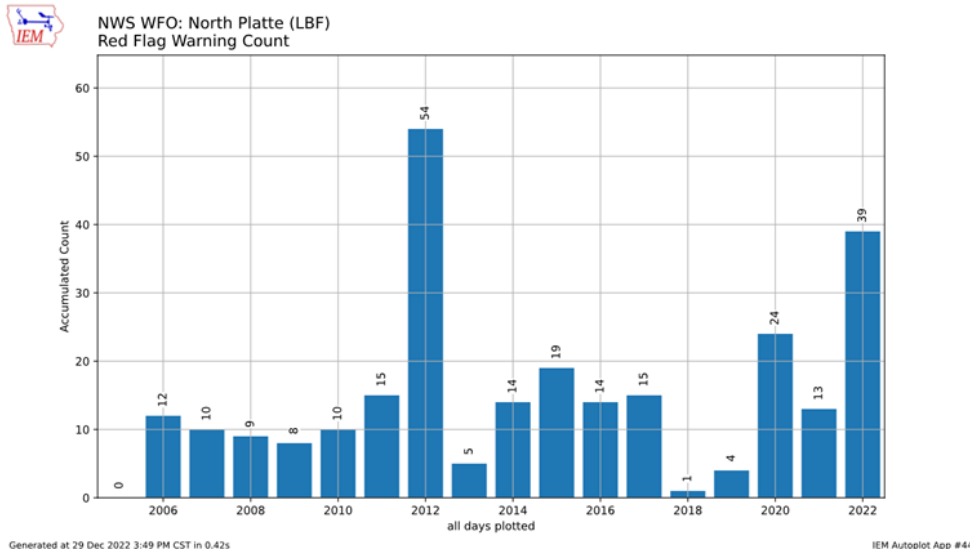
So the next time you see or hear about a winter storm moving into your area, think about all the data NWS forecasters will look at to make a specific forecast of snow amount for your area. Then go online to the web page above to see what your chance of snow amounts are! The vast amounts of data will continue to grow in the future, as will the needs of our customers. It is possible that one day you will be able to see the same type of presentation for temperatures, wind, or almost anything weather-related you need information for. Would you like to know what the chance is for the low temperature in your area to fall below 32 degrees? I think many of us would say "Yes!".

Just How Windy and Dry was it this Year?
By Jaclyn Gomez—Meteorologist

You may have thought we had a lot of windy days this past year, and you wouldn't be wrong. Looking back at our recorded High Wind Warnings for the past 15 years, 2022 had the highest amount of High Wind Warnings, with 10 being issued. The second highest amount of High Wind Warnings came in 2012, with 9 being issued. High Wind Warnings are issued when winds are 40 mph or greater for 1 hour or more or wind gust of 58 mph or greater.



The dry and windy conditions created favorable conditions for Red Flag Warnings as well. In 2022 we had a total of 39 Red Flag Warnings issued, which out of the last 15 years, ranks second in the most Red Flag warnings issued in a year. 2012 had the most Red Flags issued in a year with 54 .



2022 Top 5 Weather Events For Western and North Central Nebraska
By Chris Buttler—Lead Meteorologist

Over the past 12 months, weather conditions across western and north central Nebraska were diverse. Thanks to a hot and dry summer and fall, drought conditions expanded across all of western and north central Nebraska in 2022. Severe thunderstorm events were well below average this past warm season and only 3 tornadoes were reported over western and north central Nebraska in 2022. The dry conditions also led to numerous small, as well as large range fires across the area. The year ended with cold and snowy conditions in December as a major blizzard impacted the Sandhills and northern Nebraska. This was followed a week later as bitterly cold temperatures spread across the region. Below are the 5 most notable weather events from the area for the past year.

1: Drought conditions intensify across western and north central Nebraska this year

Dry conditions developed early in 2022 and persisted through the end of the year. The year began with a large portion of western and north central Nebraska in abnormally dry or moderate drought conditions. Portions of northern Holt and eastern Boyd county began the year with severe drought conditions. Aided by a very dry and hot summer, drought conditions quickly deteriorated. By the end of July, most of western and north central Nebraska was seeing severe to extreme drought conditions. The most severe drought conditions were confined to southwestern Nebraska and Holt and Boyd counties. Dry and very warm temperatures continued into September, October and November. By early December, almost all of western and north central Nebraska was impacted by extreme to exceptional drought conditions. Moderate to severe drought was occurring over the northwestern Sandhills and Sheridan county. Through the beginning of December, Cooperative Weather Stations across western and north central Nebraska had precipitation deficits ranging from 5.70 inches at Ericson, to as much as 13.30 inches at Ogallala. As of December 1st, Ogallala had only reported 5.84 inches of precipitation for 2022! As of December 1st, Imperial, Wallace, and Kingsley Dam had reported 9.17, 8.43, and 7.93 inches of precipitation respectively. Some slight improvements in drought conditions had occurred by the end of December over northwestern Nebraska, thanks to the heavy snowfall from December 11th through the 16th.

For the remainder of western and north central Nebraska, precipitation was much lighter with this system and no improvements were noted in drought conditions by the end of December.

2: Excessive heat across western and north central Nebraska during the summer of 2022

Very dry conditions across the area and persistent ridging aloft, led to hot temperatures across western and north central Nebraska over the summer into the early fall months. At North Platte, daily high temperatures hit 100 degrees or higher on 24 days this past year. This mark was tied with the 24 days which occurred in 2012 which was second all time. The record is 29-100+ degree days set in 1936. Imperial had 25-100+ degree days which was second all-time to the 34 days which occurred in 2012. Valentine saw 17-100+ degree days this summer which was second all-time to the 28 days which occurred in 2012 and 1936.

Mean daily temperatures were above normal this summer, but not near record territory. The reason, daily minimum temperatures were lower than expected thanks to the very dry conditions this summer.

3: Bovee fire of October 2-11

A fire initiated along a trail during the mid-afternoon hours of October 2nd in north central portions of the Nebraska National Forest near Halsey. Aided by very strong southerly winds and dry conditions, fire quickly spread to the north and north-northwest, consuming the Nebraska 4H Camp. At the camp, 18 buildings were destroyed including the main lodge. The fire then jumped the Middle Loup River and Nebraska highway 2, racing across several miles of open rangeland. One firefighter perished from a medical emergency while battling the fire. Approximately 200-250 different personnel battled this fire from the 2nd through the 11th. When the fire was fully extinguished, 19000 total acres had burned.

4: December 11-16 blizzard

A powerful storm system crossed the Rocky Mountains early during the week of December 11th, then slowly moved northeast over the Central and Northern Plains through the 16th. As the system approached, an initial surge of warm air led to rain and even thunderstorms across the area. Precipitation then changed over to heavy snow in the panhandle. Northwest winds increased throughout the event, creating several days of blizzard conditions across a large portion of western and north central Nebraska. What set this storm apart from previous blizzards was the prolonged period of strong winds after the bulk of the snowfall ended. Impacts included, snow accumulations of 18 to 24 inches over north central Nebraska, snow drifts several feet high, and numerous road closures over the panhandle and western Sandhills which lasted several days.

5: May 12 severe thunderstorms, high winds and blowing dust

An approaching cold front led to the development of a line of strong to severe thunderstorms during the afternoon hours of May 12th. The line of storms developed roughly along highway 83 from south of North Platte to the Kansas border. This line quickly raced east and northeast into the late afternoon hours, leading to numerous reports of damaging winds and hail. Storms with wind gusts estimated at 70 MPH damaged or destroyed numerous outbuildings on the west side of Burwell as well as the grandstand at the rodeo grounds in Burwell. Thunderstorm winds near 90 MPH overturned a semi east of O`Neill, injuring the driver. A strong cold front passed through the area immediately behind the exiting line of storms. As the front passed, it produced wind gusts up to 75 MPH. The winds lofted topsoil, producing areas of blowing dust, significantly reducing visibilities across the area. This led to a multi-car pileup on highway 30 between Sutherland and Hershey.

How to Measure Snowfall
By Jaclyn Gomez-Meteorologist

With all the recent snowfall events we have had so far this winter, you may be wondering how do we properly measure snowfall? We recommend that you have a snowboard in your yard for the most accurate measurements. This can simply be a 16”x16” piece of plywood. It is preferred it is painted white, but any light color is fine. You might be wondering why we would want it painted white, well it has to do with how sun absorption. If the piece of wood was painted a dark color, this would absorb the sun’s rays and cause the piece of wood to be warmer and may melt more of the snow as it initially lands, thus giving you an inaccurate lesser amount. A white or light colored wood would not absorb as much of the sun’s rays and would give an accurate snowfall amount. Pictured on the right is an example of a snowboard. Snowboards should be placed out before the first flakes fall. It is not necessary to have a snowboard to measure snow, but this will give the most accurate snowfall amounts.

Where should I take my snowfall measurements? When measuring snowfall make sure to measure in area that is an open space, free from buildings and not under trees. Make sure not to measure any snow drifts as these are not included in snowfall measurements. If snow has been windblown, take three measurements from different locations and average them together to get an accurate measurement. When measuring be aware that grass can leave air space below the bottom layer of snow, and measuring all the way to the ground can inaccurately inflate the snow depth.

Snowfall measurements will be observed in inches and tenths. An example would be 3.9 not 3.92. So when you call the National Weather Service or post your snowfall amount on Facebook or Twitter you will want to make sure to give us your amount to the nearest tenth, along with your location.

National Weather Service Office North Platte, NE

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Comments and suggestions are
always welcome. Your feedback is very important to us!

http://www.weather.gov/northplatte