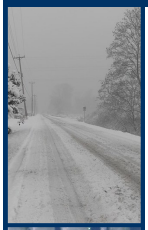
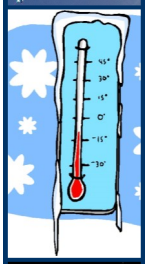
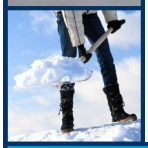
Nebraska/Iowa Winter Weather Awareness Day

November 10, 2016







Welcome to Winter 2016-17! Well, not exactly. It isn't officially winter until 4:44 AM CST (3:44 AM MST) on December 21st. However, we know winter weather could start at any time, and already has to some degree in western and north central Nebraska. It's time to prepare and become "Weather-Ready" for the wintry hazards which lie ahead. All of us at the NWS hope you find this information packet helpful in the coming weeks and months. Remember, now is the time to prepare. Don't wait until the last minute. Here are a few highlights of this year's Winter Weather Awareness campaign.

The Upcoming Winter: The $64,000 question just about every NWS meteorologist hears this time of year is "What will the winter be like?". The answer is "to be determined", but the NWS does provide an outlook for the winter ahead and some reasoning to support the outlook. It's not an exact forecast by any means, but does give some insight into what conditions (colder, drier, etc.) may be most likely to occur in our region. Take a look at the winter outlook on pages 9-10.

What are the Chances? Every forecast for rain or snow has a precipitation "probability". The chance of precipitation ranges from 0% to 100%. This winter, the NWS will be issuing a "probabilistic snow amount" forecast for the counties served by the Omaha/Valley NWS office in eastern Nebraska. It may change how you look at snow amounts. Learn more about this product and how it may help decision makers plan on page 6.

A Picture is Worth a Thousand Words: To that end, NWS Hastings has been taking part in an experimental Instagram project. Instagram is a photo sharing social media platform which has been around for years, but only recently has the NWS investigated its use by local NWS offices. Learn more about the Instagram experiment on page 4.

Becoming "Weather-Ready": If you are not "Weather-Ready" you should be, and sooner rather than later. As core partners of the NWS, you should set the example and make sure your business or organization is prepared for the upcoming winter and capable of being resilient in your operations in the face of whatever Mother Nature throws your way.

Learn more about becoming "Weather-Ready" at:
www.nws.noaa.gov/com/weatherreadynation

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La Niña and the 2016-17 Winter Outlook

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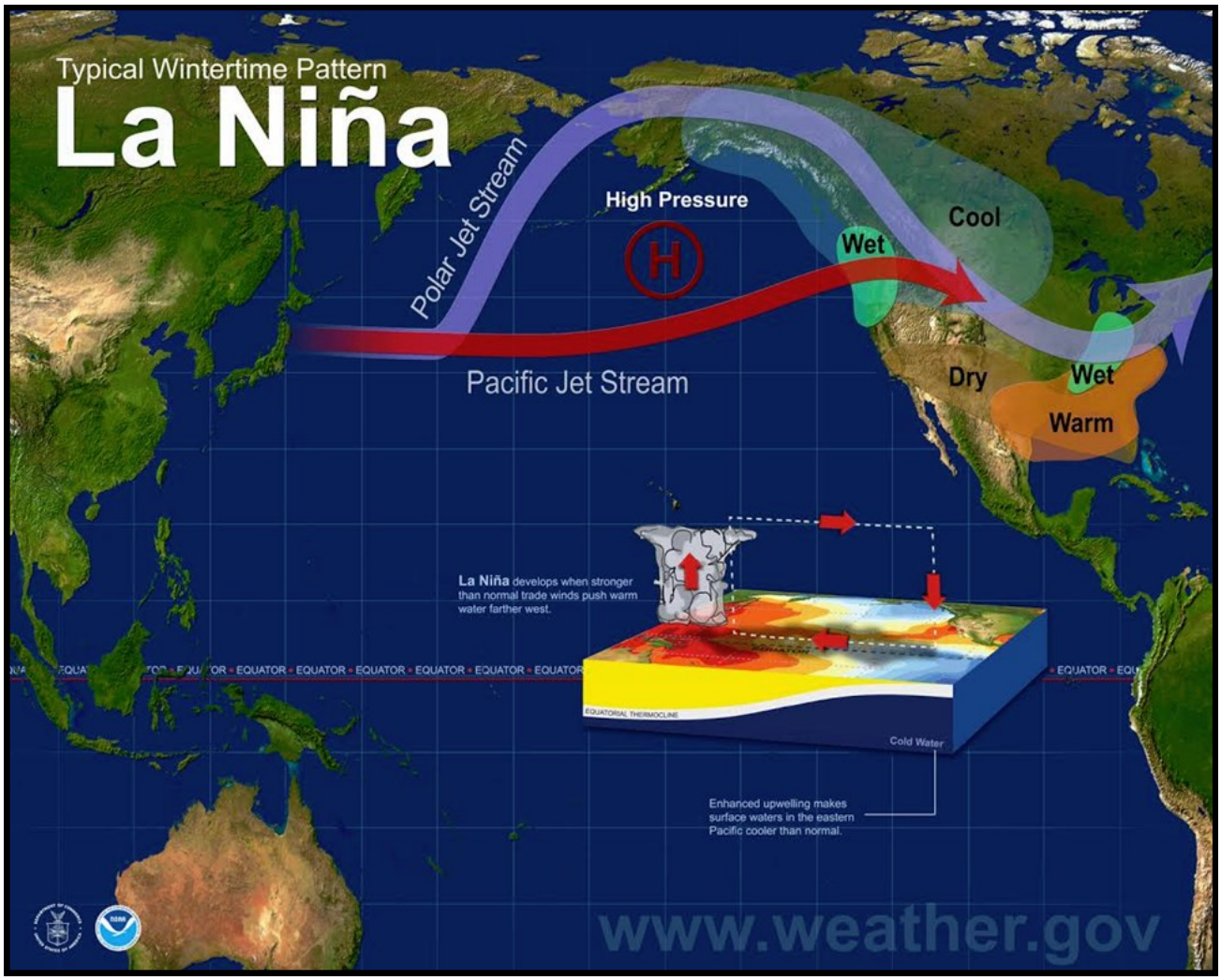
Last year's strong El Niño has been replaced by an emerging weak La Niña. What does that mean for Nebraska?

La Niña is a name given to the cold side of a combined ocean and atmosphere phenomenon that typically shows up in the fall to winter. During La Niña, the temperatures in the eastern or central Pacific Ocean near the equator become cooler than normal. The cold pool affects the position of the jet stream, driving the Pacific jet into the northwestern U.S. The polar jet stream tends to divert into Canada around the Aleutian High Pressure south of Alaska, then drops south into the central and eastern U.S., bringing cold air with it.

Here in Nebraska, we tend to be in between the areas of strongest influence from La Niña, especially a weak one. Our wintertime patterns are more likely to be driven by signals that are not foreseeable a month or two ahead of time.



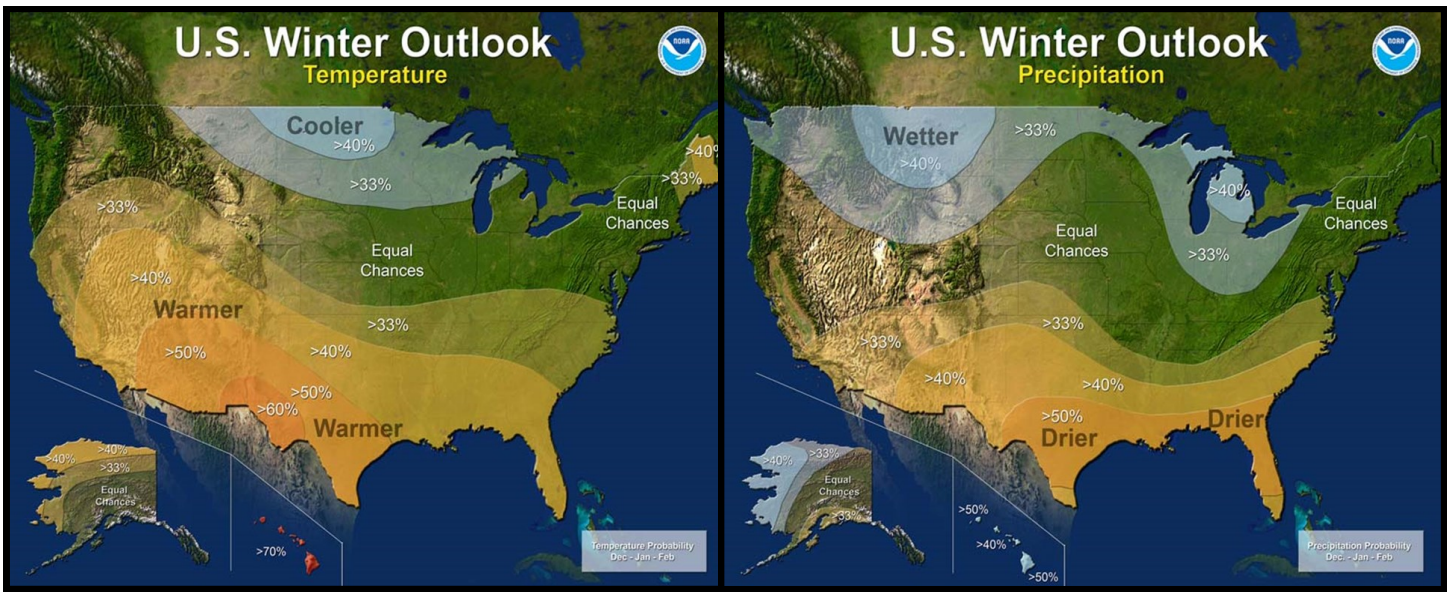
La Niña and the 2016-17 Winter Outlook

Winter Weather Awareness Day - November 10, 2016

This winter, the NWS Climate Prediction Center's outlook for both temperatures and precipitation lean toward the La Niña tendencies, but with low confidence because it is a weak episode. In Nebraska, the result is that the odds don't tilt to favor higher chances for either cooler or warmer conditions, or either wetter or drier conditions. The "equal chances" label means that it is just as likely that our winter could see temperatures that are above, near, or below normal, and precipitation that is above, near, or below normal. We will keep an eye through the winter months for patterns that could emerge that show their hands much later.

You might have noticed that we haven't talked much about the outlook for snow this winter. The Climate Prediction Center does not create outlooks for snowfall, and for good reason. Wintertime precipitation type is determined by a delicate balance of temperatures and humidity from the ground up several thousand feet, and just a couple of degrees can mean the difference between a foot of snow and a slushy mix of rain and snow. The delicate balance of this prediction is just not one that is very skillful on seasonal time scales. In a climate like Nebraska's, where winter precipitation can fall as a mix just as much as snowfall, it is not safe to say that a higher than usual chance for wet conditions translates to a higher than usual chance for a snowier winter. In short, we just can't say one way or the other.

La Niña is an important factor in winter conditions and has a signal that is fairly predictable, at least in some parts of the country. It is not the only influence on winter conditions, though, and many of those other influences are ones that can only be seen a week or two in advance. Some of these influences are quite strong, and we will continue to track them through the winter months as the Climate Prediction Center fine-tunes the winter outlooks.



2015-16 Nebraska/Iowa Winter Weather Summary

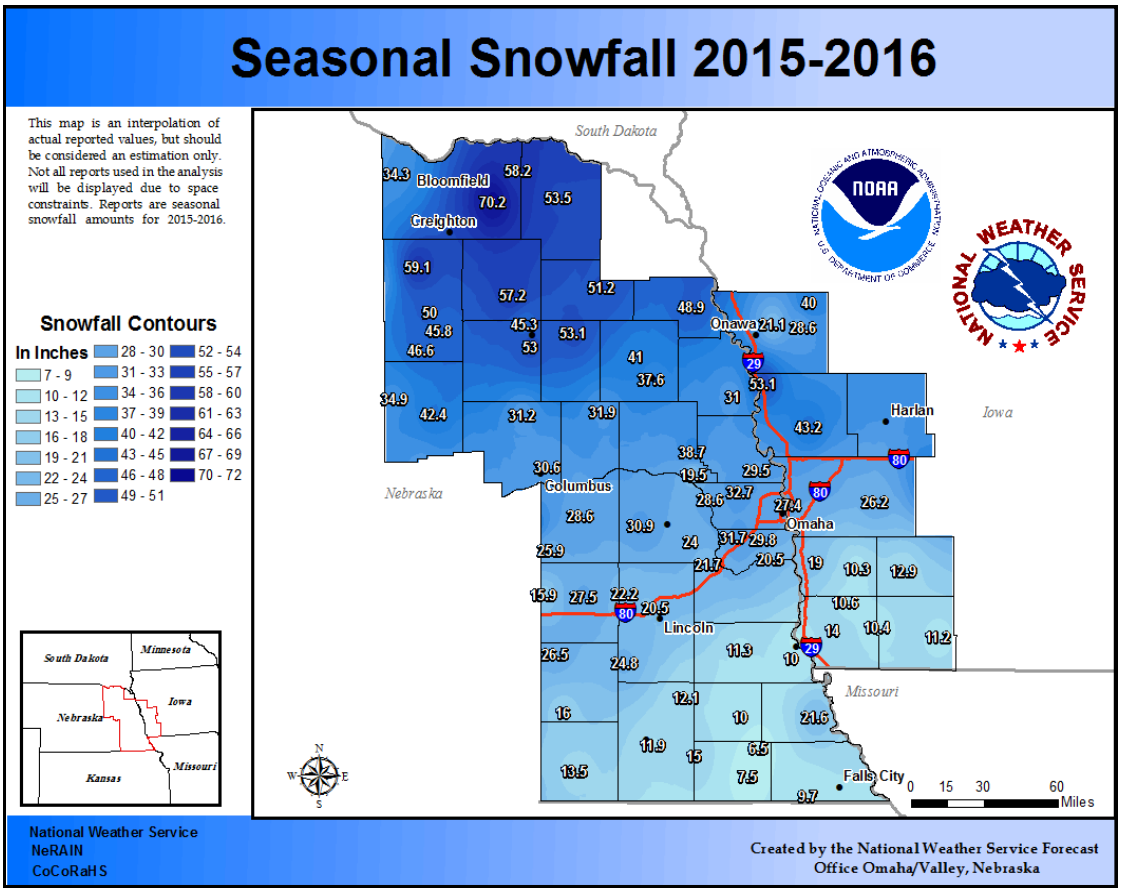
Winter Weather Awareness Day - November 10, 2016

Eastern Nebraska/Western Iowa - NWS Omaha/Valley, NE

	Omaha	Lincoln	Norfolk
Average Temperature (DJF)	30.8°F	31.5 °F	28.7 °F
Ranking (warmest)	*13th*	*8th*	*9th*
Total Precipitation (DJF)	6.98"	6.01"	4.42"
Ranking (wettest)	*2nd*	*1st*	*4th*
Total snowfall (Full 2015-16)	27.4"	20.5"	53"
Ranking (snowiest)	*64th/130*	*79th/117*	*8th/124*

Eastern Nebraska and western Iowa experienced a slightly warmer-than-normal winter, but with above-normal precipitation and near-normal snowfall as a number of winter storms, some significant, impacted the area. Specifically for December through February, Lincoln had its wettest on record, Omaha was 2nd wettest, and Norfolk was 4th wettest on record. Norfolk experienced much above normal precipitation and it was the 8th snowiest on record. The winter ranked as the second mildest in Omaha since 1950-51 on the Accumulated Winter Season Severity Index (AWSSI), an index that accounts for temperature as well as snowfall and snow depth. In fact, most of the central and eastern U.S. experienced a near-record mild winter.

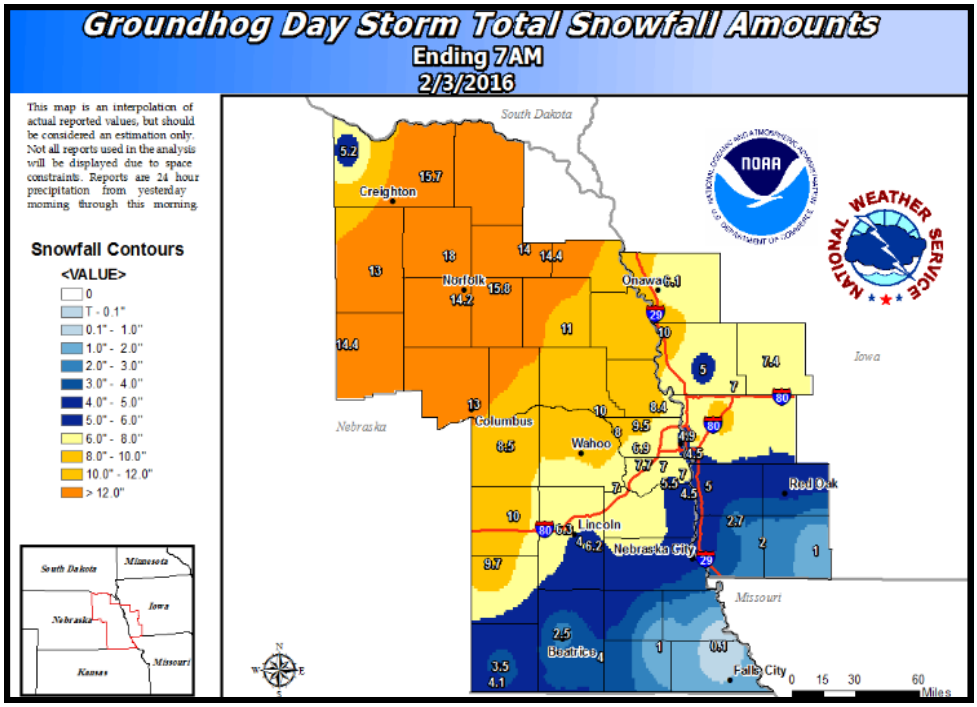
The winter precipitation started in late November as three winter storms impacted parts of northeast Nebraska and west central Iowa. These occurred on the 20th, 26th, and the 30th of November. The winter storm on the **26th of November** created significant travel problems for the Thanksgiving weekend. A strong cold front brought shallow cold air to the area and allowed for areas of freezing rain to accumulate to as much as a quarter of an inch creating isolated tree damage and power outages. The winter storms on the **20th and 30th** were generally snow producers for northeast Nebraska, with as much as 16" measured at Santee on the 20th.



Eastern Nebraska/Western Iowa - NWS Omaha/Valley, NE Cont.

Although November ended with an active winter weather pattern, most of December was warm, with a lack of winter precipitation. In fact, the period from **December 12th - 15th** was very warm and wet across all of eastern Nebraska and western Iowa as a significant storm system slowly moved across the area. With the lack of cold air in place, the precipitation fell as all rain, with Omaha receiving 3.63", Lincoln receiving 1.58", and Norfolk receiving 1.32". This actually led to rare winter river flooding along the Missouri River and several smaller rivers in western Iowa. December did turn cooler and white to end the month as winter systems impacted the area on the **24th, 25th, and the 28th**. The snowfall on the 24th was a localized event near the Interstate 80 corridor that deposited as much as 6 to 9" of snow for the Omaha metro area and resulted in a white Christmas for this part of the area. The winter storm from late on the 25th into the 26th was again fairly localized, mainly centered over northeast Nebraska, and brought significant snowfall.

The month of January was generally wetter than normal for many locations but lacked significant winter weather systems. Although the coldest air of the season occurred near the middle of the month, the period generally averaged above normal for temperatures, with a warm period to start and end the month. The return to significant winter weather started early in the month of February, though, as the most significant system of the season brought widespread blizzard conditions to a large part of northeast Nebraska on **Groundhog Day** (February 2nd). This system brought heavy winds and snow to the area. Winds gusted over 50 MPH in many locations, and snowfall totals in the teens were common in northeast Nebraska, including a measured 18" in Pierce, NE. Drifts were measured at 5 to 9' deep, and numerous roads were closed for several days. Areas along and south of Interstate 80 in Iowa and Nebraska saw heavy snowfall, and in some cases thunder with the snow, but snow totals and winds were both lower in general.



Despite the blizzard to start, the rest of February was generally quiet, with above normal temperatures.

For detailed information on this storm, follow this link:
http://www.weather.gov/oax/event_archive_20160202

Probabilistic Snow Experiment
"Range of Possibilities"

Winter Weather Awareness Day - November 10, 2016

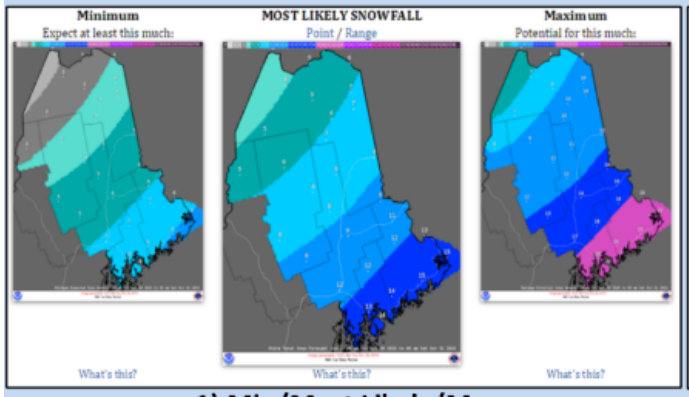
The **"Probabilistic Snow Experiment"** will have around 50 National Weather Service Forecast Offices around the country participating. As one of these 50 offices, NWS Omaha/Valley will provide snow forecasts that will communicate a range of snowfall possibilities and confidence along with our usual complement of snowfall graphics.

Forecasting snowfall amounts is challenging and inherently laden with uncertainties of the strength of the system, the forecast track, rain, snow or a mix, ground temperatures, and snowfall duration. Providing a range of possibilities will allow people to make better plans and decisions.

What is it?

- **An improved way to forecast snow**
- **Range of possibilities; including the minimum, most likely, and the maximum**
- **Combination of forecaster skill and 70+ U.S. and international weather models**
- **Range of possibilities for snow accumulation at a specific point**

3 New Tools



Location	Min	Likely	Max	>=0.1"	>=1"	>=2"	>=4"	>=6"	>=8"	>=12"	>=18"
Bangor, ME	6	11	17	100%	100%	100%	100%	100%	67%	47%	0%
Bar Harbor, ME	8	14	21	100%	100%	100%	100%	100%	74%	57%	34%
Calais, ME	7	13	19	100%	100%	100%	100%	100%	72%	54%	30%
Caribou, ME	4	6	10	100%	100%	100%	70%	52%	36%	0%	0%
Dover-Foxcroft, ME	5	9	13	100%	100%	100%	100%	68%	54%	30%	0%
Fort Kent, ME	3	4	7	100%	100%	100%	54%	31%	0%	0%	0%
Greenville, ME	4	8	12	100%	100%	100%	100%	63%	48%	0%	0%
Houlton, ME	4	8	12	100%	100%	100%	100%	63%	48%	0%	0%
Machias, ME	8	14	21	100%	100%	100%	100%	100%	100%	59%	37%
Madawaska, ME	3	5	7	100%	100%	100%	57%	34%	0%	0%	0%
Millinocket, ME	4	8	12	100%	100%	100%	100%	63%	49%	0%	0%

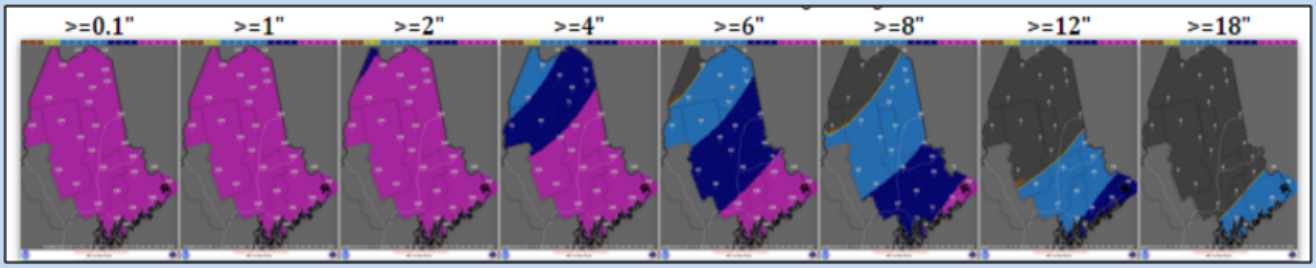
Switch to Range

1) Min/Most Likely/Max

These show not only our current expectation (most-likely), but also the range of possibilities from the storm (max & min scenarios).

2) Localized Listing

This shows the range of possibilities for individual towns and cities near you.



3) Chance of Exceeding – These show the percentage chance of exceeding a specific snowfall amount. Options are: 0.1", 1", 2", 4", 6", 8", 12", 18".

Webpage: www.weather.gov/oax/winter **(starts this winter)**

Watch, Warning or Advisory? A Push For Hazard Simplification

Winter Weather Awareness Day - November 10, 2016

Did you know the National Weather Service (NWS) has 123 different Hazard or Emergency Services Products which can be issued, with over 100 different colors used to represent the information on the NWS national webpage (weather.gov)? That is a lot of weather information to understand and still maintain a consistent and resonant message with those who may be impacted by hazardous weather. Is it possible to message the information in a simpler and more understandable method?

With this in mind, the NWS is soliciting your help with "Hazard Simplification". Hazard Simplification is an attempt to simplify or make it easier for users of NWS watch, warning and advisory information to understand, interpret and use the information for making important weather-related decisions. There are many good aspects of the current system and any new ideas will be weighed carefully. However, social science research has shown the current system can evolve and be improved upon to help everyone understand the hazards, become "Weather-Ready" and be resilient in the face of hazardous weather conditions.

Where do you come in? Your feedback is important in shaping the future of hazardous weather messaging. The NWS has created a website to explain the Hazard Simplification concept, and give you an opportunity to comment: **www.weather.gov/hazardsimplification**. At this website, you will be able to view some options for "repairing" the current system, or making larger changes which could "revamp" the current system. There are reference materials for information about past Hazard Simplification projects and examples of potential changes.

Finally, there are surveys on the website which give everyone a chance to comment on various aspects for Hazard Simplification. One such survey provides the opportunity to give feedback on some Optional Hazard Maps. Surveys about flood and winter weather related simplification will come soon. You will also see prototype demonstrations of Hazard Simplification for which you can provide feedback in the near future.

We hope you will take a few minutes to learn about "Hazard Simplification" and help shape the future the NWS messaging of future hazardous weather related events.

National Weather Service Social Media

Winter Weather Awareness Day - November 10, 2016

Have you found us on your favorite Social Media Platform?

Did you realize that your local NWS office is on Social Media? Do you have a Facebook page or a Twitter account? Find us, follow us for the latest weather information, climate facts, and other fun science or office information.

New this year: Instagram!

NWS Hastings joined Instagram this summer. This is a prototype effort to determine the utility of Instagram for the NWS and its customers. Check us out, follow us and interact with us, then provide us feedback.

Follow us at nwshastings

Facebook

Each office in the NWS has a Facebook and Twitter account. Find your local NWS office and follow them. Each office Facebook and Twitter account keeps you informed and up-to-date with the latest forecasts, watches and warnings for your local area. Be a part of the process, we always need ground truth reports and we love to see your pictures. Comment on our Facebook posts, or send us a tweet with your information, report or question and we will respond to it as we can.

Twitter

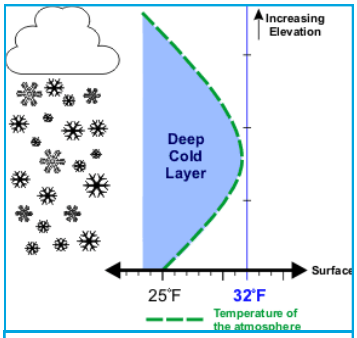
Follow your local office on Twitter at:

NWS Cheyenne, WY	**NWS Goodland, KS**	**NWS Sioux Falls, SD**
@NWSCheyenne	**@NWSGoodland**	**@NWSSiouxFalls**
NWS North Platte, NE	**NWS Hastings, NE**	**NWS Omaha, NE**
@NWSNorthPlatte	**@NWSHastings**	**@NWSOmaha**

Determining Winter Precipitation Types

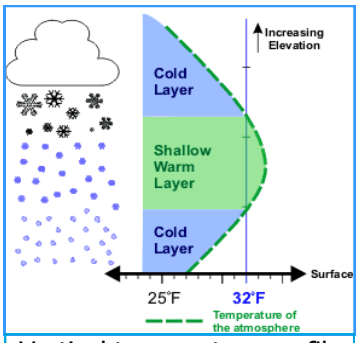
Winter Weather Awareness Day - November 10, 2016

One of the difficult tasks for a forecaster is trying to figure out what type of precipitation is going to occur in the winter. An important piece of the puzzle involves determining the temperature throughout the troposphere (basically the lower 7-8 miles of the atmosphere) where the temperature usually decreases with height. However, there are times when the temperature actually increases with height in the lower troposphere and this can cause problems for the forecaster.



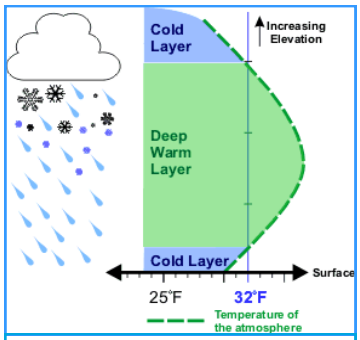
Vertical temperature profile needed for snow

Snow/Rain Process: How does the temperature affect the precipitation type? Ice crystals form at heights where the temperature is several degrees below freezing. As they fall, the crystals grow by several times, eventually forming snowflakes. If the entire column of the atmosphere remains below freezing all the way to the ground, we get **snow**. However, what happens if the snowflakes encounter a warm layer in the atmosphere that is above freezing? If the layer is warm and/or deep enough, the snowflakes melt and we get **rain**.



Vertical temperature profile needed for sleet

Sleet Process: If the warm layer is not quite as warm or as deep (let's say a degree or two above freezing for 500 feet) the snowflakes will partially melt, and then refreeze as they encounter a cold layer closer to the ground. By the time they hit the ground, they look like tiny frozen ice balls known as sleet.



Vertical temperature profile needed for freezing rain

Freezing Rain Process: This process is similar to sleet formation except that the warm layer completely melts the snowflakes into raindrops. But before reaching the ground, the rain falls through another cold layer. If the temperature in this layer and at the ground is several degrees below freezing, the rain drops will instantaneously freeze wherever they land (on trees, sidewalks, roads, power lines, etc.), causing a potential hazardous situation known as freezing rain.

Forecasters use information from radiosondes (weather balloons) to determine the temperature profile of the atmosphere. Due to cost factors, radiosondes are normally only launched twice per day at NWS sites across the country. In Nebraska, they are launched from the North Platte and Omaha offices. Due to the sparse coverage in both space and time, one can see why it might be tough to determine whether we will get snow in Chadron, while those in York may see a mixture of sleet, rain, and freezing rain.

Challenges Of Forecasting Snowfall Amounts

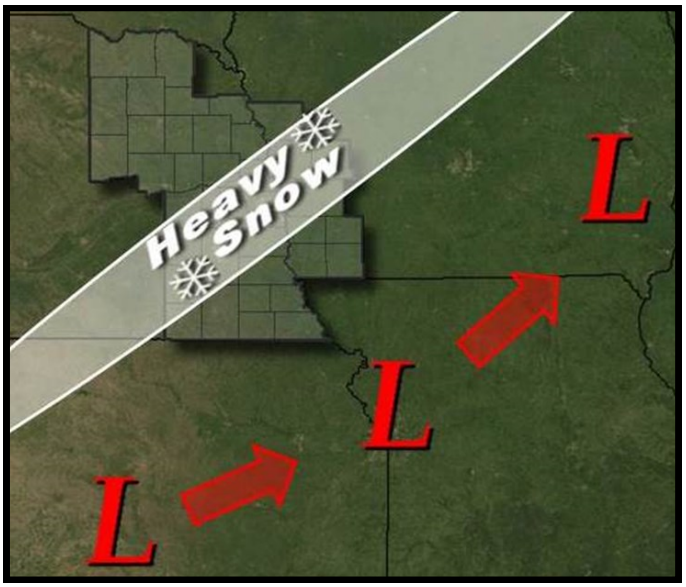
Winter Weather Awareness Day - November 10, 2016

Forecasting the amount of snowfall is challenging for meteorologists. Most people do not understand why forecasts for heavy amounts of snow can become a bust, or when little is expected you get dumped on. There are several factors involved in forecasting snow amounts. Let's take a look at some of them.

Surface Temperature - A ground temperature above freezing can cause much of the snow to melt upon impact. However, if it is snowing very hard, the snow could still accumulate and may get deep in some cases.

Precipitation Type - The temperature and moisture profiles in the lowest 10,000 feet of the atmosphere are critical in determining what type of precipitation you will have. The temperature at the surface does not necessarily indicate what sort of precipitation one will have. Refer back to page 7 for more detailed information about determining various precipitation types.

Storm Track - Another important consideration in forecasting snow amounts where the storm (low pressure) track is. The heaviest snow band typically occurs northwest of the surface low pressure track (see image to right). A shift north or south of the low can result in a shift of this band as well. Forecasters use their best judgement based on guidance from various computer models to determine the location of the heaviest band of snow.



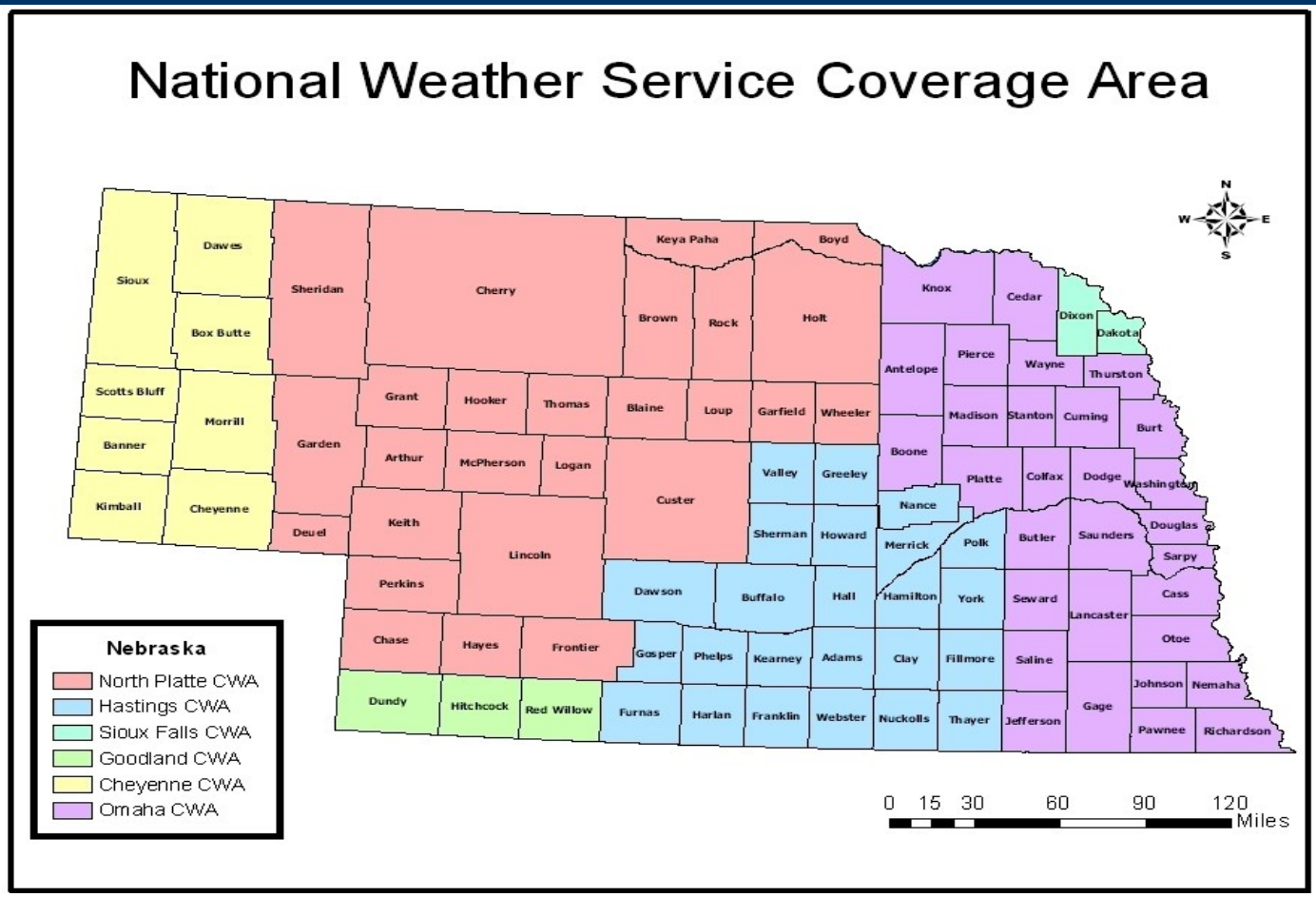
Snow to Liquid Ratio - Many people use the rule of thumb that 1" of liquid water equals 10" of snow. This is not always the case, especially in the Plains states. Snow in this area is more typically 14 to 1 (or 14" of snow for every 1" of liquid water), but can vary quite a bit depending on the moisture content of the atmosphere. Very wet snows may have less than a 10 to 1 ratio and dry snows can have a 20 to 1 ratio! This can be an important factor in determining snowfall amounts.

Thunder Snow - There are times when a low pressure system moves across the area will have enough moisture and instability aloft to create thunder snow. In these cases, snowfall rates can increase tremendously and pile up 2 to 3" of snow per hour.

All of these factors are taken into consideration when forecasting snow amounts. Any changes to the factors listed, as well as some others not mentioned, can lead to a change in the amount of snowfall that was originally forecasted. It is important for everyone to pay close attention to updates to the forecast during a winter storm event to see if there are changes.

National Weather Service Offices Serving Nebraska

Winter Weather Awareness Day - November 10, 2016



Panhandle	West and North Central	Extreme Southwest
Cheyenne, WY	North Platte	Goodland, KS
1301 Airport Parkway Cheyenne, WY 82001	5250 E. Lee Bird Drive North Platte, NE 69101	920 Armory Road Goodland, KS 67735
(307) 772-2468	(308) 532-4936	(785) 899-7119
www.weather.gov/cheyenne	www.weather.gov/northplatte	www.weather.gov/goodland

South Central	East	Far Northeast
Hastings	Omaha/Valley	Sioux Falls, SD
6365 N. Osborne Drive West Hastings, NE 68901	6707 N. 288th Street Valley, NE 68064	26 Weather Lane Sioux Falls, SD 57104
(402) 462-4287	(402) 359-9443	(605) 330-4247
www.weather.gov/hastings	www.weather.gov/omaha	www.weather.gov/siouxfalls

NOAA Weather Radio All-Hazards (NWR)

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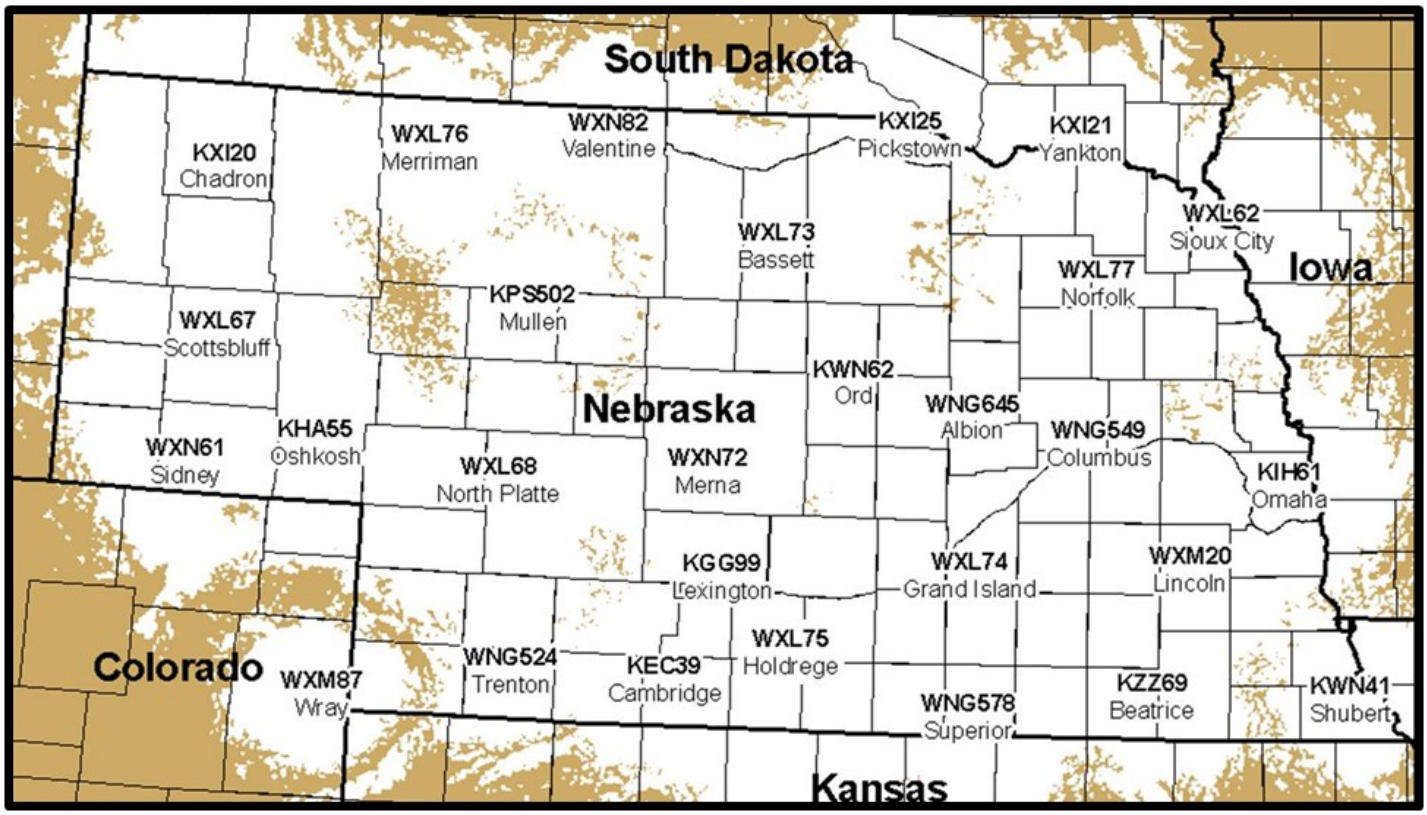

NOAA Weather Radio All Hazards is a nationwide network of radio stations broadcasting continuous weather information directly from the nearest National Weather Service office. NWR broadcasts official Weather Service warnings, watches, forecasts and other hazard information 24 hours a day, 7 days a week.

Working with the Federal Communication Commission's (FCC) Emergency Alert System, NWR is an "All Hazards" radio network, making it your single source for comprehensive weather and emergency information. In conjunction with Federal, State, and Local Emergency Managers and other public officials, NWR also broadcasts warning and post-event information for all types of hazards, including natural (such as tornadoes or floods), environmental (such as chemical releases or oil spills), and public safety (such as AMBER alerts or 911 Telephone outages).

Known as the "Voice of NOAA's National Weather Service," NWR is provided as a public service by the National Oceanic and Atmospheric Administration (NOAA). NWR includes 1000 transmitters, covering all 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories. NWR requires a special radio receiver or scanner capable of picking up the signal. Broadcasts are found in the VHF public service band at these seven frequencies (MHz):

162.400	162.425	162.450	162.475	162.500	162.525	162.550

Coverage information and SAME Codes for every county in Nebraska can be found at:

www.weather.gov/nwr/Maps/PHP/NE.php

Winter Weather Terminology

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Key Words to Know - What is the Difference?

OUTLOOK - Hazardous Weather Outlooks are issued everyday, and serve as a "heads-up" that a significant weather event may be possible in the next 7 days.

ADVISORY - An advisory is issued when winter weather events could cause a significant inconvenience, but could also lead to life threatening conditions if not cautious.

WATCH - A watch is issued when winter weather events have the potential to threaten life and property, but the exact timing and location of the storm is uncertain. Watches are normally issued between 12 to 48 hours in advance.

WARNING - A warning is issued when winter weather events are occurring or are imminent and pose a threat to life and property. Warnings are normally issued between 2 and 24 hours in advance.

Winter Weather Product Criteria

Winter Weather Advisory Products (In addition to these thresholds, impacts that cause significant inconvenience or could lead to life threatening conditions if not cautious)

- **Freezing Rain Advisory** - Small accumulation of ice (freezing rain and/or freezing drizzle), generally less than 1/4 of an inch

- **Winter Weather Advisory**

  For Snow - Snow accumulation of 3 to 5 inches in 12 hours

  For Sleet - Accumulation of ice pellets less than 1/2 of an inch

  For Snow & Blowing Snow - Snowfall with blowing snow intermittently reducing visibility to less than 1/2 of a mile

- **Wind Chill Advisory** - Wind Chill values of -20°F to -29°F

Winter Weather Terminology

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Watch Products

- **Blizzard Watch** - Conditions are favorable for a blizzard event in the next 12 to 48 hrs.
- **Winter Storm Watch** - Conditions are favorable for a winter storm event (Heavy Sleet, Heavy Snow, Ice Storm, Heavy Snow and Blowing Snow or a combination of events) to meet or exceed local Winter Storm Warning criteria in the next 12 to 48 hrs.
- **Wind Chill Watch** - Conditions are favorable for wind chill temperatures to meet or exceed Wind Chill Warning criteria in the next 12 to 48 hours.

Warning Products (In addition to these thresholds, impacts that pose a threat to life and property)

- **Blizzard Warning** - Sustained wind or frequent gusts greater than or equal to 35 miles per hour accompanied by falling and/or blowing snow, frequently visibilities less than 1/4 of a mile for at least 3 hours.
- **Ice Storm Warning** - Widespread ice accumulation of 1/4 of an inch or more.
- **Winter Storm Warning** - Heavy Snow (snow accumulation of 6 inches or more in 12 hours or 8 inches or more in 24 hours), Sleet (accumulation of ice pellets 1/2 of an inch and greater), Ice (accumulation of 1/4 of an inch or more) and/or heavy Snow and Blowing Snow (wind is below blizzard criteria).
- **Wind Chill Warning** - Wind chills -30°F or colder

Remember to dress for the season!

- Try to stay dry.
- Wear loose-fitting, light-weight, warm clothing in several layers. Trapped air between these layers can insulate. Layers can be removed to avoid perspiration and subsequent chills.
- Outer garments should be tightly woven, water repellent, and hooded.
- Always wear a hat, as half of your body heat can be lost from the head.
- Mittens, snug at the wrist, are better than gloves.

Winter Weather Dangers

Winter Weather Awareness Day - November 10, 2016

Exposure to cold can cause frostbite or hypothermia and become life-threatening. Infants and elderly people are most susceptible. What constitutes extreme cold varies in different parts of the country. In the south, near freezing temperatures are considered extreme cold. Freezing temperatures can cause severe damage to citrus fruit crops and other vegetation. Pipes may freeze and burst in homes that are poorly insulated or without heat. Further north, extreme cold means temperatures well below zero.

Wind Chill - is not the actual temperature, but rather how the combination of wind and cold temperatures feel on exposed skin. It is based on the rate of heat loss from exposed skin, and as the wind speed increases, heat is carried away from the body at an accelerated rate, driving down the body temperature. Wind chill will also impact animals, but not impact inanimate objects such as cars or exposed water pipes, because they cannot cool below the actual air temperature.

The NWS Wind Chill Index uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. More information about the Wind Chill Index can be found at :

http://www.nws.noaa.gov/om/winter/windchill.shtml

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

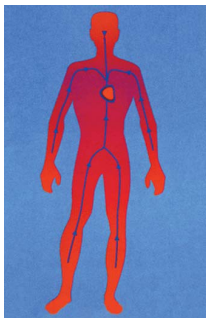
Effective 11/01/01

Winter Weather Dangers

Winter Weather Awareness Day - November 10, 2016

Frostbite - is damage to body tissue caused by extreme cold. A wind chill of -20°F will cause frostbite in just 30 minutes. Frostbite causes a loss of feeling and a white or pale appearance in extremities, such as fingers, toes, ear lobes or the tip of the nose. If symptoms are detected, get medical help immediately! If you must wait for help, slowly rewarm affected areas. However, if the person is also showing signs of hypothermia, warm the body core before the extremities.

Hypothermia - is a condition brought on when extremities are excessively cold, and the body temperature drops to less than 95°F. It can kill. For those who survive, there are likely to be lasting kidney, liver and pancreas problems. Warning signs include uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness and apparent exhaustion. Take the person's temperature. If below 95°F, seek medical care immediately!



If Medical Care is Not Available - warm the person slowly, starting with the body core. Warming the arms and legs first drives cold blood toward the heart and can lead to heart failure! If necessary, use your body heat to help. Get the person into dry clothing and wrap in a warm blanket covering the head and neck. Do not give the person alcohol, drugs, coffee or any hot beverage or food. Warm broth is the first food to offer.

Remember to Avoid Overexertion!

Avoid activities such as shoveling heavy snow, pushing a car, or walking in deep snow. The strain from the cold and the hard labor could cause a heart attack, and sweating could lead to a chill and hypothermia. Take Red Cross CPR and AED training so you can respond quickly to an emergency.

Additional detailed information about the dangers associated with winter and how to deal with emergencies you may face, check out the following website:

http://www.nws.noaa.gov/om/winter/index.shtml

This page is designed to teach you how to stay safe in a winter storm or in abnormally cold weather. If you know what to do before, during, and after a winter event, you can increase your chances of survival. You will find information on winter alerts, science and hazards, as well as snow coverage maps and information describing the different types of winter storms. You'll also find a broad array of educational materials.

Winter Weather Safety Tips

Winter Weather Awareness Day - November 10, 2016

Be Prepared Before the Storm Strikes!

When preparing your home or workplace for the upcoming winter season, keep in mind that the primary concerns deal with the loss of heat, power and telephone service, along with a shortage of supplies if a winter storm continues for an extended period of time.

Make sure to have the following supplies available:

- Flashlight and extra batteries
- Battery-powered NOAA Weather Radio and portable radio to receive emergency information - these may be your only links to the outside
- Extra food and water. Have high energy food, such as dried fruit, nuts and granola bars, and food which requires no cooking or refrigeration.
- Extra medicine and baby items
- First-aid supplies
- Heating fuel. Refuel BEFORE you are empty. Fuel carriers may not reach you for days after a winter storm.
- Emergency heat source: fireplace, wood stove, space heater
  - Use properly to prevent a fire and remember to ventilate properly.
- Fire extinguisher and smoke alarm
  - Test smoke alarms once a month to ensure they work properly.

On the farm and for pets:

- Move animals into sheltered areas.
- Shelter belts, properly laid out and oriented, are better protection for cattle than confining shelters.
- Haul extra feed to nearby feeding areas.
- Have plenty of water available. Animals can die from dehydration in winter storms.
- Make sure your pets have plenty of food, water and shelter.

Winter Weather Safety Tips

Winter Weather Awareness Day - November 10, 2016

I'm caught outside:

- Find shelter!
- Attempt to stay dry.
- Cover all exposed body parts.
- If there is no shelter available:
  - Build a lean-to, windbreak or cave to protect yourself
  - Build a fire for heat and to attract attention
  - Place rocks around the fire to absorb and reflect heat
  - Melt snow for water, eating snow lowers body temperature

I'm caught in a vehicle:

- Stay in the vehicle! You could quickly become disoriented in wind-driven snow and cold.
- Run the motor about 10 minutes each hour for heat.
- Open the window a little for fresh air to avoid carbon monoxide poisoning.
- Make sure the exhaust pipe is not blocked.
- Be visible to rescuers!
  - Turn on the dome light at night when running the engine
  - Tie a colored cloth, preferably red, to your antenna or door
  - After the snow stops falling, raise the hood to indicate you need help
- Exercise from time to time, move arms, legs, fingers, and toes vigorously to keep blood circulating and to keep warm.

I'm caught inside:

- Stay inside! If using alternate heat from a fireplace, wood stove, space heater, etc., be sure to use fire safeguards and properly ventilate.
- If you don't have heat available:
  - Close off unneeded rooms.
  - Stuff towels or rags in cracks under doors.
  - Cover windows at night.
- Eat and drink, providing the body with energy and preventing dehydration.
- Wear layers of loose fitting, lightweight, warm clothing. Remove layers to avoid perspiration and subsequent chill.

Winter Weather Travel Tips

Winter Weather Awareness Day - November 10, 2016

Along with your home and workplace, vehicles also need to be prepared for the upcoming winter season. It is very important to fully check and winterize your vehicle, which includes having a mechanic check your battery, antifreeze, wipers, windshield washer fluid, ignition system, thermostat, lights, exhaust system, heater, brakes, and oil levels.

If you must travel during winter conditions, it is best not to travel alone. Try to plan your travel during the day, and make sure to let others know your destination, route, and when you expect to arrive. Make sure to keep your gas tank near full to avoid ice in the tank and fuel lines.

Always carry a Winter Storm Survival Kit in your car!!

- Mobile phone, charger and batteries
- Flashlight with extra batteries
- First-aid kit
- Knife
- Shovel
- Tool kit
- Tow rope
- Battery booster cables
- Compass and road maps
- A windshield scraper and brush or small broom for ice/snow removal
- Blankets and sleeping bags, or newspapers for insulation
- Rain gear, extra sets of dry clothes, socks, mittens, and stocking caps

- Large empty can to use as emergency toilet. Tissues, paper towels, and plastic bags for sanitary purposes
- Small can and waterproof matches to melt snow for drinking water
- Cards and games
- High calorie, non-perishable food, such as canned fruit, nuts, and high energy "munchies" (Include a non-electric can opener if necessary)
- A small sack of sand or cat litter for generating traction under wheels and a set of tire chains or traction mats.
- A brightly colored (preferably red) cloth to tie to the antenna

Road Condition Information

Winter Weather Awareness Day - November 10, 2016

Before you travel, check out the latest road conditions. Road report information across Nebraska can be found at the Nebraska Department of Roads web site at:

http://www.511.nebraska.gov http://511ia.org

Nebraska: When in-state, call 511.
When out of state call: 1-800-906-9069

Iowa: http://511ia.org
Out of state: 1-800-288-1047

If you located inside the states listed below, you can dial 511 for road information.

South Dakota: http://www.safetravelusa.com/sd/
Out of state: 1-866-MY-SD511 (1-866-697-3511)

Wyoming: http://map.wyoroad.info/
Out of state: 1-888-WYO-ROAD (1-888-996-7623)

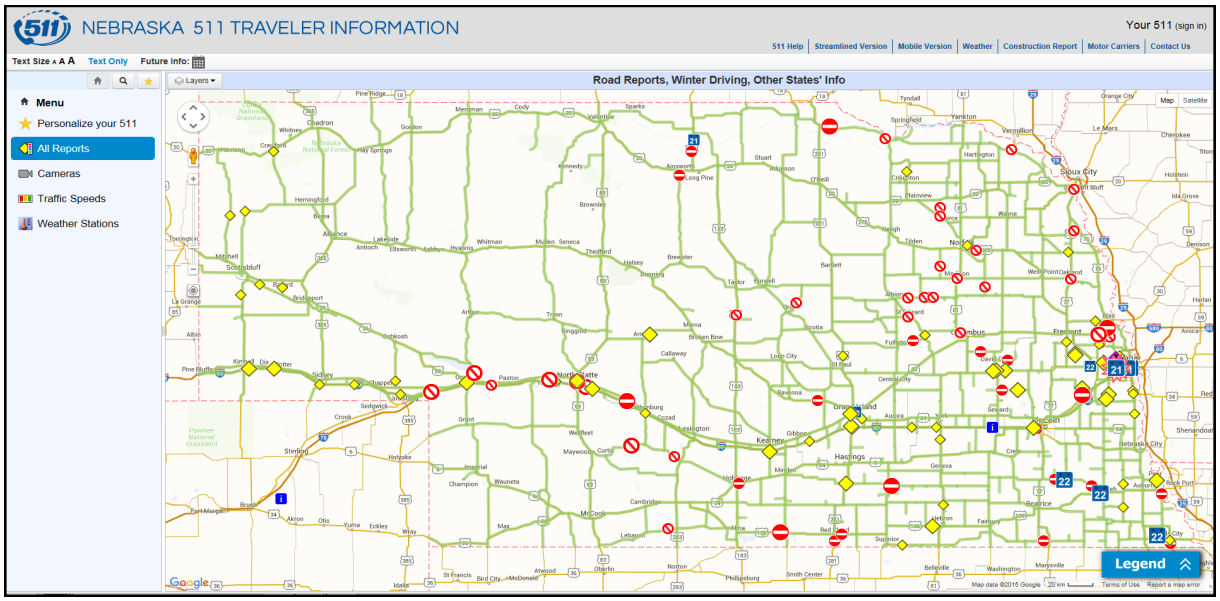
Colorado: http://www.cotrip.org/roadConditions.htm
Out of state: 1-303-639-1111

Kansas: http://511.ksdot.org/
Out of state: 1-866-511-KDOT (1-866-511-5368)

Missouri: http://traveler.modot.org/map/
Out of state: 1-888-ASK-MDOT (1-888-275-6636)

National Traffic and Road Closure Information can be found at:

www.fhwa.dot.gov/trafficinfo/index.htm



Winter Preparedness For Schools

Winter Weather Awareness Day - November 10, 2016

Gathering Information

- Know where to get weather information: Utilize NOAA Weather Radio, local Media sources, Internet and paging services.

- Know how to get road information: State Highway Departments or Law Enforcement are often your best sources for road conditions. City and county transportation or school officials and drivers or security teams are also excellent sources.

Alerting Students and Staff

- Alert students and staff to take action: Use mobile communications for bus drivers and a PA system for school staff and students.

Activating a Plan

- Determine when to activate a plan: Gather information about the type of winter storm, expected impact and time of impact on the school district. The primary decision will be whether to cancel, delay or hold classes as usual. In Watch situations, immediate action will usually not be required. When a Warning or Advisory is issued, assess the weather situation by monitoring forecasts, current weather conditions and road conditions.

Canceling or Delaying Classes

- Determine when to cancel or delay classes: How much time do you have before the storm impacts the area? Not only must students be transported to school safely, but also back home via bus, car or on foot. What kind of an impact will the storm make? Will roads be impassable or will road conditions just have a minimal effect on transportation of students, causing only small delays?

School Bus Driver Actions

- For heavy snow or blowing/drifting snow: Be familiar with alternate routes, stay up to date on the latest forecast, and maintain communication with school officials.

- For ice storms: Remain alert for downed trees, utility lines, and other road hazards. Be familiar with alternate routes. Stay up to date on the forecast and maintain communication with school officials.

- Extreme cold: Learn to recognize and treat symptoms of hypothermia and frostbite.

Safety Instruction

- Educate school staff and students: Conduct drills and hold safety programs annually.

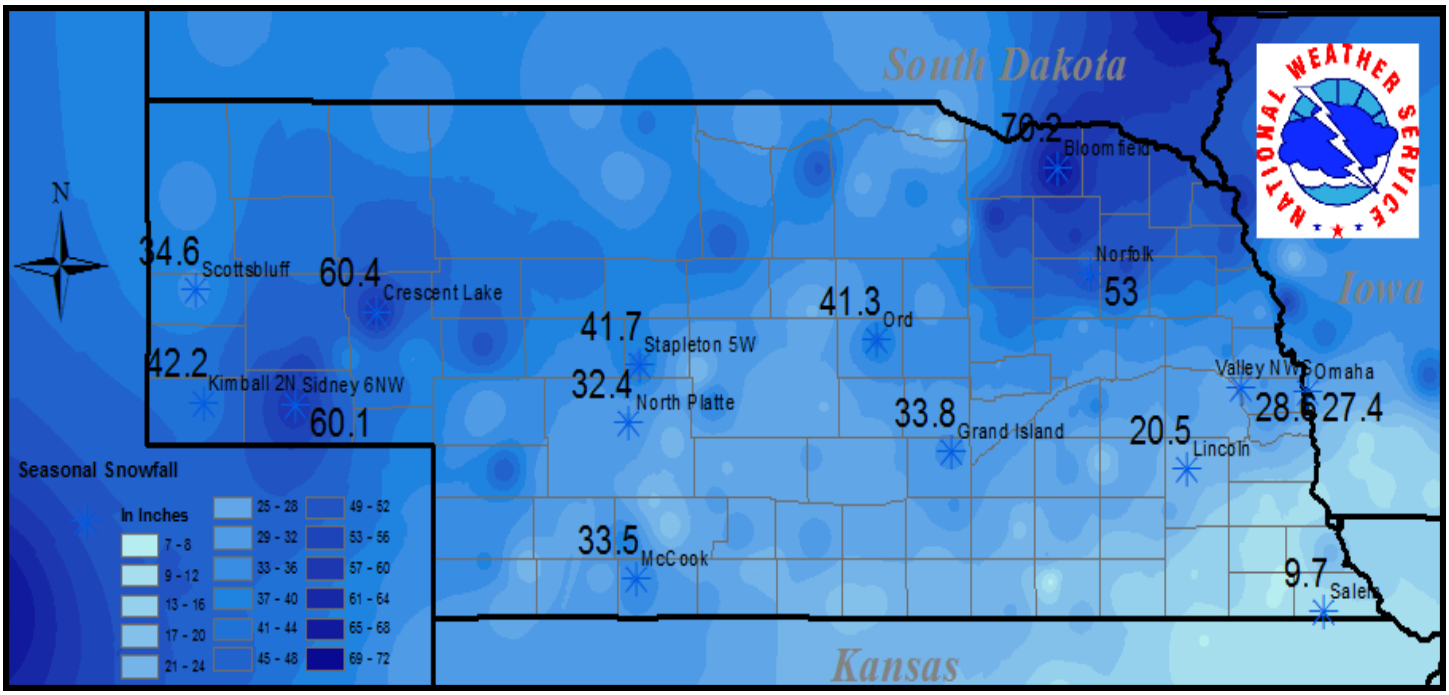
- Participate in Winter Weather Preparedness Day campaigns.

- Contact your local Emergency Manager or National Weather Service Office for a speaker to discuss winter weather safety.

2015-16 Nebraska/Iowa Winter Weather Summary

Winter Weather Awareness Day - November 10, 2016

2015-16 Season Statewide Snowfall Map



Seasonal Snowfall 2015-2016					
Location	**Normal (1981-2010)**	**2015-2016**	**% Normal**	**2014-2015**	**% Normal**
Scottsbluff	42.1″	34.6″	82%	51.6″	123%
North Platte	28.5″	32.4″	114%	21.3″	75%
Valentine	33.3″	40.8″	123%	22.5″	68%
McCook	28.8″	33.5″	120%	19.0″	66%
Grand Island	29.0″	33.8″	117%	24.3″	84%
Norfolk	30.5″	53.0″	174%	20.7″	68%
Omaha	26.4″	27.4″	104%	13.8″	52%
Lincoln	25.9″	20.5″	79%	21.9″	85%

2015-16 Nebraska/Iowa Winter Weather Summary

Winter Weather Awareness Day - November 10, 2016

Western Nebraska Panhandle - NWS Cheyenne, WY

The winter of 2015-2016 (which meteorologically is the period December through February) turned out to be generally warmer than average for most of the Nebraska Panhandle. The Sidney area turned out a little cooler than normal. The winter was characterized by rather cold temperatures in December and January, followed by a very warm February. Precipitation was above average across most of the area. December was the wettest month overall with February also seeing generally wetter than normal conditions. January was fairly dry though.

The most significant cold outbreak occurred in late December into early January when several days of below-zero temperatures occurred. The most significant snowfalls occurred in mid-December and early February with Scottsbluff recording a 6.5" snowstorm on **December 15th**, and a 5.4" snow on **February 1st - 2nd**.

Temperatures:

The following table summarizes the monthly and overall winter average temperatures and the departures from normal for select sites over the area:

City	December average temp.	December departure from normal	January average temp.	January departure from normal	February average temp.	February departure from normal	Dec-Feb average temp.	Dec-Feb departure from normal
Alliance	22.0	-1.6	21.5	-2.7	32.8	+5.7	25.4	+0.4
Chadron	23.8	-0.6	23.8	-0.6	36.6	+9.2	28.1	+2.7
Harrison	25.1	+1.8	23.5	+0.1	31.3	+5.5	26.6	+2.4
Kimball	24.5	-1.8	25.8	-1.2	33.9	+4.9	28.1	+0.7
Scottsbluff	26.3	+0.2	27.5	+0.3	37.0	+6.6	30.3	+2.4
Sidney	25.9	-2.8	27.5	-1.7	35.2	+3.2	29.5	-0.5

This next table depicts the dates of warmest and coldest temperatures of the winter for selected cities as well as the warmest and coldest average daily temperatures. The total number of days with low temperatures at or below zero and the departure from normal is also noted:

City	Lowest temperature and date	Highest temperature and date	Lowest daily average temp. and date	Highest daily average temp. and date	Number of days with mins at or below zero
Alliance	**-14** on Dec. 29	**73** on Feb. 27*	**-0.5** on Dec. 30	**51.0** on Feb. 18	**16 (-1)**
Chadron	**-12** on Dec. 27	**74** on Feb. 18	**1.5** on Dec. 29	**57.5** on Feb. 18	**12 (-3)**
Harrison	**-13** on Dec. 28	**64** on Feb. 18	**4** on Dec. 30	**49.5** on Feb. 18	**M**
Kimball	**-6** on Dec. 29*	**72** on Feb. 18	**5** on Dec. 27	**48.5** on Feb. 28	**10 (+1)**
Scottsbluff	**-8** on Dec. 17	**75** on Feb. 18	**4** on Dec. 27	**56** on Dec. 9	**7 (-5)**
Sidney	**-7** on Dec. 29	**76** on Feb. 18	**6** on Dec. 29	**52** on Feb. 18	**7 (-2)**

*and February 18th

Precipitation:

Winter precipitation turned out to be generally above average across the area. The northern and far western Panhandle saw amounts close to average precipitation. December was quite moist with plenty of snowfall across many areas with January and February seeing rather dry conditions overall. Total seasonal snowfalls for the season (October through May) ranged from about 30-50" across the Panhandle.

The following table lists the December through February liquid precipitation amounts and their departures from normal:

City	December pcpn and departure	January pcpn and departure	February pcpn and departure	Total pcpn and departure
Alliance	1.00 (+0.68)	0.02 (-0.16)	0.61 (+0.23)	1.63 (+0.75)
Chadron	1.13 (+0.61)	0.17 (-0.19)	0.18 (-0.43)	1.48 (-0.01)
Harrison	1.07 (+0.67)	0.22 (-0.10)	0.61 (+0.23)	1.90 (+0.80)
Kimball	1.09 (+0.63)	0.13 (-0.16)	0.73 (+0.38)	1.95 (+0.85)
Scottsbluff	0.71 (+0.20)	0.21 (-0.20)	0.56 (-0.04)	1.48 (-0.04)
Sidney	0.95 (+0.41)	0.06 (-0.14)	1.11 (+0.79)	2.12 (+1.06)

2015-16 Nebraska/Iowa Winter Weather Summary

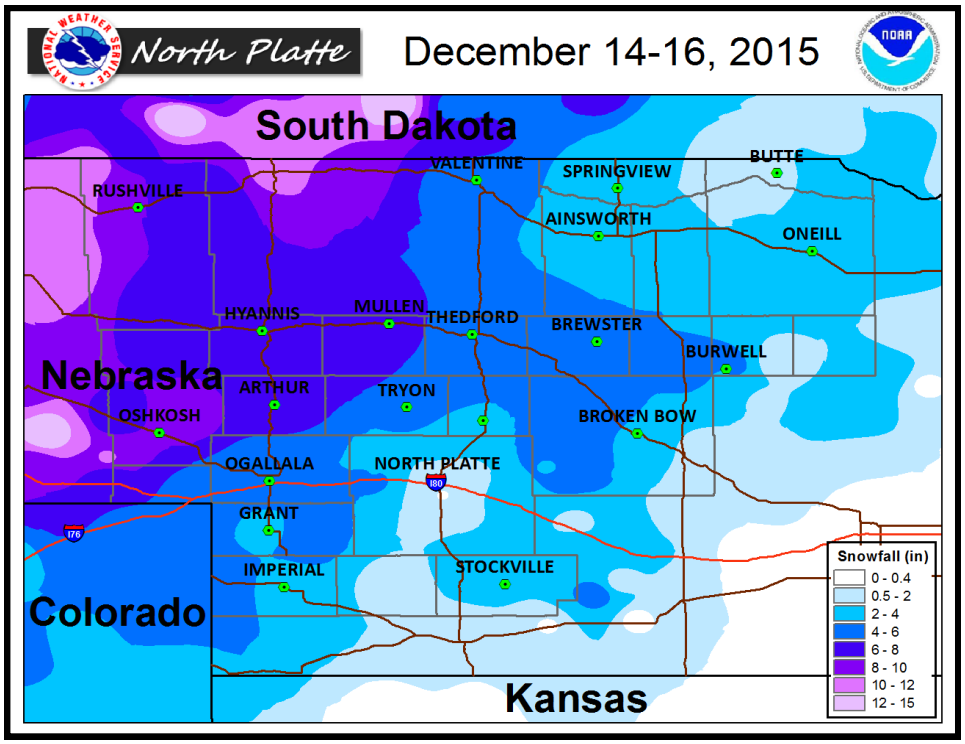
Winter Weather Awareness Day - November 10, 2016

West and North Central Nebraska - NWS North Platte, NE

Strong El Niño conditions were present during the winter of 2015-16. Temperatures during the winter season were generally above normal across western and north central Nebraska while precipitation was near normal to slightly above normal. Snowfall during the season was highest over the northwestern Sandhills and north central Nebraska. During the season, five winter storms tracked through western and north central Nebraska. Two storms impacted the area in December. After a quiet January, a third winter storm hit the area in early February, a fourth in March and a spring winter storm in late April. Seasonal snowfall was highest at Crescent Lakes National Wildlife Refuge in Garden County where it totaled 60.4". Snowfall was lowest in portions of southwestern Nebraska where 28.6" occurred at Wallace in Lincoln County.

December: A tandem of storms hit western and north central Nebraska.

On **December 15th**, a strong upper level low and surface low crossed the Central Plains. Snowfall began during the overnight hours of December 15th and continued into the 16th. Snowfall with this system was heaviest across the northwestern Sandhills, eastern Nebraska Panhandle and portions of north central Nebraska. By the afternoon of December 16th, between 8-12" of snow fell north and west of a line from Chappell, to Mullen, to north of Valentine. Twelve inches of snow fell in the Pine Ridge of northern Sheridan County, as well as, along the South Dakota and Nebraska border north of Valentine. At Oshkosh and Hyannis, 8" of snow fell while 10" of snow was reported at Merriman.



Another storm system brought snow to the Sandhills and northern Nebraska on **Christmas night into December 26th**. A mid level front became anchored across the region and served as the focus for snowfall. By the afternoon of December 26th, 5-8" of snow fell across the eastern Nebraska panhandle and portions of north central Nebraska.

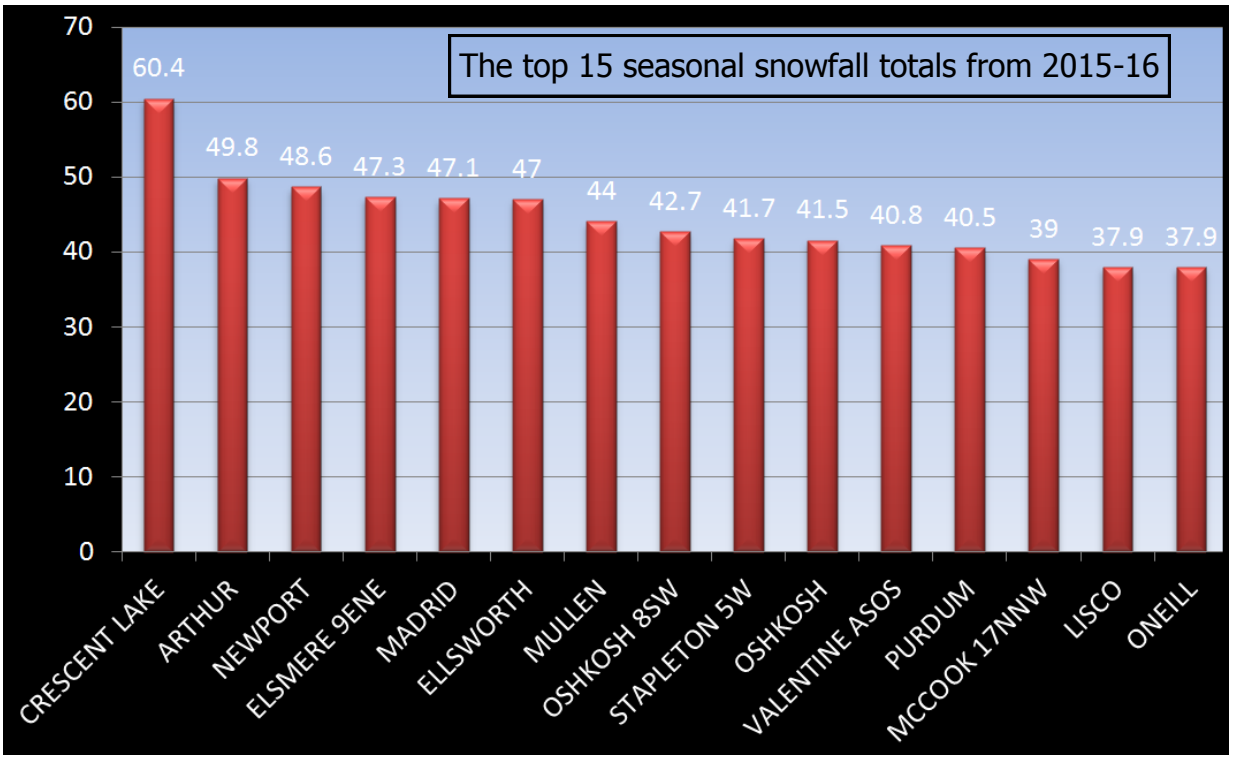
West and North Central Nebraska - NWS North Platte, NE Cont.

An early February winter storm hits the region

A strong upper level low tracked across the southwestern United States on January 31st. This feature then emerged onto the Central Plains on February 1st. Snow began to develop that afternoon and spread east across western and north central Nebraska into February 2nd. By the evening of February 2nd, 8-15" of snow was reported across a large portion of western and north central Nebraska. In addition to heavy snow, occasional wind gusts to 50 MPH, produced areas of blowing and drifting snow and blizzard conditions across southwestern Nebraska. Interstate 80 was closed and was not reopened until February 3rd.

Spring snowstorm hits in March and a second in late April.

An upper level trough of low pressure tracked across the Southern Plains on March 23rd. Snow developed early from the southwest and then moved into portions of north central Nebraska. Snow accumulations of 2-10" were reported with the heaviest accumulations along a line from Imperial to Tryon to Ericson. In addition to snow, strong winds produced blizzard and near blizzard conditions across the region. Winds gusted as high as 61 MPH at Broken Bow and 56 MPH at North Platte. Interstate 80 was closed and did not reopen until March 24th. A second storm impacted western Nebraska on April 29th-30th. This storm brought 6-14" of wet snow to the eastern panhandle and western Nebraska.



2015-16 Nebraska/Iowa Winter Weather Summary

Winter Weather Awareness Day - November 10, 2016

Extreme Southwest Nebraska - NWS Goodland, KS

The 2015-16 winter season was well above normal in terms of temperatures. However, even though temperatures were quite warm, the winter season was near normal in terms of snowfall, primarily due to two significant winter storms.

Overall, last winter can be characterized as a very warm winter. It consisted of several extended periods of above normal temperatures, followed by brief cold snaps before a return to warmer weather. The cold snaps also lacked their usual punch. To put it into perspective, McCook never fell below 0°. This is a rarity as the average lowest minimum temperature for December and January is -2°. The last winter when a temperature below zero was not measured at McCook was the 2004-05 winter season. Furthermore, the average number of days (from December through February) McCook observes a minimum below zero is 7.8 days.

Below is a table highlighting departures from normal for each month's average temperature. Each month was above normal for all three sites.

	Monthly Temperature Departure From Normal						
Station	**Oct 2015**	**Nov 2015**	**Dec 2015**	**Jan 2016**	**Feb 2016**	**Mar 2016**	**Apr 2016**
Benkelman	4.6	1.0	2.8	2.7	6.2	6.2	1.9
Culbertson	4.4	1.6	3.9	3.3	4.7	5.5	2.2
McCook	6.4	2.7	5.0	4.7	6.5	6.3	1.9

Table 1: Temperature departure from (1981-2010) normal. Red shading above normal, blue shading below.

The coldest night of the winter season occurred **February 4th**. On this date, overnight temperatures dipped into the single digits across southwest Nebraska. In addition, a breeze brought wind chill readings down below -15° for some locations. The lowest temperature reading of the year, 2° above zero, was observed at the McCook Municipal Airport on **January 10th**.

Turning to snowfall, seasonal snowfall was near normal last winter as shown in the table below. Snowfall totals were just below normal to above normal, depending on the location. The most notable snowfall event occurred **February 1st-2nd**. Additional snow events occurred across southwest Nebraska on **November 11th**, **November 17th**, **December 24th**, and **March 23rd**.

Station	Oct 2015-Apr 2016 Snowfall	1981-2010 Normal	Percent of Normal
Benkelman	26.2	29.8	88%
Culbertson	25.5	28.2	90%
McCook	33.5	28.7	117%

Table 2: Oct '15-Apr '16 Snowfall, Normal, Percent of Normal Snowfall. Green is above normal, tan is below normal.

November 17th Blizzard

The first significant winter storm of the season struck southwest Nebraska on November 17th. There were several facets of this storm that were particularly interesting. The first item to note was that this blizzard was immediately preceded by the latest tornado outbreak observed across the High Plains. On November 16th, 6 tornadoes struck northwest Kansas. Numerous tornadoes were reported across the Texas Panhandle, western Oklahoma and western Kansas. One tornadic storm did move into southern Nebraska, producing a tornado as it moved into Furnas County from Norton County, Kansas.

The second interesting fact was that this blizzard produced a narrow band of intense snowfall. Portions of southwest Nebraska were on the northern fringe of this snow band. Accumulations of 5" at Culbertson and 7" at McCook were reported while Benkelman reported only 1.7". While this may not seem like a big difference, the intensity of this band is highlighted further south over northwest Kansas. Snow totals of 20+" were reported along a narrow line from Atwood to Colby to Sharon Springs, Kansas. A mere 35 miles west of Colby, the town of Goodland reported only 4" of total snow accumulation. Hoxie, 35 miles east of Colby, reported 4" of total snow accumulation as well. The heaviest snow occurred in a band roughly 50 miles wide (west to east) and 150 miles long (from south-southwest to north-northeast from near Tribune, Kansas into southwest Nebraska). If this band of snow had developed 30 miles further north, a crippling blizzard would have occurred over southwest Nebraska.

February 1st-2nd Blizzard

The blizzard that struck the High Plains in early February will not be one that is easily forgotten. This particular blizzard packed a potent punch, bringing widespread winds of 50-60 MPH, snow accumulations of 13-18", snow drifts of 3-5' and persistent, near-zero visibility during the peak of the storm. Travel was impossible across the High Plains, particularly in southwest Nebraska. The highest snowfall amount reported with this storm was 18" in McCook. In addition, there were more than 16 hours of visibility below one-half mile, much of it less than one-quarter mile, reported at the McCook Municipal Airport. Other reports included 11.6" at Benkelman and 13" at Culbertson.

March 23rd Blizzard

One last quick hitting blizzard moved across southwest Nebraska on March 23rd. During the afternoon and evening hours, winds of 50-60 MPH, combined with snow accumulations of 3-4", produced blizzard conditions with near-zero visibility across Dundy and Hitchcock Counties. Blizzard conditions were also observed in Red Willow County; however, whiteout conditions only occurred a couple times and did not persist for very long as this system passed.

2015-16 Nebraska/Iowa Winter Weather Summary

Winter Weather Awareness Day - November 10, 2016

South Central Nebraska - NWS Hastings, NE

The 2015-16 winter season started the same day the severe weather season ended, **November 16th**. This day brought a rare November tornado, then accumulating snowfall, to western portions of the coverage area. The EF-1 tornado entered southern Furnas County, passing to the east of Beaver City. South of Highway 89, trees and power poles were damaged, and to the north, outbuildings were damaged and grain carts were moved. It was the first November tornado in the NWS Hastings forecast area since 2000. Colder air then pushed in, resulting in 2-6″ of snow over far western portions of the area.

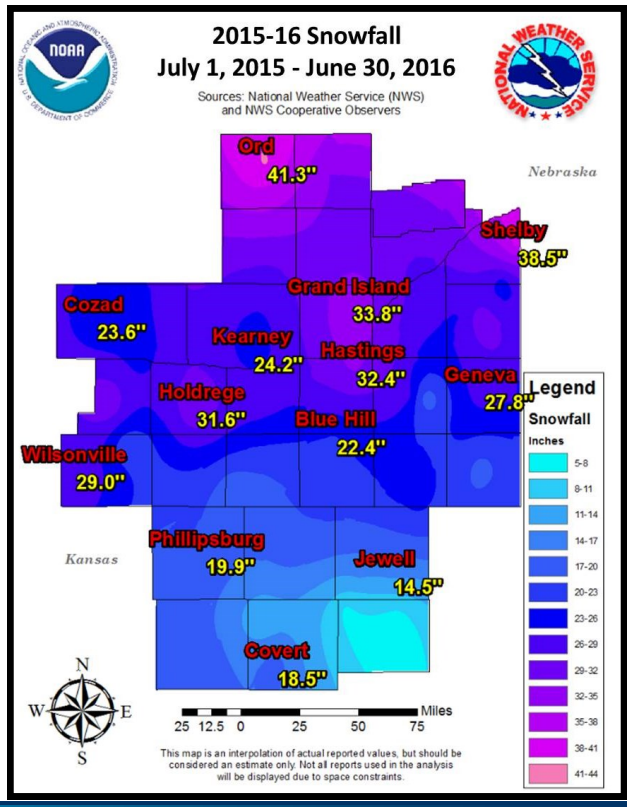
Light wintry precipitation affected portions of the area on **Thanksgiving Day**. Steadiest early on, freezing rain and sleet brought a glaze of ice and treacherous roads, especially over Nuckolls and Thayer Counties.

On **December 13-14th**, 1-3″ of snow fell over Clay, Fillmore, Nuckolls and Thayer Counties, but the snow wasn't the main story. A soaking rain fell across a good chunk of the area prior to the snow. East of an Alma-Kearney-Wolbach line, storm total liquid averaged between 1-2″. For that area, this yielded generally 2-2.5 times as much December precipitation as the 30-year monthly normal. **December 15th** brought another small batch of snow, this time to the far north and west when portions of Dawson, Gosper, Valley and Greeley Counties saw between 3-5″ of snow. Light-moderate snow on **Christmas Eve** was welcomed by many, setting the stage for the first white Christmas in a couple years. Most picked up 1-2″ of new snow, with locations south of Highway 6 getting 3-4″. It ended up being an unusual **Christmas Day** for areas along/east of a Franklin-Grand Island-Osceola line, when a narrow axis of thunderstorms developed. Along with frequent lightning, these storms produced a varied mix of sleet, graupel, freezing rain and snow. Accumulations were fairly minimal, the NWS Hastings office tallied 1.1″ of graupel. This likely marked one of the only, if not the only, occurrence of Christmas thunderstorms in this area!

Other than a band of heavy snow south and east of Hastings on **January 20th**, the month of January was quiet. The highest totals (6-9″) were in Nuckolls and Thayer Counties.

No question the event of the season was the blizzard that struck the area to start off February (see next page). The rest of the month was relatively quiet, with only light bouts of snow. Outside of precipitation, of note were **February 7th and 19th**, when strong winds affected the area with many gusts over 50 MPH. The strongest gusts recorded were: Hastings (58 MPH on the 7th) and Ord (59 MPH on the 19th).

One last snow storm on **March 23rd** brought an end to the season. Starting as showers and thunderstorms (with some small hail), colder air built in overnight, bringing a switch over to snow. The heaviest amounts fell over Valley and Greeley Counties, with Ord recording 8″. Amounts tapered off to 3-5″ in the Kearney County area to no snow in portions of Fillmore and Thayer Counties. Strong winds gusting over 50 MPH resulted in blizzard-like conditions in the evening, resulting in several road closures, including I-80 west of Grand Island. A peak gust of 61 MPH was recorded at the Ord Airport.



2015-16 Nebraska/Iowa Winter Weather Summary

Winter Weather Awareness Day - November 10, 2016

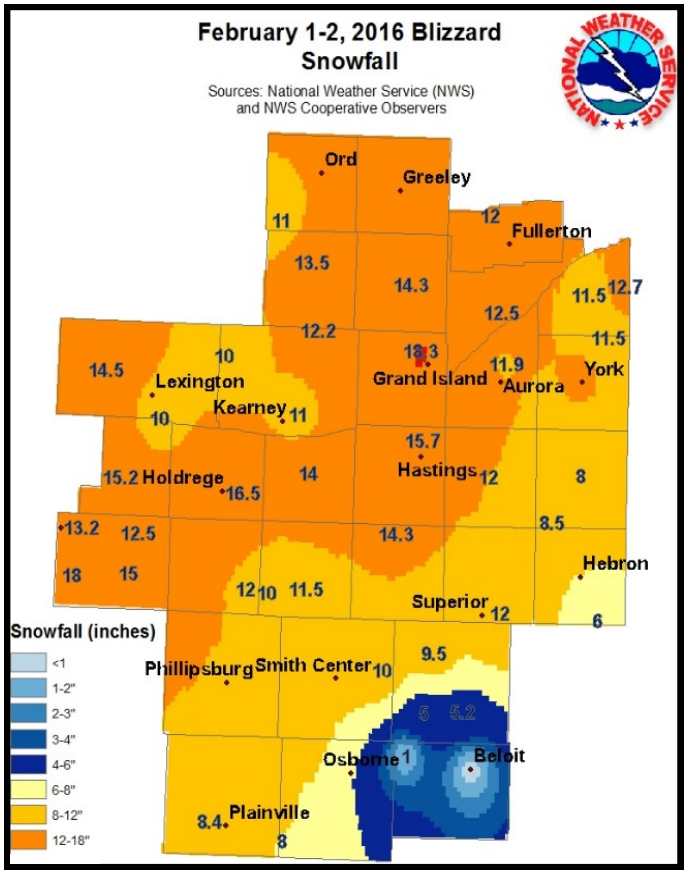
South Central Nebraska - NWS Hastings, NE Cont.

One of the most significant blizzards on record slammed the area on **Groundhog Day, February 2nd**, as a crippling combination of heavy snow and strong winds brought things to a halt. Among numerous other road closures, I-80 was shut down across all of south central Nebraska.

In terms of snow totals, this was the 2nd highest on record for Grand Island (18.3") and was the 4th highest 2-day total for Hastings (15.7"). At the peak of the blizzard during the pre-dawn/daytime hours on the 2nd, wind speeds averaged 30-40 MPH with gusts of 40-50 MPH. This was easily the worst winter storm to impact the area since the "2009 Christmas Blizzard". In Hall County alone, snow removal and public works related costs tallied over $438,000.

Via NWS Coop Observers, the majority of the area recorded snow totals of 10-16", with the highest amounts including 18" at Wilsonville, 16.5" at Holdrege and 15" at Beaver City. Extreme southeast areas (Thayer/Fillmore Counties) were spared the worst, recording "only" 5-8". In terms of liquid equivalent precipitation, this storm help propel many spots to a top-10 wettest winter on record, thanks to event liquid totals ranging from 0.70-1.6" for most, and as high as 1.81" in Grand Island.

More information and photos can be found here: http:www.weather.gov/gid/feb22016blizzard



Hip-deep drifts in Hastings. Photo from Amanda Schroeder.

No sunbathing in Dannebrog today! Photo from Paula Dush.

Grand Island. Photo from Trinia Lindell.