



# Nebraska Winter Weather Awareness Day

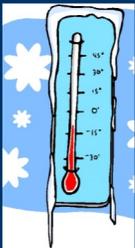
November 5, 2015



Welcome to the 2015-16 Nebraska Winter Weather Awareness Information Packet. Most of us probably are not in the "winter weather mode" yet, but it only takes one snow storm or a treacherous, icy commute to remind us winter is just around the corner. Use the information in this packet to prepare your school, your company, your subscribers, your listeners and yourself. Highlighted below are a few things we hope you check out in this year's packet. Thanks for helping make Nebraska "Weather-Ready".



**El Niño:** El Niño is a Pacific Ocean phenomena during which near equatorial waters are warmer than normal. El Niño happens routinely every few years and has strong influences on our weather at times. A special section on the potential El Niño impact and the Winter Outlook are included in this year's packet. Take a look and see what the NOAA/NWS Winter Outlook has in store for Nebraska.



**Winter Weather Forecast Challenges:** Ever known a snowfall forecast to be wrong? If you haven't, you must have been living on another planet. Winter weather may be the most difficult weather to forecast correctly. NWS forecasters try to determine what type of precipitation (frozen, freezing or liquid) may fall. Add on the location, timing, amounts and impacts of winter weather, and it really takes a team of forecasters to get it correct. Check out the section on the challenges of winter weather forecasting to learn more.



**Winter Terminology:** No one likes a test over terms, so we will not give you one. We actually gave you all the answers. Look over the pages which include winter terminology; such as watches, warnings and advisories. These types of terms have been around for decades, but some are still confused. Take this opportunity to know what terminology is used to communicate our winter weather hazards.



**It Might be Hard to Recall, But We Did Have Winter Last Year:** Did you know parts of northwest Nebraska had over 60" of snow while other parts of the state had less than 10"? Did you know at least one station set an all time pressure measurement last winter? If you did not know those things, check out our summary of last winter. Seems like old news, but it is still packed with interesting facts and figures, including a statewide seasonal snowfall map.



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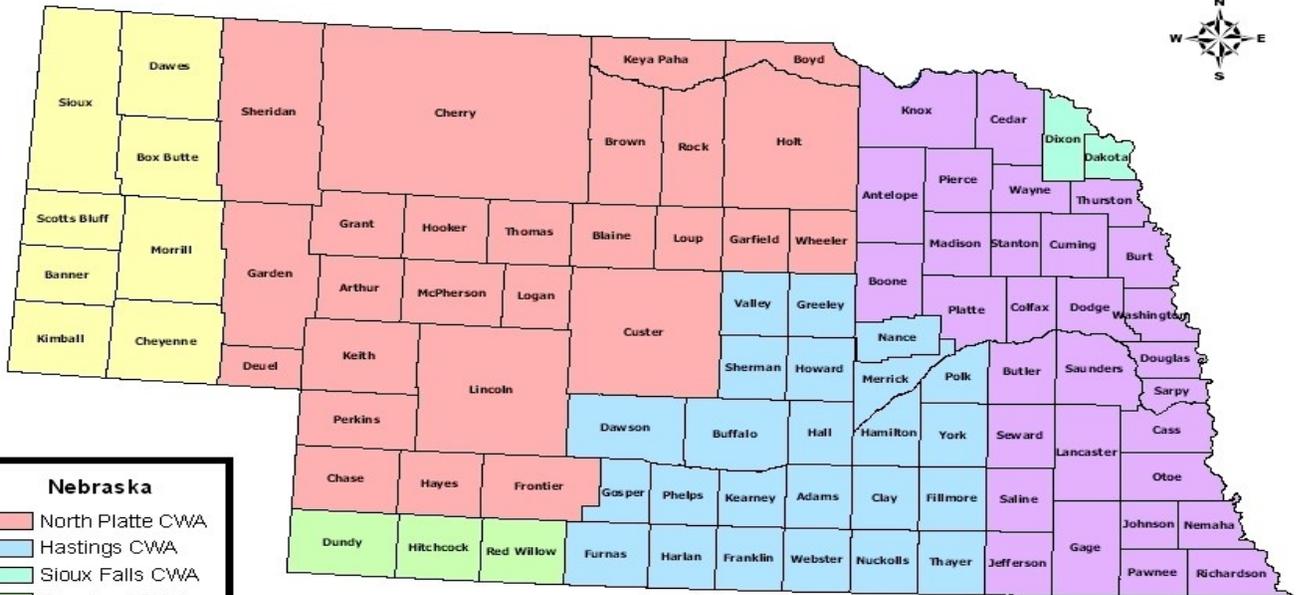


# National Weather Service Offices Serving Nebraska



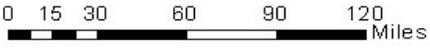
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## National Weather Service Coverage Area



**Nebraska**

- North Platte CWA
- Hastings CWA
- Sioux Falls CWA
- Goodland CWA
- Cheyenne CWA
- Omaha CWA



**Panhandle**  
Cheyenne, WY  
[www.weather.gov/cys](http://www.weather.gov/cys)

**NWSCheyenne**  
 **@NWSCheyenne**  
 **NWS Cheyenne**

**West and North Central**  
North Platte  
[www.weather.gov/lbf](http://www.weather.gov/lbf)

**NWSNorthPlatte**  
 **@NWSNorthPlatte**  
 **NWS North Platte**

**Far Southwest**  
Goodland, KS  
[www.weather.gov/gld](http://www.weather.gov/gld)

**NWSGoodland**  
 **@NWSGoodland**  
 **NWS Goodland**

**South Central**  
Hastings  
[www.weather.gov/gid](http://www.weather.gov/gid)

**NWSHastings**  
 **@NWSHastings**  
 **NWS Hastings**

**East**  
Omaha  
[www.weather.gov/oax](http://www.weather.gov/oax)

**NWSOmaha**  
 **@NWSOmaha**  
 **NWS Omaha**

**Far Northeast**  
Sioux Falls, SD  
[www.weather.gov/fsd](http://www.weather.gov/fsd)

**NWSSiouxFalls**  
 **@NWSSiouxFalls**  
 **NWS Sioux Falls**





# El Niño And The 2015-16 Winter Outlook



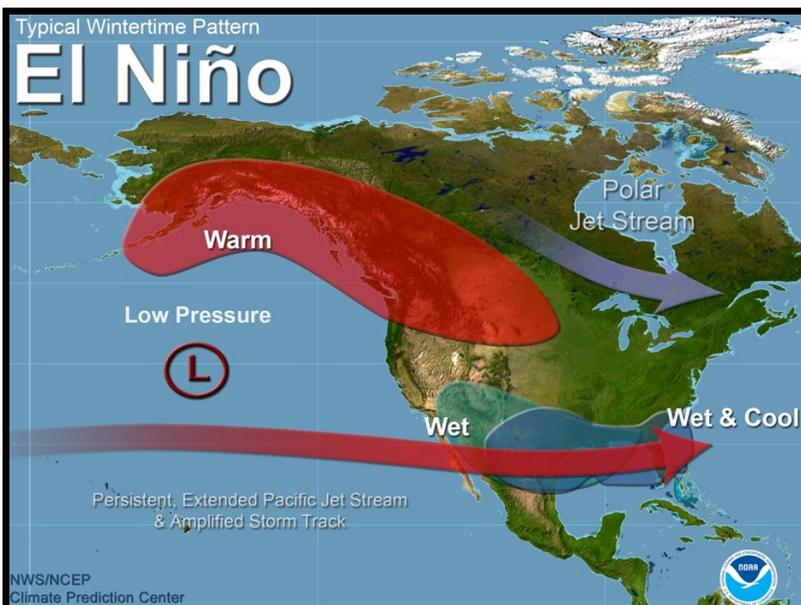
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A strong El Niño is in place and will continue through the winter months. What does that mean for Nebraska?

El Niño is a name given to a combined ocean and atmosphere phenomenon that typically shows up in the fall to winter. During El Niño, the temperatures in the eastern or central Pacific Ocean near the equator become warmer than usual. The warm pool affects the position of the jet stream, driving the subtropical jet stream across the southern U.S. and bringing a tendency toward storminess. The polar jet stream tends to stay further north in Canada, leaving the northern U.S. warmer and drier than usual.

Here in Nebraska, we are right in the middle between the stronger tendencies in both the northern and southern U.S., but we do still see at least small influences of El Niño on our wintertime temperatures and precipitation. During an El Niño winter, our odds shift toward a higher than usual chance for warmer temperatures and wetter conditions.

This winter, the NWS Climate Prediction Center's outlook for both temperatures and precipitation follows the El Niño tendencies pretty strongly. In Nebraska, the odds are tilted slightly toward chances for both warmer and wetter conditions. To get specific, we have a 33-40% chance for temperatures to be in the warmest third compared to climatology, with about a 33% chance of temperatures in the near-normal third and a 27-33% chance for temperatures in the coolest third. On the precipitation side, we have a 33-50% chance for conditions like the wettest third of climatology, with about a 33% chance of conditions in the near-normal third and a 17-27% chance of conditions like the driest third of climatology. Those chances for the wetter conditions are highest in south central Nebraska, while the chances for the warmest conditions are highest in northern Nebraska.



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





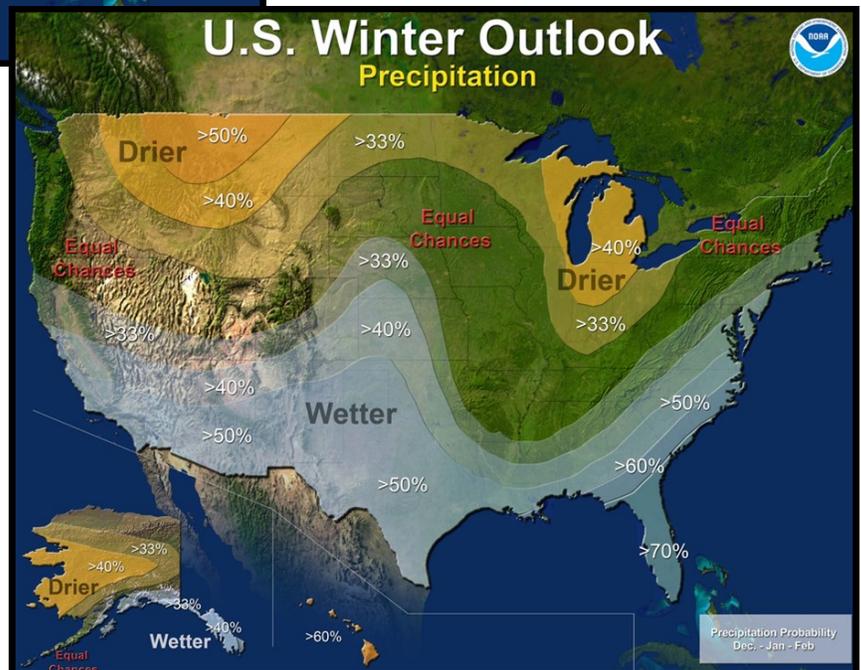
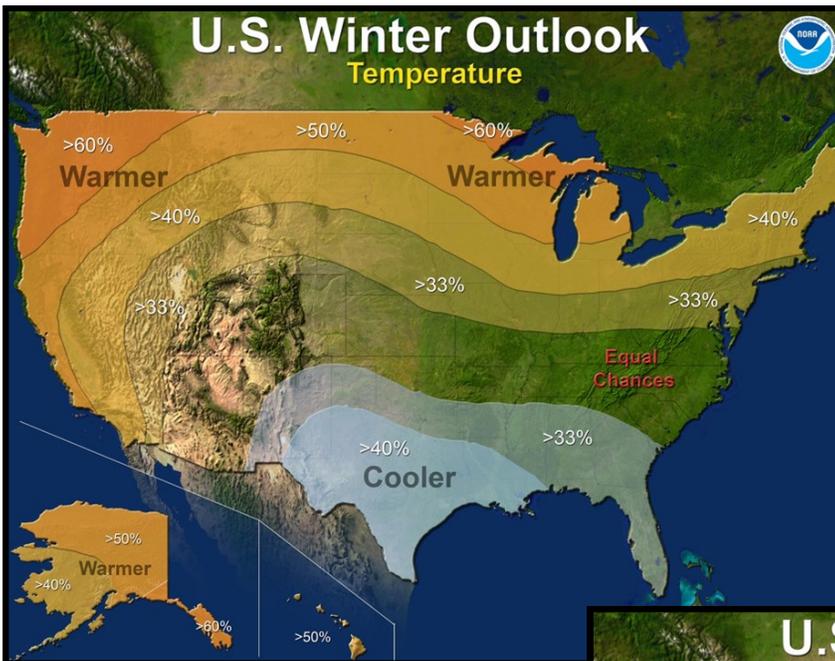
# El Niño And The 2015-16 Winter Outlook



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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.

El Niño is an important factor in winter conditions and has a signal that is fairly predictable, at least in general terms. 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.





# 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.

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## 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

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## 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



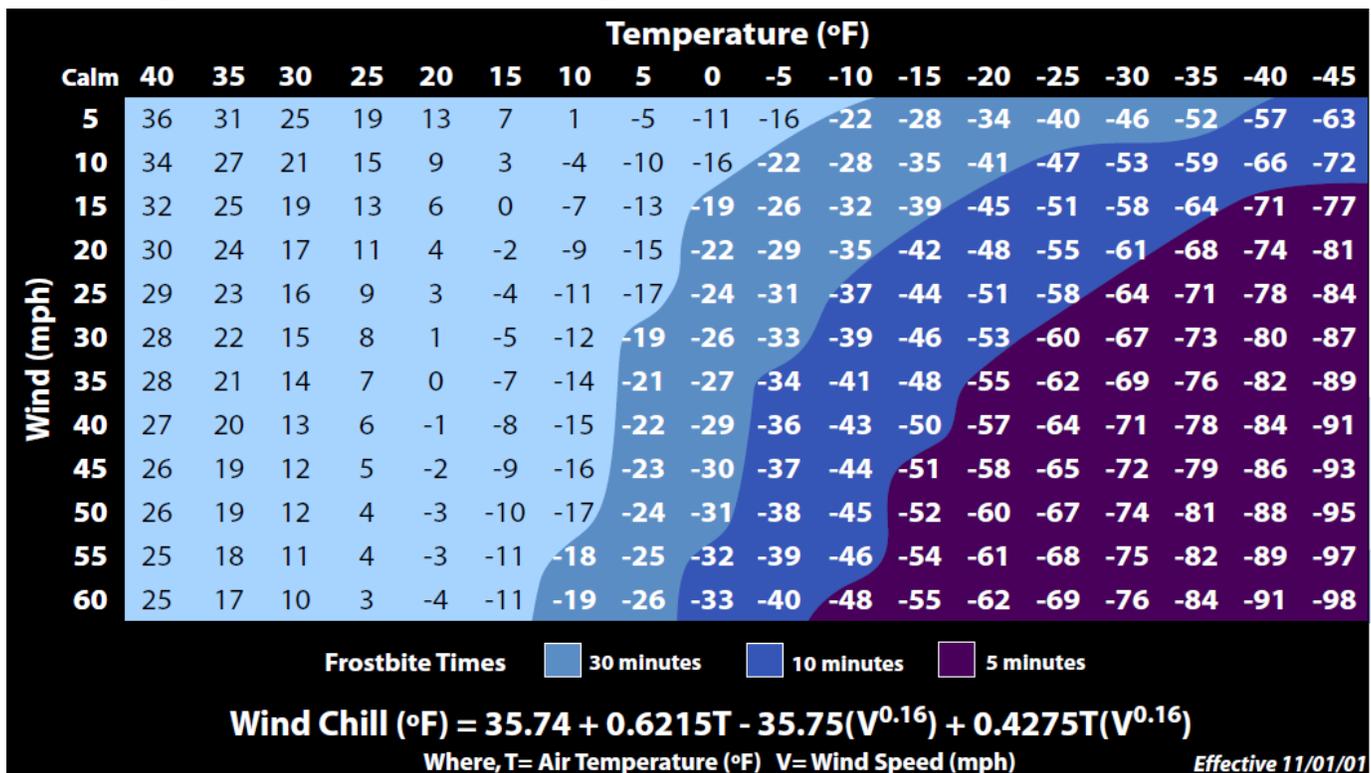
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Exposure to cold can cause frostbite or hypothermia and become life-threatening. Infants and elderly people are most susceptible. What constitutes extreme cold varies in different parts of the country. In the south, near freezing temperatures are considered 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>





# Winter Weather Dangers

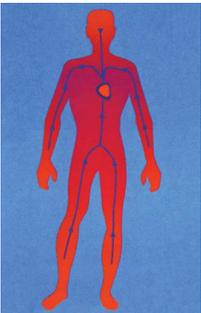


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**Frostbite** - is damage to body tissue caused by extreme cold. A wind chill of  $-20^{\circ}\text{F}$  will cause frostbite in just 30 minutes. Frostbite causes a loss of feeling and a white or pale appearance in extremities, such as fingers, toes, 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  $95^{\circ}\text{F}$ . 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  $95^{\circ}\text{F}$ , 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.

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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 Preparedness For Schools



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## 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/drifted 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.





# Winter Weather Safety Tips



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## ***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



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## **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



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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.

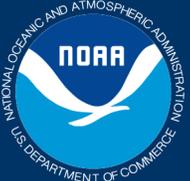
## ***Always carry a Winter Storm Survival Kit in your car!!***

- ◆ 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



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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>

**Nebraska:** When in-state, call 511.

When out of state call: 1-800-906-9069

**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/>

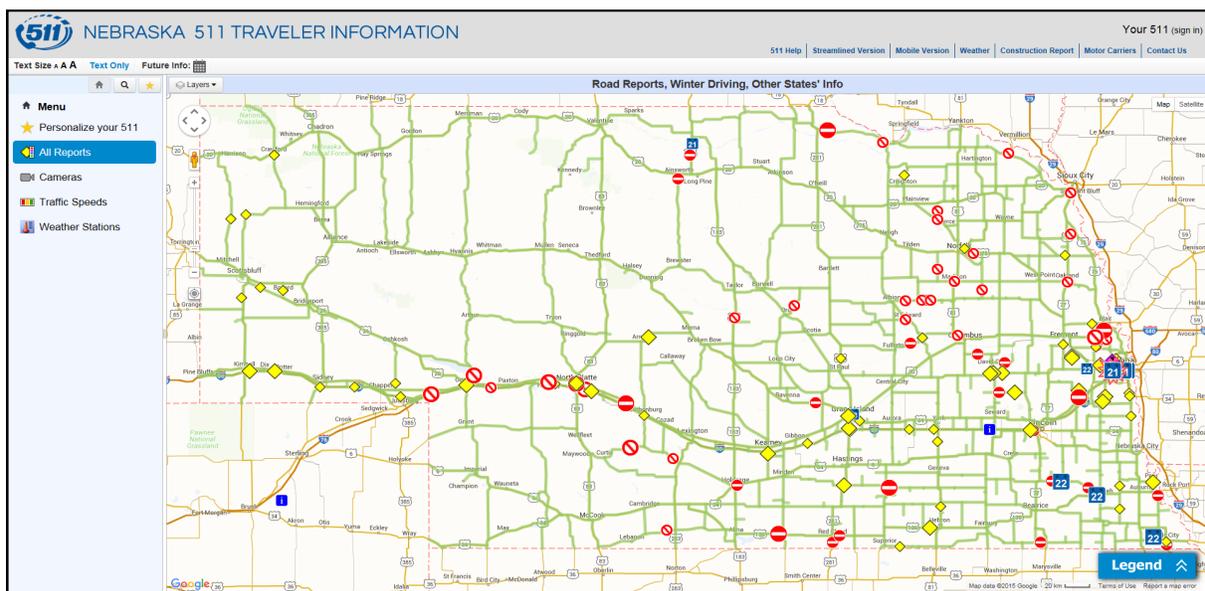
Out of state: 1-888-ASK-MDOT  
(1-888-275-6636)

**Iowa:** <http://511ia.org>

Out of state: 1-800-288-1047

National Traffic and Road Closure Information can be found at:

[www.fhwa.dot.gov/trafficinfo/index.htm](http://www.fhwa.dot.gov/trafficinfo/index.htm)



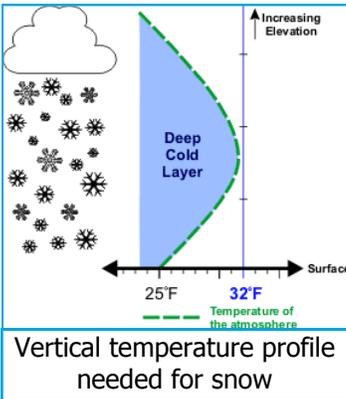


# Determining Winter Precipitation Types



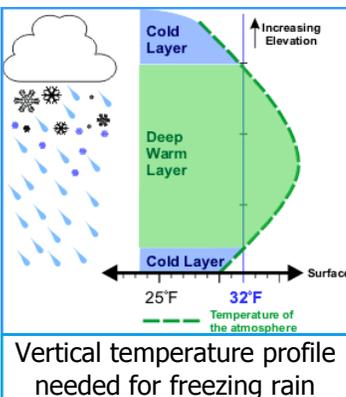
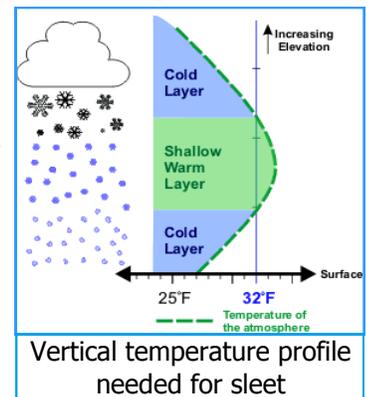
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One of the difficult tasks for a forecaster is trying to figure out what type of precipitation is going to occur in the winter. An important piece of the puzzle involves determining the temperature throughout the troposphere (basically the lower 7-8 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.



**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**.

**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.



**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 where 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



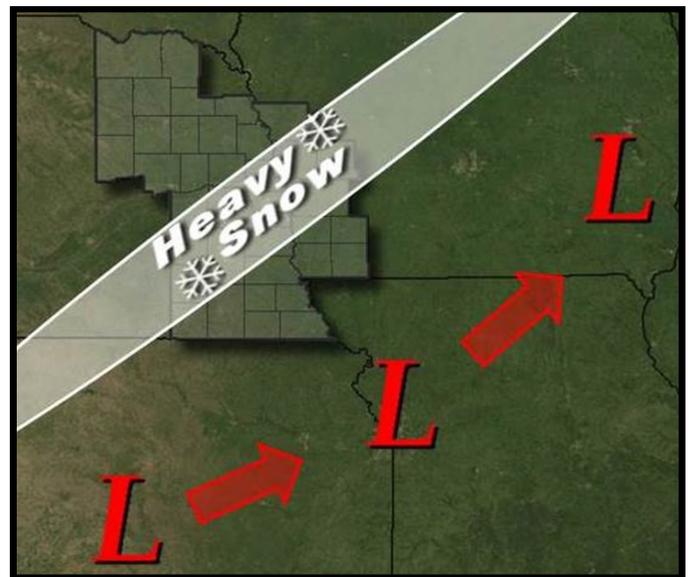
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Forecasting the amount of snowfall is challenging for meteorologists. Most people do not understand why forecasts for heavy amounts of snow can become a bust, or when little is expected you get dumped on. There are several factors involved in forecasting 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 15 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.



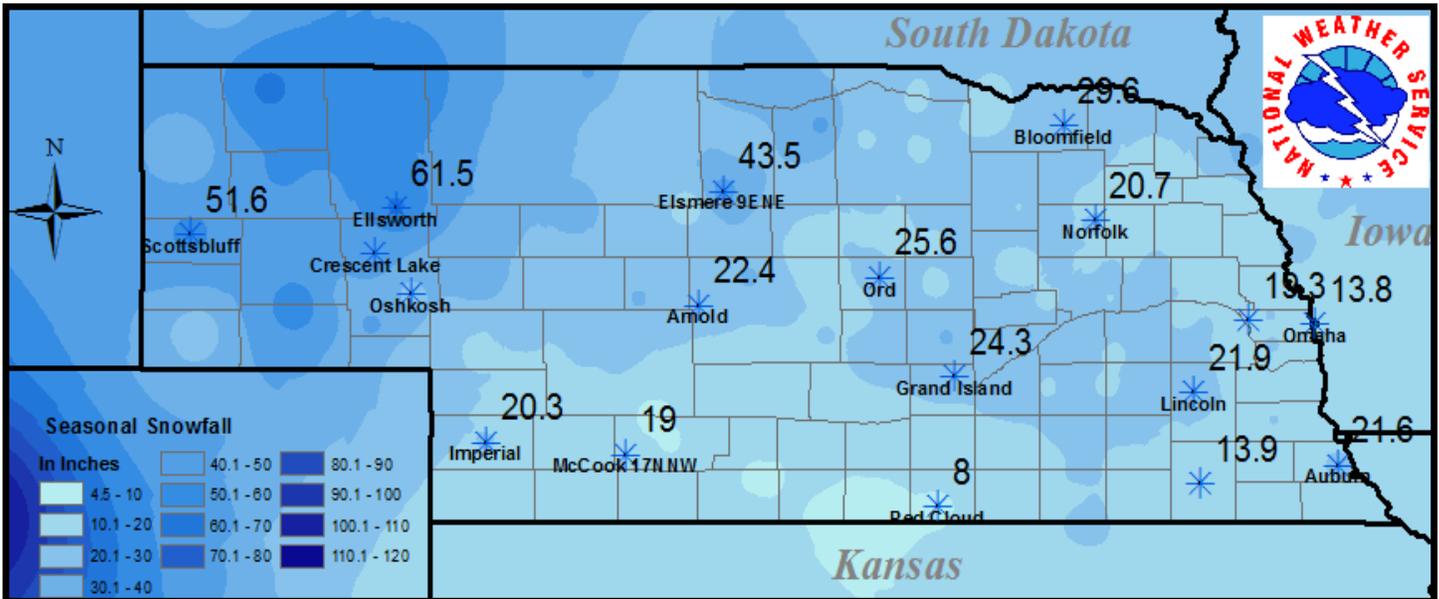


# 2014-15 Nebraska Winter Weather Summary

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## 2014-15 Season Statewide Snowfall Map



### Seasonal Snowfall 2014-2015

Location	Normal (1981-2010)	2014-2015	% Normal	2012-2013	% Normal
Scottsbluff	42.1"	51.6"	123%	63.7"	151%
North Platte	28.5"	21.3"	75%	29.8"	105%
Valentine	33.3"	22.5"	68%	35.8"	108%
McCook	28.8"	19.0"	66%	40.0"	139%
Grand Island	29.0"	24.3"	84%	16.4"	57%
Norfolk	30.5"	20.7"	68%	19.9"	66%
Omaha	26.4"	13.8"	52%	17.8"	67%
Lincoln	25.9"	21.9"	85%	18.2"	70%





# 2014-15 Nebraska Winter Weather Summary



Winter Weather Awareness Day - November 5, 2015

## Nebraska Panhandle - NWS Cheyenne, WY

The 2014-15 season turned out to be a little warmer than average for most of the Nebraska Panhandle. The Sidney area turned out a little cooler than normal. Precipitation was a little above average across the area, particularly over the northwest part of the Panhandle. December was the wettest month overall with January and February generally drier than average. The most significant cold outbreak occurred in late December into early January when several days of below-zero temperatures occurred. Before that the most significant snowfalls occurred in mid to late December with Scottsbluff recording a 10.5" snowstorm on **December 14-15<sup>th</sup>**, and a 10.6" snow on **Christmas Day through the 26<sup>th</sup>**.

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

City	Dec. avg temp	Dec. depart. from normal	Jan. avg temp	Jan. Depart. from normal	Feb. avg temp	Feb depart. from normal	Dec-Feb avg temp.	Dec-Feb depart. from normal
Alliance	24.2	+0.6	24.5	+0.3	28.8	+1.7	25.8	+0.8
Chadron	26.5	+2.1	26.1	+1.7	30.5	+3.1	27.7	+2.3
Harrison	25.7	+2.4	25.8	+2.4	27.3	+1.5	26.3	+2.1
Kimball	26.5	+0.2	28.8	+1.8	30.0	+1.0	28.4	+1.0
Scottsbluff	25.8	-0.3	26.6	-0.6	33.4	+3.0	28.6	+0.7
Sidney	26.0	-2.7	28.7	-0.5	31.8	-0.2	28.8	-1.2

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 temp and date	Highest temp and date	Lowest daily avg temp and date	Highest daily avg temp and date	# days with mins at or below zero
Alliance	-28 on Dec. 31*	71 on Jan. 27	-14 on Dec. 30	49.0 on Jan. 27	15 (-2)
Chadron	-21 on Dec. 30	72 on Dec. 12	-10.5 on Dec 30	53.0 on Feb. 7	10 (-5)
Harrison	-19 on Jan. 4	67 on Jan. 28	-10 on Dec. 31	52.5 on Jan. 28	12 (-2)
Kimball	-26 on Dec. 31	74 on Jan. 28	-12.5 on Dec 31	56.0 on Feb. 8	14 (+5)
Scottsbluff	-28 on Dec. 31	72 on Feb. 7	-10.5 on Dec 30	55.0 on Feb. 7	9 (-3)
Sidney	-21 on Dec. 31*	76 on Feb. 7	-10.5 on Dec 30	57.5 on Feb. 7	13 (+4)

**Precipitation:** Winter precipitation turned out to be a bit above average across the area. The southern panhandle saw amounts close to or a little below 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 ranged from about 30-50" across the Panhandle. The following table tabulates the December through February liquid precipitation amounts and their departures from average:

City	Dec pcpn (depart)	Jan pcpn (depart)	Feb pcpn (depart)	Total pcpn (depart)
Alliance	1.00 (+0.68)	0.02 (-0.16)	0.05 (-0.33)	1.07 (+0.19)
Chadron	1.37 (+0.85)	0.02 (-0.34)	0.27 (-0.34)	1.66 (+0.17)
Harrison	0.63 (+0.23)	0.31 (-0.01)	0.61 (+0.23)	1.55 (+0.45)
Kimball	0.71 (+0.25)	0.15 (-0.14)	0.49 (+0.14)	1.35 (+0.25)
Scottsbluff	1.47 (+0.96)	0.45 (+0.04)	0.39 (-0.21)	2.31 (+0.79)
Sidney	0.42 (-0.12)	0.16 (-0.04)	0.27 (-0.05)	-0.21 (-0.09)





# 2014-15 Nebraska Winter Weather Summary



Winter Weather Awareness Day - November 5, 2015

## West and North Central Nebraska - NWS North Platte, NE

The winter season of 2014-15 began with three winter storms arriving in December followed by dangerous wind chills at the end of the month. The next winter storm arrived in February, followed by two late season winter storms in May. The season will be remembered for the two winter storms in May. While no record snowfall was observed across western and north central Nebraska, the seasonal snowfall total of 61.5" at Ellsworth, in Sheridan County, was the highest cooperative observer amount reported. See the statewide snowfall map on page 17 for additional information.

### December - A Snowy Month

The first winter storm of the season brought rain, followed by freezing rain, sleet and snow to portions of western and north central Nebraska. The storm began as rain early in the afternoon on **December 14<sup>th</sup>** and transitioned to freezing rain, sleet, then snow during the overnight hours and daytime hours on December 15<sup>th</sup>. The heaviest snowfall amounts ranged from 4 to 9" across north central Nebraska. Freezing rain and sleet caused additional impacts, including very icy roadways, across eastern portions of north central Nebraska.

Another winter storm arrived **December 22<sup>nd</sup> and 23<sup>rd</sup>**. Heavy snow with blowing and drifting occurred across northern Sheridan County. The highest snowfall totals were across northwest Sheridan County with 12" near Hay Springs and 6" near Rushville. Across the remainder of the county, amounts ranged from 2 to 4". Northwest winds increased to 20 to 30 mph on December 23<sup>rd</sup>, causing blowing and drifting snow and visibilities as low as a quarter mile at times during the morning hours.

Another storm system brought widespread snowfall of 2 to 4" with locally higher amounts during the busy **Christmas holiday**. Near the end of December, an arctic air mass combined with winds to produce dangerous wind chills of 30 to 40 below across much of western and north central Nebraska during the evening and overnight hours.

### February - A Winter Storm

A low pressure system combined with an arctic cold front on **February 3<sup>rd</sup> and 4<sup>th</sup>** to produce heavy snow with some blowing and drifting to portions of western and north central Nebraska. Snowfall amounts ranged from 4 to 8" with local amounts up to 10".





# 2014-15 Nebraska Winter Weather Summary



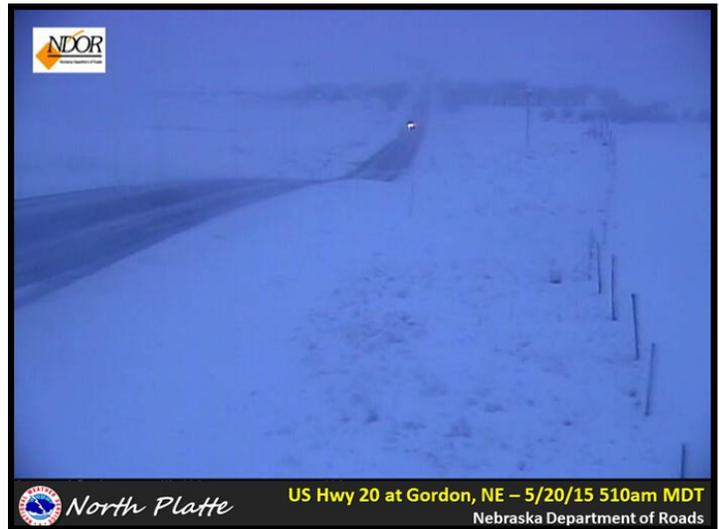
Winter Weather Awareness Day - November 5, 2015

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

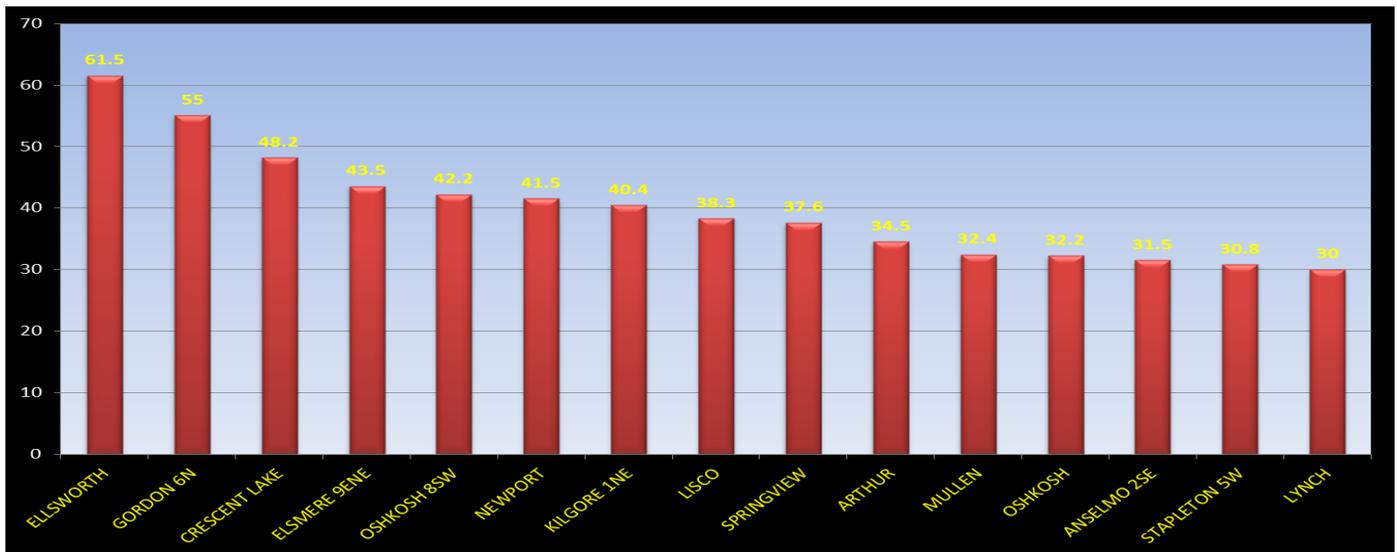
## May - Two Late Season Winter Storms

The first winter storm in May impacted northwest Nebraska during the overnight hours on **May 9<sup>th</sup> through May 10<sup>th</sup>**. A powerful low pressure system crossed western Nebraska late on May 9<sup>th</sup> to produce heavy snow overnight in Sheridan County. The precipitation began as rain, then mixed with snow, and finally transitioned to all snow. The heaviest snowfall fell in the Pine Ridge area, where amounts ranged from 12 to 24"!

A second winter storm occurred on **May 19<sup>th</sup> and 20<sup>th</sup>**. This brought heavy snow to Sheridan County again as well as portions of Garden, Grant, and western Cherry Counties. Snowfall amounts from this storm ranged from 2 to 8". To the right is a photo of the road conditions near Gordon on the morning of May 20<sup>th</sup>.



A table of the 15 snowiest seasonal snowfall totals obtained from cooperative observers is shown below, where Ellsworth tops the list followed closely by 6 miles north of Gordon. For the month of May alone, Gordon 6N received 21"! The average seasonal snowfall is 39.7".





# 2014-15 Nebraska Winter Weather Summary



Winter Weather Awareness Day - November 5, 2015

## Far Southwest Nebraska - NWS Goodland, KS

The 2014-15 winter season had little for noteworthy events. The two more unusual weather events were the extreme cold, which occurred during the end of December into the beginning of January, and an ice jam which occurred west of Benkelman in January. Despite the few days of bitter wind chills, the area was generally above normal from October through April, with temperatures warming well above normal in March and April. Frost came a few days later than normal for the area.

Station	Temperature Departure From Normal						
	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015
Benkelman	2.8°	-2.4°	0.5°	2.4°	1.6°	6.6°	3.2°
Culbertson	3.3°	-2.8°	0.6°	0.9°	-0.6°	5.2°	3.0°
McCook	3.8°	-1.8°	2.0°	3.9°	1.9°	8.1°	4.6°
Trenton Dam	4.3°	-1.3°	2.0°	4.0°	1.7°	6.7°	4.2°

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

Seasonal snowfall was lacking last winter as shown in the table below. Snowfall totals were around half of normal. The most notable snowfall event occurred on **Christmas Day**. Of the snowfall reports received, Stratton accumulated 3" of total snowfall from the storm, Benkelman 4-5", and Culbertson 4".

Station	Oct 2014-Apr 2015 Snowfall	1981-2010 Normal	Percent of Normal
Benkelman	13.0"	29.8"	44%
Culbertson	13.5"	28.2"	48%
McCook	15.2"	28.7"	53%
Trenton Dam	13.7"	24.5"	56%

Table 2: Oct 2014 - Apr 2015 Snowfall, Normal Snowfall, Percent of Normal Snowfall

### December 2014 - January 2015

Almost five consecutive days of wind chills either at or below -15° were reported across extreme Southwest Nebraska due to an arctic air mass settling over the area and breezy north winds. The coldest wind chills occurred on the last two days of the year when wind chills fell as low as -26° in Benkelman and -25° in McCook.

Early in January an ice jam occurred west of Benkelman near the Doane Bridge on Road 333. Large chunks of ice had become jammed under the bridge and caused minor flooding as the Republican River flow was redirected around the bridge, flooding Road 333.

No other notable winter weather occurred the remainder of the winter season.





# 2014-15 Nebraska Winter Weather Summary



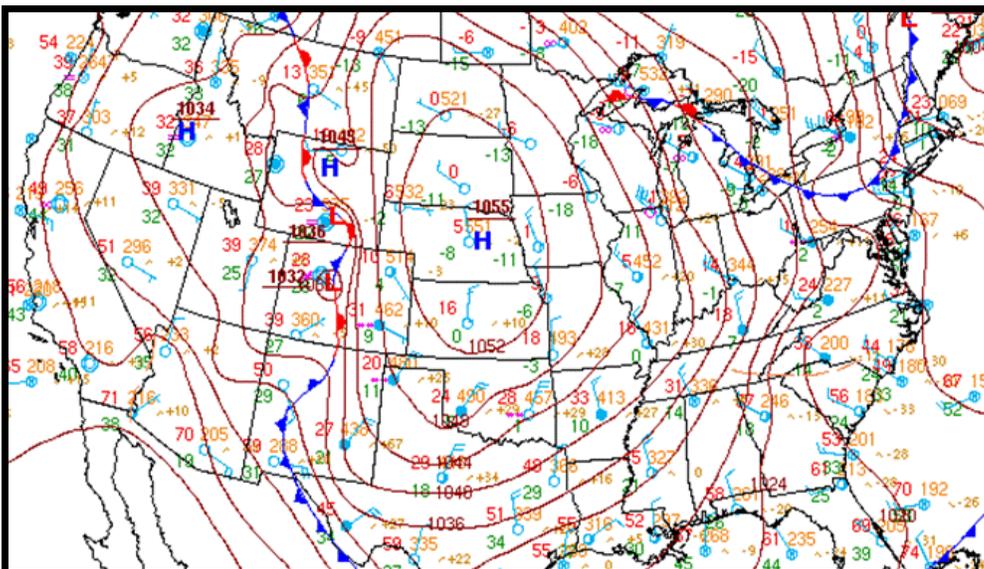
Winter Weather Awareness Day - November 5, 2015

## South Central Nebraska - NWS Hastings, NE

**December 15<sup>th</sup>** brought the first impactful snow event of the 2014-15 winter season, when generally 1 to 4" of fairly wet snow targeted several counties primarily west of the Highway 281 corridor. Within this area, locations roughly 15 miles either side of a line from Ord-Elm Creek-Oxford received the most concentrated swath of steady, wind-blown snow. Some of the overall worst early morning travel conditions focused within a narrow, north-south oriented snow band over Phelps and western Buffalo counties.

The remainder of the month of December was void of any significant storms, instead being impacted by events with snowfall totals of less than 6". On **December 18<sup>th</sup>**, the majority of the coverage area picked up a light coating of snow up to around 0.5". However, the far southeast fringes of the area, especially Nuckolls and Thayer Counties, picked up amounts in the 1.5" to 3" range. **December 26<sup>th</sup>** brought another 1-2" of snow for most locations, with locations mainly north and northwest of a Johnson Lake-Kearney-Grand Island-Fullerton line realizing the highest totals of 2-4". Freezing drizzle also fell across areas east of Highway 281 prior to the snowfall, resulting in numerous traffic accidents.

Quite possibly the most interesting story in January wasn't snow, but a record breaking atmospheric pressure recorded at the Central Nebraska Regional Airport in Grand Island. A sea level pressure of 1056.9 millibars (mb) was recorded on **January 7<sup>th</sup>**. This was the highest recorded atmospheric pressure ever measured at the airport. The old record (1054.5 mb) occurred on December 24, 1983. Very high atmospheric pressure measurements often coincide with record breaking cold. Fortunately, the temperature that day only dipped to -3° in Grand Island, a far cry from the extreme cold experienced when the record was last set. Back in 1983, Grand Island was in the midst of its coldest December on record and there was 17" of snow on the ground. The combination of the anomalous high pressure and snow on the ground resulted in the temperature in Grand Island plummeting to -19° on December 24, 1983.



**Left:** Surface analysis map at 12 p.m. CST on January 7th, 2015 shows record setting high pressure over the central U.S.

This occurred as a result of an unusually strong/cold Arctic high pressure system sinking southward out of Canada and across the Plains.





# 2014-15 Nebraska Winter Weather Summary



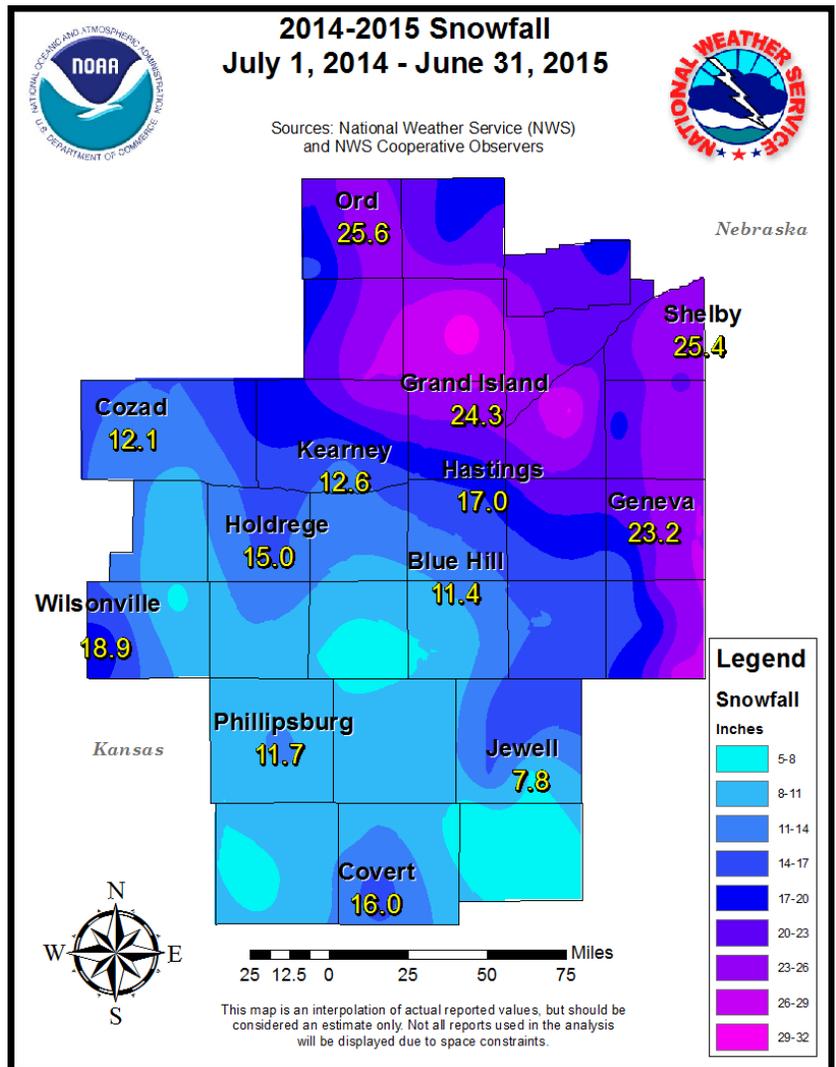
Winter Weather Awareness Day - November 5, 2015

## South Central Nebraska - NWS Hastings, NE Cont.

On **January 28<sup>th</sup>**, a new high temperature record of 68 was set at Grand Island, breaking the previous record of 63 set in 1986. Hastings tied their record of 69, set in 1931. A "great" way to follow record warmth, **January 31<sup>st</sup>-February 1<sup>st</sup>** brought the first widespread winter storm of the season to the Plains. The majority of the area received at least 2-4" of snow, with most counties near and especially east of the Highway 281 corridor reporting noticeably higher totals in generally the 6-8" range. The highest totals featured 9.0" 4 miles north of Aurora and 8.4" 3 miles northeast of Shelby. On a positive note, this storm brought widespread, much needed liquid precipitation, with many places receiving between 0.5-1". Through the day on February 1<sup>st</sup>, a strong cold front brought strong north winds, with speeds at least 20-30 MPH and gusts near 45 MPH. Although additional accumulation was fairly minimal after the winds ramped up, travel conditions became treacherous due to blowing/drifting snow and near-blizzard conditions. Significant impacts occurred as portions of Interstate 80 were closed due to numerous accidents. Area roads remained extremely slick into February 2<sup>nd</sup>, resulting in numerous school cancellations.

Only a few days later, on **February 4<sup>th</sup>**, another notable but quicker hitting storm dropped more snow across the area. The highest amounts in the 4-9" range targeted a roughly 30 mile wide corridor running from Sherman County east to southeast through the St. Paul, Grand Island, Central City, Aurora and York areas. Combined with winds gusting near 35 MPH, this resulted in a rough morning commute and prompted numerous school closures.

One final snow event on **February 17<sup>th</sup>** added 2-4" of snow to the seasonal total (image to the right), but overall the 2014-2015 snow season was a "light" one in terms of seasonal totals. On average, the region received 10 to 20" less snow than normal, with a few locations measuring less than 10" of snow for the season. A few of the lowest seasonal totals include 6.5" at Franklin, 7" at Edison, 8" at Red Cloud and 9" at Harlan County Lake.





# 2014-15 Nebraska Winter Weather Summary



Winter Weather Awareness Day - November 5, 2015

## Eastern Nebraska - NWS Omaha/Valley, NE

The winter of 2014-15 had near to slightly above normal precipitation and temperatures, but below normal snowfall. The winter ranked as "mild" on the Accumulated Winter Season Severity Index (AWSSI), meaning that was in the lowest 20<sup>th</sup> percentile for winter severity for the area. Winter storm activity over the winter was infrequent.

	Omaha	Lincoln	Norfolk
Average Temperature (DJF)	26.7 °F	27.0 °F	25.1 °F
Ranking (warmest)	57th	61st	26th
Total Precipitation (DJF)	2.82"	3.06"	2.08"
Ranking (wettest)	50th	35th	52nd
Total snowfall (Full 2014-15)	13.8"	21.9"	20.7"
Ranking (least snowy)	7th	26th	18th

The most significant winter storm of the season came on **January 31<sup>st</sup>** into the day on **February 1<sup>st</sup>**. This system brought widespread 6 to 9" of snow to east central and southeast Nebraska. A mix of rain and snow, which started to fall during the morning on January 31<sup>st</sup>, became all snow by late afternoon. The snow continued into the morning on February 1<sup>st</sup>. In addition to the snowfall, northwest winds increased to 20 to 30 MPH winds and gusts to 40 MPH created significant blowing and drifting of the new snowfall, which created very difficult travel.

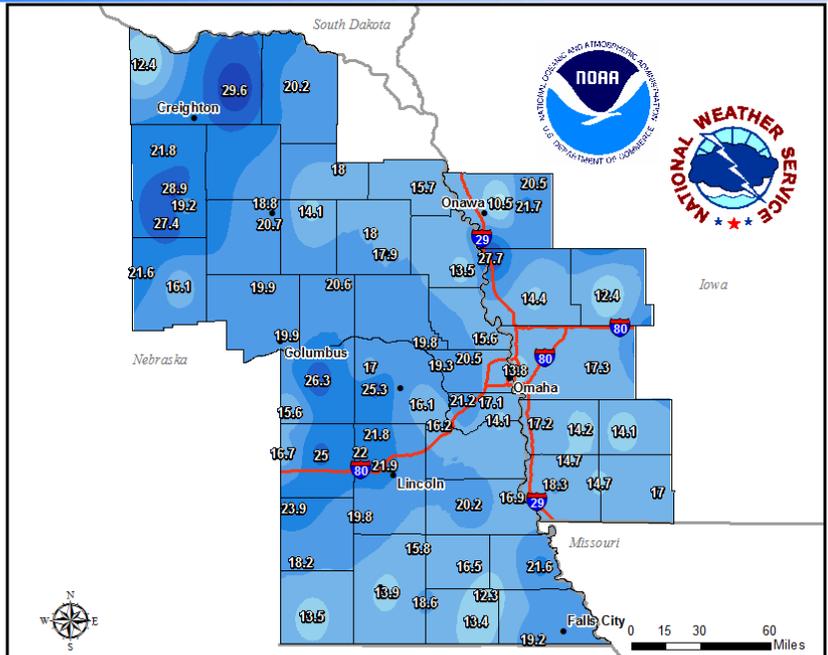
The only other winter storm of the season affected a small portion of northeast Nebraska on **December 15<sup>th</sup> into December 16<sup>th</sup>**. A strong upper level storm system moved from Kansas into Iowa during this time and produced widespread precipitation across eastern Nebraska. The majority of this fell in the form of rain as temperatures remained in the upper 30s and lower 40s. During the morning on December 15<sup>th</sup>, sufficiently cold air moved into northeast Nebraska to allow for the precipitation to change from rain to a mix of

## Seasonal Snowfall 2014-2015

This map is an interpolation of actual reported values, but should be considered an estimation only. Not all reports used in the analysis will be displayed due to space constraints. Reports seasonal snowfall from 2014-2015

### Snowfall Contours In Inches

- <12
- 12 - 15
- 15 - 18
- 18 - 21
- 22 - 24
- 24 - 27
- 27 - 30
- 30 - 33
- 33 - 36



National Weather Service  
NeRAH  
CoCoRaHS

Created by the National Weather Service Forecast Office Omaha/Valley, Nebraska





# 2014-15 Nebraska Winter Weather Summary



Winter Weather Awareness Day - November 5, 2015

## Eastern Nebraska - NWS Omaha/Valley, NE Cont.

sleet and snow, eventually becoming all snow, which then lasted through the afternoon before ending during the evening. Northwest winds gusting to over 40 MPH accompanied the snowfall across northeast Nebraska into the morning of December 16<sup>th</sup>. This created blowing and drifting snow.

A number of other weaker storm systems affected the area during the winter season, bringing generally light to moderate snowfalls and cold air. One of these types of weather systems kicked off the winter season as a very strong and sharp cold front sliced across eastern Nebraska on **November 10<sup>th</sup>** that brought what had been a very warm start to November to an abrupt end. Highs on November 11<sup>th</sup> were 30 to 40 degrees colder than on November 10<sup>th</sup>. Along with the sharply colder temperatures, the system brought the first widespread snowfall to the region. Snowfall amounts were generally less than an inch, but with the recent warm temperatures, the snowfall initially melted on area roadways and then froze as the colder air rushed in. This allowed the wet roadways to quickly freeze, creating significant travel problems and numerous accidents. The next, and more significant, snow system followed quickly on the heels of the first, bringing more light to moderate snowfall to the area on **November 15-16<sup>th</sup>**. Snowfall from this system ranged from 3 to 5" in northeast Nebraska to 1 to 3" in southeast Nebraska.

Most of east central and southeast Nebraska was greeted with a brown ground on Christmas morning, but a weak storm system brought snowfall of 1 to 2" across parts of northeast Nebraska on **December 23<sup>rd</sup>-24<sup>th</sup>**, allowing for at least 1" of snow on the ground for a white Christmas in these areas. The pattern of quick moving light snowfalls continued after Christmas, with an additional system on **December 26<sup>th</sup>** that brought generally 1 to 3" to northeast Nebraska and another on **December 29<sup>th</sup>** with 1 to 2" of snowfall to southeast Nebraska. The weak weather systems kept moving through the area into the New Year, with another 1 to 2" of snowfall on **January 3<sup>rd</sup>**. The pattern of light snows finally broke down after the system on **January 4<sup>th</sup>** that brought generally less than 1" to mainly east central Nebraska. Mild temperatures dominated the second half of January, with highs in the 50s and little precipitation.

After the winter storm on January 31<sup>st</sup>-February 1<sup>st</sup> (see page 23), winter only provided one additional moderate snowfall. This came on **February 4<sup>th</sup>**, when a quick moving clipper type system moved across the state and produced a period of heavy snowfall during the morning rush hour over east central and southeast Nebraska. Snowfall amounts ranged from 3 to 6" in southeast Nebraska to 1 to 2" in northeast Nebraska. On its heels, the coldest temperatures of the winter shattered the mild spell, with lows in the teens below zero. Because these bitterly cold temperatures followed a prolonged mild spell, they caused freeze damage to some varieties of fruits and trees, even though the temperatures themselves were not especially abnormal. After a mild January, temperatures remained below normal for much of February. The last dusting of snow for the season fell on **March 4<sup>th</sup>** in Omaha and Lincoln and on **April 9<sup>th</sup>** in Norfolk.

