

# Nebraska Winter Weather Awareness Day

Winter Weather Awareness Day - November 4, 2010



With Fall upon the Great Plains, now is the time to focus attention to winter weather and the dangers it can pose to life and property. **November 4th, 2010** has been declared as Winter Weather Awareness Day for the state of Nebraska. Each year, dozens of Americans die due to exposure to the cold. Winter weather accounts for vehicle accidents and fatalities, and results in fires due to dangerous use of heaters and other winter weather fatalities. Other hazards, such as hypothermia and frostbite, can lead to the loss of fingers and toes or cause permanent internal injuries and even death. The very young and the elderly are among those most vulnerable to the potentially harsh winter conditions. Recognizing the threats and knowing what to do when they occur could prevent the loss of extremities or save a life.

A winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall and cold temperatures. People can be trapped at home or in a car with no utilities or assistance, and those who attempt to walk for help could find themselves in a deadly situation. The aftermath of a winter storm can have an impact on a community or region for days, weeks, or possibly months.

**Wind** - Some winter storms have extremely strong winds which can create blizzard conditions with blinding, wind driven snow, drifting, and dangerous wind chills. These intense winds can bring down trees and poles, and can also cause damage to homes and other buildings.

**Snow** - Heavy snow accumulations can immobilize a region and paralyze a city, stranding motorists, stopping the flow of supplies, and disrupting emergency services. Buildings may collapse and trees and power lines can be destroyed from the heavy snow. In rural regions, homes and farms may be isolated for days, and livestock could be lost.

**Cold** - Extremely cold temperatures can accompany winter storms and be left in their wake. Infants and the elderly are most susceptible to prolonged exposure to the cold, which can cause potentially life-threatening conditions such as hypothermia and frostbite. Below freezing temperatures can damage vegetation and cause pipes to freeze and burst inside homes.

**Ice** - Heavy ice accumulations can bring down objects like trees, utility poles and lines, and communication towers. Power can be disrupted or lost for days while utility companies repair the damage. Even a small amount of ice can cause hazardous conditions for motorists and pedestrians.

***Now is the time to prepare for the winter season!!***

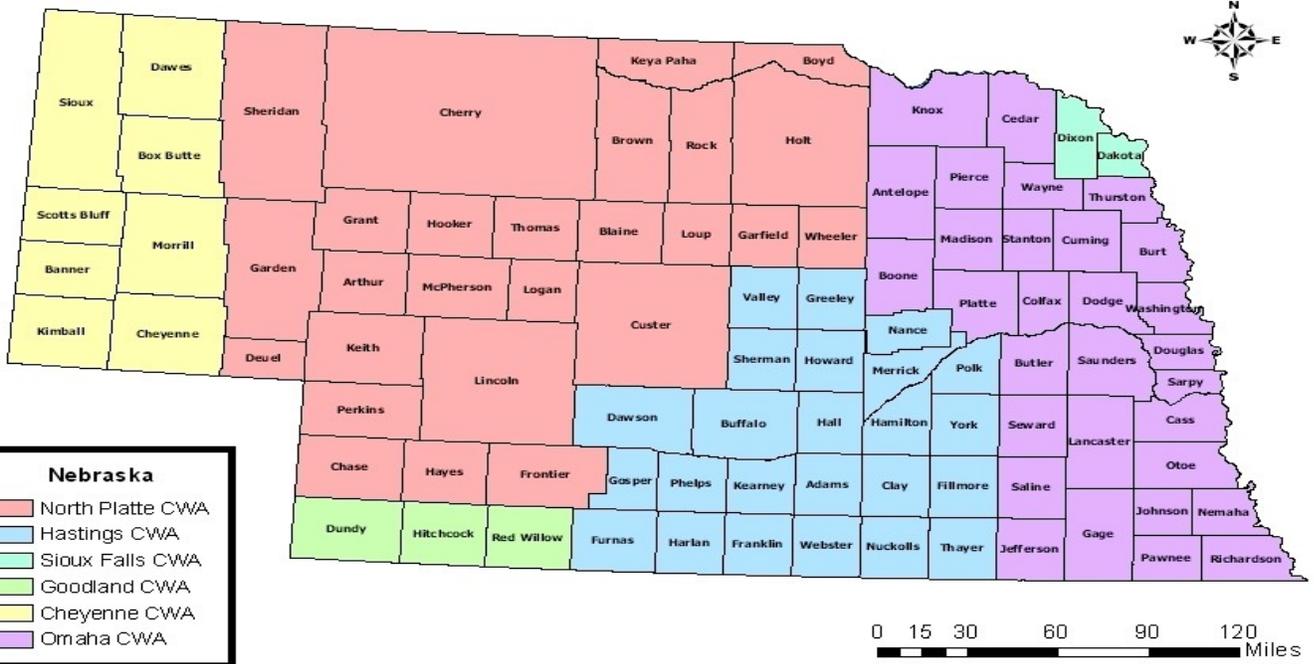


# National Weather Service Offices Serving Nebraska

Winter Weather Awareness Day - November 4, 2010



## National Weather Service Coverage Area



### Far West

National Weather Service  
1301 Airport Parkway  
Cheyenne, Wyoming 82001  
(307) 772-2468

<http://www.weather.gov/cys>

### West and North Central

National Weather Service  
5250 E. Lee Bird Drive  
North Platte, Nebraska 69101  
(308) 532-4936

<http://www.weather.gov/lbf>

### Southwest

National Weather Service  
920 Armory Road  
Goodland, Kansas 67735  
(785) 899-7119

<http://www.weather.gov/gld>

### South Central

National Weather Service  
6365 North Osborne Drive West  
Hastings, Nebraska 68901  
(402) 462-4287

<http://www.weather.gov/gid>

### East

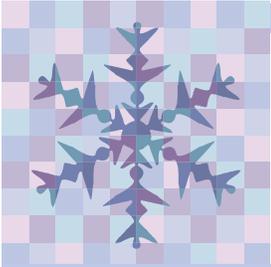
National Weather Service  
6707 North 288th Street  
Valley, Nebraska 68064  
(402) 359-5166

<http://www.weather.gov/oax>

### Far Northeast

National Weather Service  
26 Weather Lane  
Sioux Falls, South Dakota 57104  
(605) 330-4247

<http://www.weather.gov/fsd>



# NOAA Weather Radio All-Hazards

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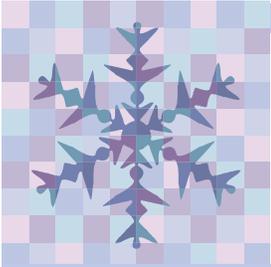
NOAA Weather Radio All Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from the nearest National Weather Service office. NWR broadcasts official Weather Service warnings, watches, forecasts and other hazard information 24 hours a day, 7 days 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), part of the Department of Commerce. 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
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Coverage information and SAME Codes for every county in Nebraska can be found at:  
<http://www.weather.gov/nwr/Maps/PHP/nebraska.php>



# Winter Weather Terminology

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## 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.

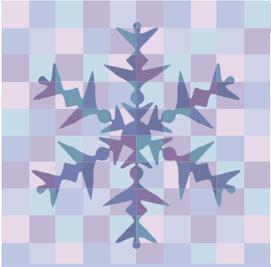
**WARNING** - A warning is issued when winter weather events are occurring or are imminent and pose a threat to life and property. Warnings are normally issued between 2 and 24 hours in advance.



## Winter Weather Product Criteria

### Winter Weather Advisory Products

- ◆ **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 and/or Ice (at least one meets criteria).
  - For Snow & Blowing Snow** - Snowfall with blowing snow intermittently reducing visibility < 1/2 mile.
- ◆ **Wind Chill Advisory** - Wind Chill values of  $-20^{\circ}\text{F}$  to  $-29^{\circ}\text{F}$ .



# 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.

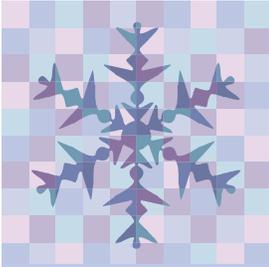
## Warning Products

- ◆ **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  $-30^{\circ}\text{F}$  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.
- ◆ Be sure to 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.



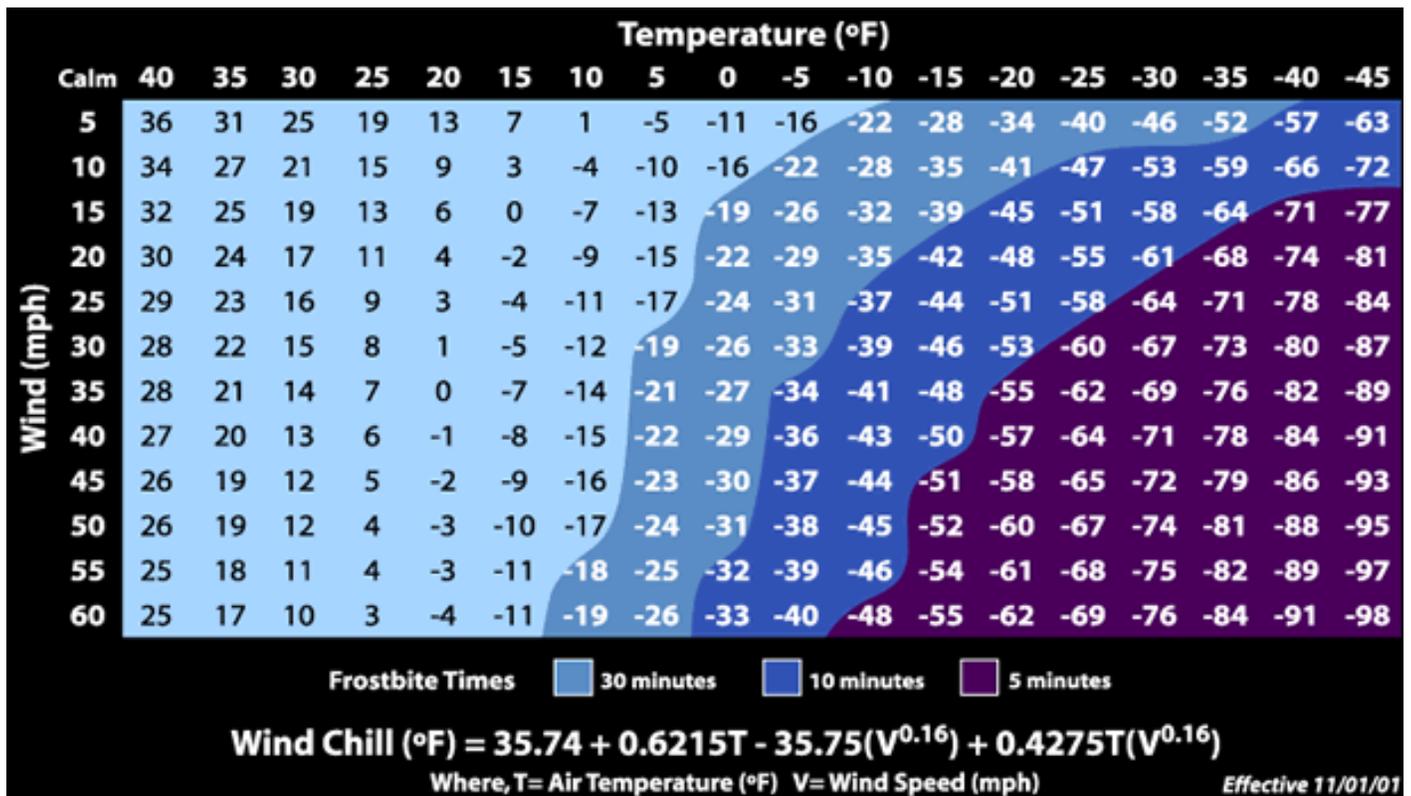
# Winter Weather Dangers

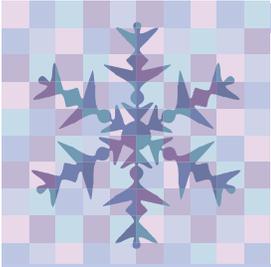
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Exposure to cold can cause frostbite or hypothermia and become life-threatening. Infants and elderly people are most susceptible. What constitutes extreme cold varies in different parts of the country. In the South, near freezing temperatures are considered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



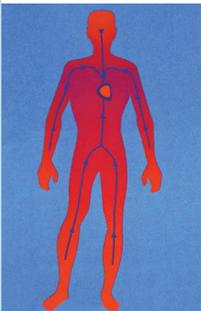


# Winter Weather Dangers

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**Frostbite** - is damage to body tissue caused by extreme cold. A wind chill of  $-20^{\circ}$  Fahrenheit (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 re-warm 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.

## **Did You Know?**

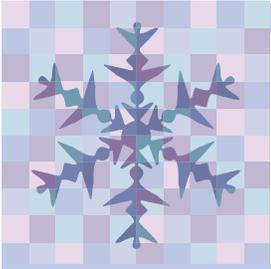
### ***Injuries Related to Cold:***

- ◆ 50% happen to people over 60 years old
- ◆ More than 75% happen to males
- ◆ About 20% occur in the home



### ***Injuries Related to Ice and Snow:***

- ◆ About 70% result from vehicle accidents
- ◆ About 25% occur to those caught in a storm
- ◆ Most happen to males over 40 years old



# 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 continue for an extended period of time.

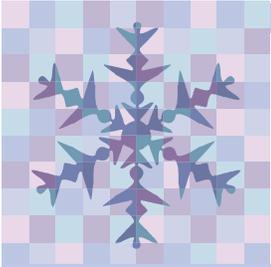
### ***Make sure to have the following supplies available:***

- ◆ 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, such as sheds
- ◆ Haul extra feed to nearby feeding areas
- ◆ Have plenty of water available
  - Most animals 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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## *What should I do if 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 snow cave to protect yourself from the wind
  - Build a fire for heat and to attract attention
  - Place rocks around the fire to absorb and reflect heat
  - Melt snow for drinking water, eating snow will lower your body temperature

### In a Vehicle:

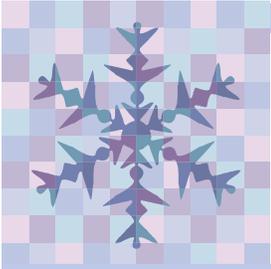
- ◆ Stay in the vehicle! You could quickly become disoriented in wind-driven snow and cold
- ◆ Run the motor about 10 minutes each hour for heat
- ◆ Open the window a little for fresh air to avoid carbon monoxide poisoning
- ◆ Make sure the exhaust pipe is not blocked
- ◆ Be visible to rescuers
  - Turn 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



### Inside:



- ◆ Stay inside!
- ◆ When using alternate heat from a fireplace, wood stove, space heater, etc., 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.

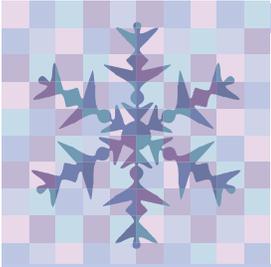
If you must travel during winter conditions, it is best not to travel alone. Try to plan your travel during the day, and make sure to let others know your destination, route, and when you expect to arrive. Make sure to keep your gas tank near full to avoid ice in the tank and fuel lines.

***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 and snow removal
- ◆ Blankets and sleeping bags, or newspapers for insulation
- ◆ Rain gear, extra sets of dry clothing, 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, games, and puzzles
- ◆ 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.





# Winter Weather Travel Tips

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## Road Conditions

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.511nebraska.org> For in-state information call 511. When out of state use: 1-402-471-4533.

For Wyoming: <http://map.wyoroad.info/>  
out of state 1-888-996-7623

For Colorado: <http://www.cotrip.org/>  
out of state 1-303-639-1111

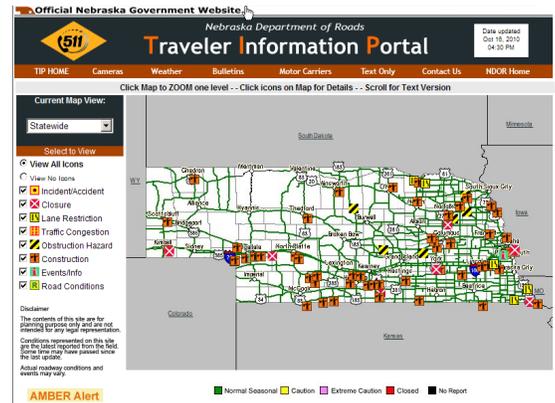
For South Dakota <http://www.safetravelusa.com/sd/>  
out of state 1-866-697-3511

For Kansas <http://511.ksdot.org>  
out of state 1-800-585-7623

For Iowa: <http://511ia.org>  
out of state 1-800-288-1047

For Missouri <http://www.fhwa.dot.gov/trafficinfo/mo.htm> out of state 1-800-222-6400

National Traffic and Road Closure Information: <http://www.fhwa.dot.gov/trafficinfo/index.htm>



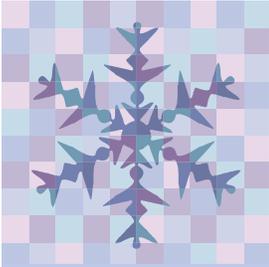
## Nebraska Winter Road Crash Statistics for 2009-2010

### Where Snowy/Icy Roads Were a Contributing Factor

The following chart shows the winter road crash statistics for the last five years. These statistics were prepared by the Highway Safety/Accidents Records Section - Traffic Engineering Division - Nebraska Department of Roads. For these traffic statistics, winter is defined as November 1-April 15th.

WINTER	C R A S H E S				CASUALTIES	
	TOTAL	FATAL	INJURY	P D O *	KILLED	INJURED
2009-2010	5,504	22	1,638	3,844	26	2,317
2008-2009	3,932	8	1,239	2,685	9	1,727
2007-2008	4,483	20	1,349	3,114	21	1,919
2006-2007	3,908	13	1,308	2,587	19	1,887
2005-2006	3,068	17	996	2,055	27	1,408
<b>TOTAL</b>	<b>20,895</b>	<b>80</b>	<b>6,530</b>	<b>14,285</b>	<b>102</b>	<b>9,258</b>

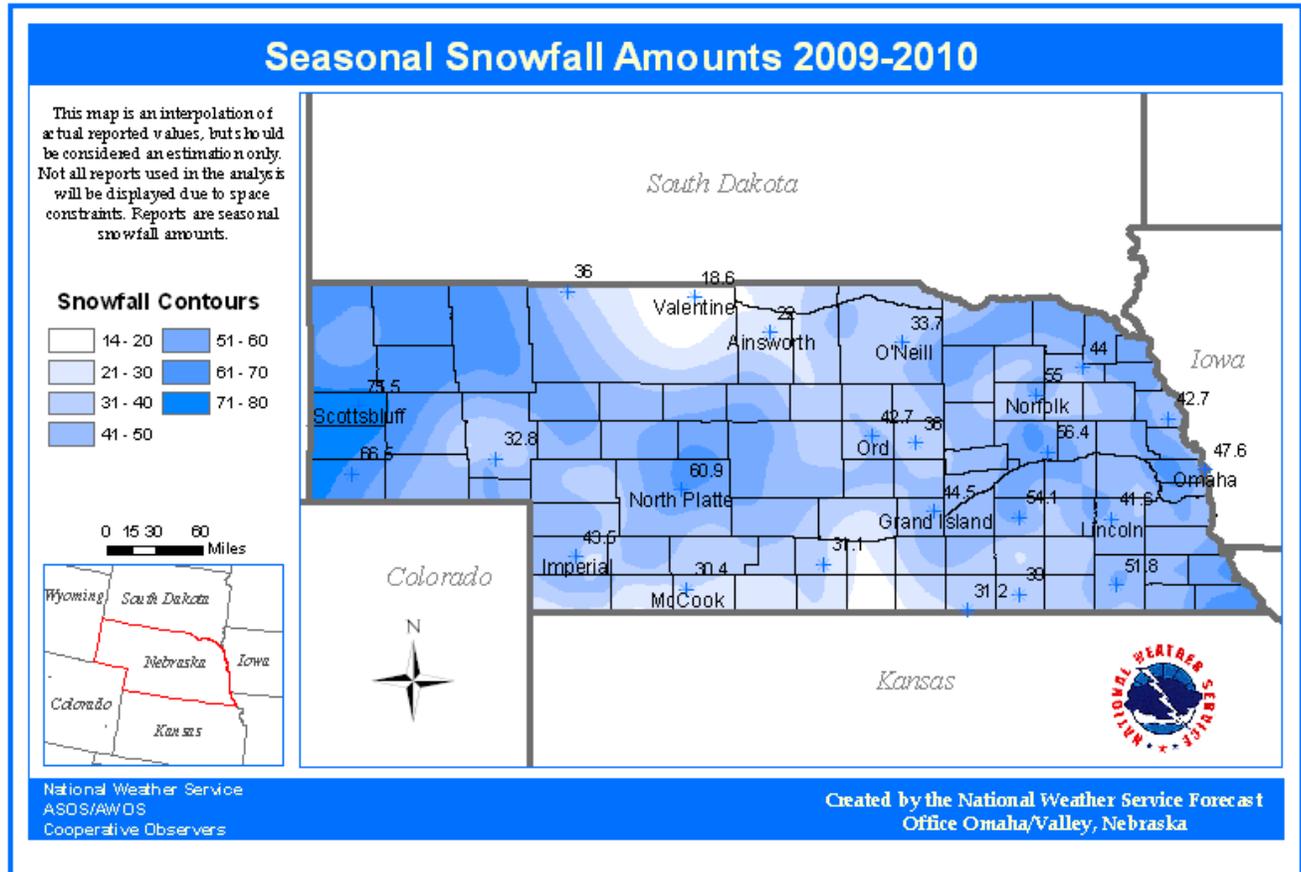
\* PDO—Property Damage Only



# 2009-2010 Nebraska Winter Season Summary

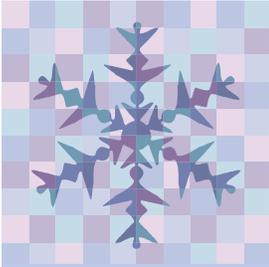
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## Statewide Snowfall Map 2009-2010



## Seasonal Snowfall 2009-2010

Location	Normal (1971-2000)	2009-2010	Percent of Normal
Scottsbluff	44.2	75.5"	171%
North Platte	27.8"	60.9"	219%
Valentine	36.9"	18.6"	50%
McCook	32.6"	30.4"	93%
Grand Island	32.8"	44.5"	136%
Norfolk	31.7"	55"	174%
Omaha	27.1"	47.6"	176%
Lincoln	26.8"	41.6"	155%



# 2009-2010 Nebraska Winter Season Summary

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## Western Nebraska Panhandle - Cheyenne, WY

The 2009-2010 winter season over the area, which from a meteorological standpoint ran from December 1<sup>st</sup> through the end of February, was colder and snowier than average. The winter was characterized by cold temperatures in December and February, with a relatively mild January in between. It was one of the coldest winters on record across the Nebraska panhandle, with many locations having one of the top 10 coldest winters on record.

The season's first snows made an early arrival to the panhandle with two significant snowstorms in October. Those two storms produced a total of over 20 inches of snowfall especially over far western sections. Bitterly cold arctic air made an arrival in early December and sent most locations to well below zero temperatures by the second week of the month. The coldest temperatures were recorded on the 9<sup>th</sup> with Scottsbluff reaching 21 below and Alliance chilling to 26 below! Alliance had 10 consecutive days with minimum temperatures below zero, from December 6<sup>th</sup> through the 15<sup>th</sup>.

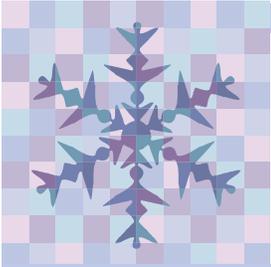
A winter storm system brought snow and very strong winds to the region around Christmas with blizzard conditions over many areas of the Nebraska panhandle.

January saw above average temperatures and rather scant precipitation across the area as changes in the weather pattern kept Arctic air out of the region for the most part while low pressure systems passed generally far to the south. There was one cold period around the 7<sup>th</sup> where some below zero temperatures were recorded. The mild temperatures extended into early February before colder air returned and held in place overall for the rest of the month.

The following table summarizes the winter temperature averages, their normal temperature, and the overall ranking for some selected cities across the area:

City	Dec 2009 - Feb 2010 Average Temperature	Dec - Feb Normal Average Temperature	Ranking
Chadron	20.3	25.3	5 <sup>th</sup> Coldest
Scottsbluff	24.3	26.7	Tied 14 <sup>th</sup> Coldest
Sidney	25.3	27.0	8 <sup>th</sup> Coldest *

\*Some missing data for Sidney. Ranking may not be correct



# 2009-2010 Nebraska Winter Season Summary

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Western Nebraska Panhandle Con't.

Snowfall for the 2009-2010 winter was generally above average, with Scottsbluff recording its third snowiest winter on record with 75.5 inches. Most of the snows occurred in December and February, with a relatively dry January in between. Scottsbluff measured a total of 32.7 inches of snow, which was 12.5 inches above average.

One other note of interest was that it was not a typically windy winter across the region. There were a few periods of strong winds, with the windiest period being around Christmas, but overall not much wind. This was a result of the typical El Nino pattern which kept most of the storm tracks well away from this area and likewise limited the winds.

## Western & North Central Nebraska - North Platte, NE

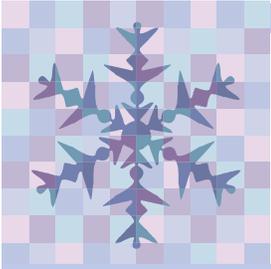
Wintry weather arrived early across western and north central Nebraska as two major winter storms impacted the region in October. After a mild November, arctic air arrived in early December, followed by a blizzard around Christmas. Cold temperatures and snowfall continued into February producing a near record seasonal snowfall at North Platte. March and April brought rain and very little in the way of additional snow to western and north central Nebraska.

### October, a Month to Remember!

Two major winter storms hit western and north central Nebraska in October. The most significant storm hit southwestern and portions of Central Nebraska on the 29th and 30th. During the peak of the storm, snowfall rates exceeded 3 inches per hour. By sunrise on the 30<sup>th</sup>, around a foot of snow had fell over portions of Frontier, Lincoln, Logan, Blaine and Custer counties. Snowfall peaked near 15 inches at Moorefield in Frontier County, Sutherland in Lincoln County and west of Merna in Custer County.

North Platte reported 12.3 inches of snow from this storm. For October 2009 snow totaled 30.3 inches which set a new record for monthly snowfall. The previous record was 27.8 inches set in March of 1912.

North Platte Snowiest October on Record		
Rank	Year	Total Monthly Snowfall (Inches)
<b>1</b>	<b>2009</b>	<b>30.3</b>
2	1969	15.7
3	1896	13.0
4	1906	9.8
5	1970	9.0
6	2002	8.2
7	1991	7.3
	1959	7.3
9	1916	6.3
10	1997	5.7



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Western & North Central Nebraska Con't.

## **Arctic Air Arrives in Early December followed by the Christmas Blizzard**

In early December, arctic air plunged south from Canada, dropping temperatures into subfreezing readings from the 5th through the 16th. A reinforcing shot of arctic air arrived on the 9th as near record low temperatures of around 20 below zero occurred on the morning of the 10th.

After seasonal temperatures in mid December, a major blizzard brought most travel to a stand still on Christmas Day. Snow began to fall on Christmas morning and by the 26th, up to 3 feet of snow fell in the Pine Ridge of northwestern Sheridan County and around a foot in Boyd, Holt and Wheeler counties. Snow accumulations were much lower across southwestern Nebraska, but what did accumulate, was picked up by strong winds. Wind gusts up to 55 mph combined with the snow producing whiteouts over north central and central Nebraska. Considerable blowing and drifting snow created drifts up to 9 feet, making many roads impassable in the O'Neill area.

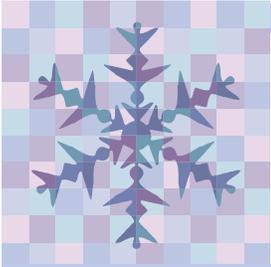
## **January and February Cold Air Settles South**

An arctic cold front moved south January 6<sup>th</sup> that brought some of the coldest temperatures of the winter season across the north central and more snow. Fresh snow accumulations were light, however wind gusts to 50 MPH combined with existing snow on the ground to produce blizzard conditions over Brown, Keya Paha, Rock, Loup, Garfield, Wheeler, Boyd and Holt counties. Numerous roads remained closed through the 8<sup>th</sup> before the winds died down. Reinforcing cold fronts and snow through February provided an extended period of snow cover and below normal temperatures.

## **March and April Unusually Wet**

March and April were wet across western and north central Nebraska. Snowfall for the two months was well below normal as the bulk of precipitation fell as rain. The winter season ended the second week of May as 3 to 4 inches of snow fell over northwestern Nebraska on May 12th.

For the 2009-2010 winter season, snowfall across western and north central Nebraska was well above normal. The exception was over portions of north central



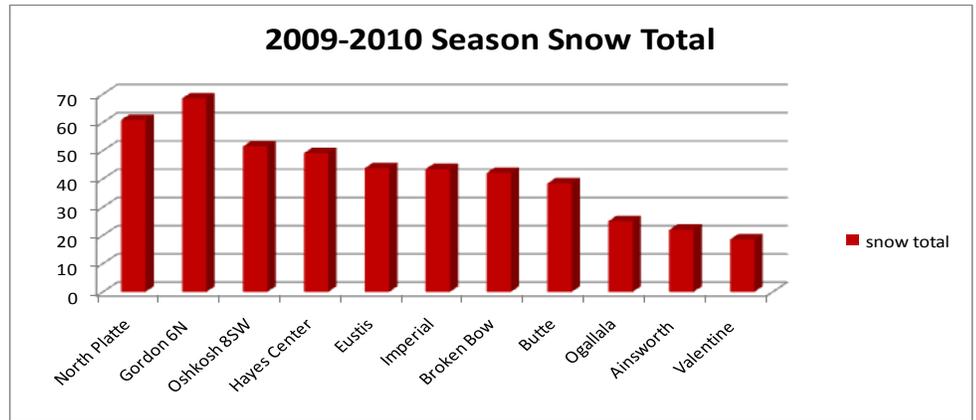
# 2009-2010 Nebraska Winter Season Summary

Winter Weather Awareness Day - November 4, 2010

Western & North Central Nebraska Con't.

Nebraska in the Valentine and Ainsworth areas where 18.6 and 22.0 inches of snow fell respectively. These amounts were roughly half of normal. On the flip side, snowfall for the season totaled 60.9 inches at North Platte, which tied the second all time record of 66.3 inches set during the season of 1979-80.

Some additional season snow totals are provided in this table for western and north central Nebraska.



## Eastern Nebraska - Omaha/Valley, NE

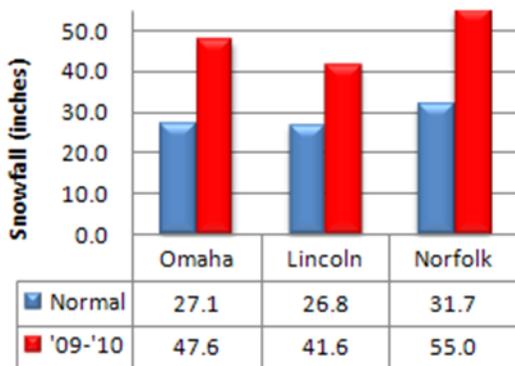
### A Winter to Remember - a Recap of the Blizzards and Winter Storms that Hit Eastern Nebraska During the Winter of 2009 and 2010

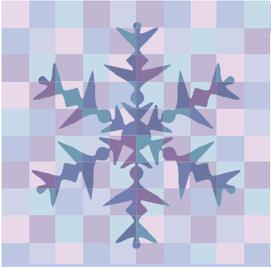
A winter storm/blizzard that hit eastern Nebraska in early December set the stage for a prolonged stretch of winter weather and snow depths that had seldom been seen before. After the winter finally ended in March the region saw seasonal snowfall totals that were in the top 15 highest, and in some cases the top 10, and record or near record stretches of at

least 1 inch of snow on the ground. For the July 1, 2009 through June 30, 2010 season Omaha received 47.6 inches of snow, Lincoln 41.6 inches and Norfolk 55.0 inches (see the graph at left). The totals ranked 14<sup>th</sup>, 8<sup>th</sup> and 6<sup>th</sup> highest on record, respectively. At least one inch of snow was on the ground for 88 days in Omaha, **a record stretch**, with 85 days recorded in Lincoln (2<sup>nd</sup> longest) and 89 days in Norfolk (7<sup>th</sup> longest). The persistent snow cover and strong wind episodes frequently closed highways and county roads, especially in northeast Nebraska, and in some cases county roads remained closed for days if not weeks on end.

### SNOW 2009-2010

Normals from 1971-2000





# 2009-2010 Nebraska Winter Season Summary

Winter Weather Awareness Day - November 4, 2010

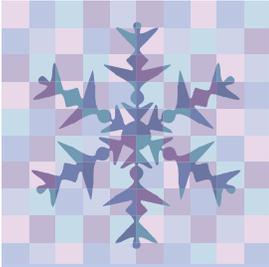
## The First Storm to Hit the Area - December 7<sup>th</sup> through the 9<sup>th</sup>, 2009

A large and relatively slow moving storm brought a prolonged winter storm and even, for a time, blizzard conditions to most of eastern Nebraska from late on December 7th through the early morning hours of December 9<sup>th</sup>, 2009. The heaviest snow fell in advance of when the strongest winds arrived, mainly during the morning and afternoon of December 8th. However, as north winds increased to 30 to 50 mph during the night of the 8th and early on the 9th (see the table below for detailed wind gusts for each winter storm), visibilities frequently dropped to near zero, especially in open areas.

Considerable drifting snow also occurred, in many cases closing roads shut almost as fast as they could be opened. This prompted many counties to pull snow plows off the roads for a while during the night of the 8th and early on the 9th. Many schools were closed for 3 days because of the storm; due to the forecast of heavy snow to begin on the 7th, because of poor visibilities, and roads that were drifted shut on the 8th and still some closed roads and bitter cold wind chills which followed the storm on the 9th. An elderly Omaha man was found dead during the evening of the 8th when he apparently had car trouble and returned to his apartment and was found dead sitting down in a chair outside.

Highest Wind Gusts									
Location	Dec. 8-9, 2009	Dec. 24-25, 2009	Jan. 7, 2010	Jan. 25, 2010	Location	Dec. 8-9, 2009	Dec. 24-25, 2009	Jan. 7, 2010	Jan. 25, 2010
Norfolk	48	47	46	48	Fremont	44	NA	46	48
Omaha Eppley	52	47	44	49	Nebraska City	44	47	41	41
Sioux City IA	51	51	46	55	Shenandoah	44	39	32	38
Gretna 4 NE	50	44	43	42	Valley NWS	44	40	37	43
Beatrice 1N	49	49	39	43	Albion	44	53	46	53
Harlan 1 N	48	NA	37	46	Falls City	45	46	39	43
Columbus	47	49	45	51	Yankton	44	40	43	52
Tekamah	47	47	49	54	Wayne	41	41	44	50
Blair	46	NA	43	45	Offutt AFB	41	48	40	47
Atlantic IA	45	31	41	43	Clarinda	40	30	36	43
Lincoln Airport	45	47	46	51	Red Oak	40	43	34	43
Plattsmouth	45	NA	41	45	Millard	39	38	38	43

NWS Omaha/Valley Wind Gust Table

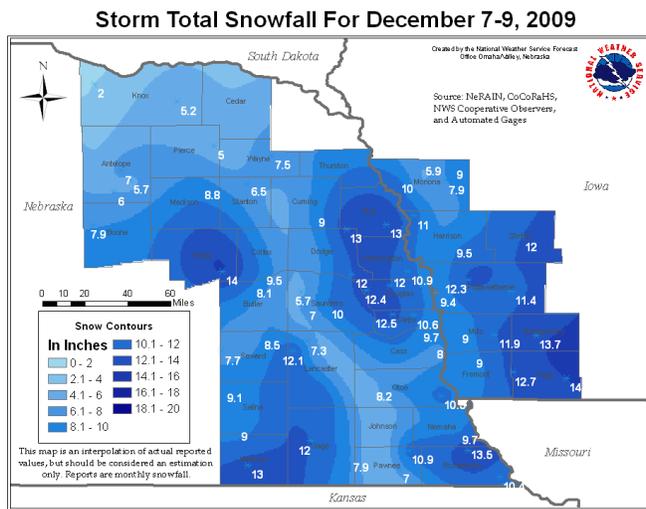


# 2009-2010 Nebraska Winter Season Summary

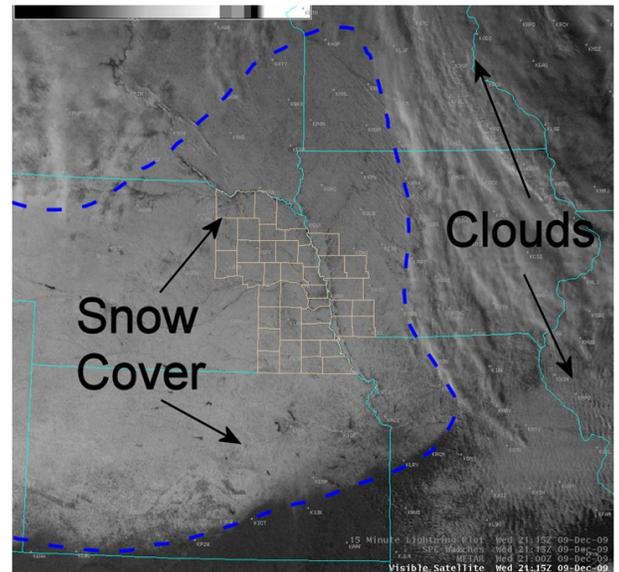
Winter Weather Awareness Day - November 4, 2010

**Eastern Nebraska Con't.** Total snowfall from the storm mostly ranged from 6 to 14 inches over most of eastern Nebraska and western Iowa (click on Snowfall Map 1 below). The blowing snow made it quite difficult to measure. Higher amounts in eastern Nebraska included around 14 inches in Columbus and Shubert and 12 to 13 inches at the National Weather Service in Valley, Fremont, Tekamah, Bennington, Uehling, Gretna, Malcolm, Beatrice, and Fairbury. In western Iowa, heavier amounts included around 14 inches in Clarinda and Red Oak, around 13 inches at Shenandoah, and around 12 inches at Underwood, Harlan, & Hastings.

The storm covered a very large area over the Plains as can be seen by this visible satellite picture taken on December 9<sup>th</sup>, laying down a foundation of snow cover that would persist over many locations into early March 2010. The snow cover also aided in bringing periods of exceptionally cold temperatures and made future storms more efficient in producing blowing & drifting snow, closing roads and making travel difficult if not impossible.



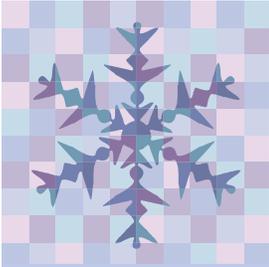
NWS Omaha/Valley Snowfall Map 1



Visible Satellite Image—12/09/09

## Christmas 2009 Blizzard

The second winter storm of the month hit eastern Nebraska and southwest Iowa as a complex weather pattern brought a prolonged period of winter weather, including blizzard conditions to the region around Christmas. Low pressure aloft in the Southern Plains lifted northeast into Missouri as another low pressure system dropped south out of Canada. These two systems then merged over the central United States and eventually pulled Atlantic moisture westward into the Plains. Before they merged, the southern system pulled up gulf moisture and brought areas of freezing rain to southeast Nebraska and 3 to 5



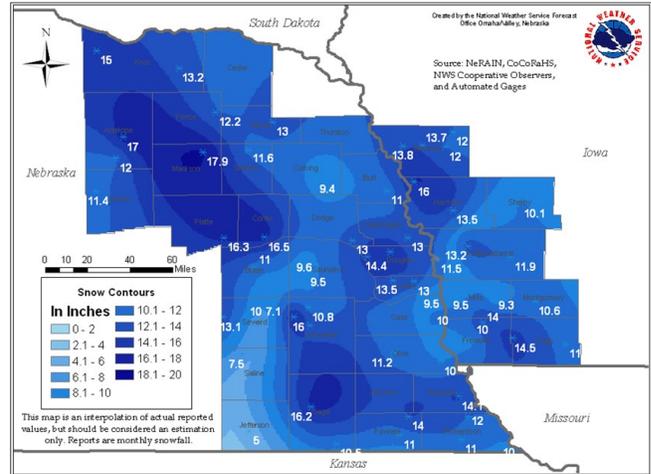
# 2009-2010 Nebraska Winter Season Summary

## Winter Weather Awareness Day - November 4, 2010

### Eastern Nebraska Con't.

inches of snow to northeast Nebraska on Dec. 23<sup>rd</sup>. The second system pulled down Arctic air as north winds gusted between 40 and 50 mph over most of the region. This not only changed all the precipitation to snow on the 24th, but also brought blizzard conditions to much of eastern Nebraska and southwest Iowa Christmas Eve and much of Christmas Day as the systems merged. Snow and blowing snow and occasional blizzard or near-blizzard conditions then continued through much of the 26<sup>th</sup>, with additional light snow on the 27<sup>th</sup>.

Storm Total Snowfall For December 24-26, 2009



NWS Omaha/Valley Snowfall Map 2

Snowfall from the prolonged winter storm was 10 to 18 inches over most of eastern Nebraska and southwest Iowa (click on Snowfall Map 2 above). Heavier totals included around 18 inches in Norfolk, around 17 inches in Neligh, 16 inches near Little Sioux Iowa, Columbus, Schuyler, Malcolm, and Beatrice, 15 inches near Verdel, Nebraska and Shenandoah, Iowa, 14 inches near the NWS in Valley, and Auburn, Gretna, Bennington and Logan Iowa and 13 inches at Fremont, Ft. Calhoun, Wayne, Bloomfield, and Papillion. The snow and strong winds drifted most rural roads shut and even made many highways impassable, especially in northeast Nebraska and sections of southeast Nebraska northwest through southwest of Lincoln where winds were a bit stronger.



A BNSF freight train was snowed in at David City Photos taken January 8-10, 2010 by Mel Wilson



## Photos

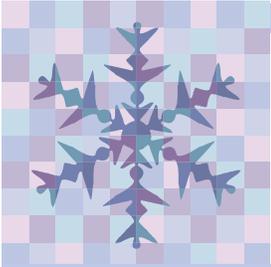


Drifts outside the National Weather Service at Valley 12/26/09



Sundog along Hwy 275 near Valley- Photo by Bryon Miller





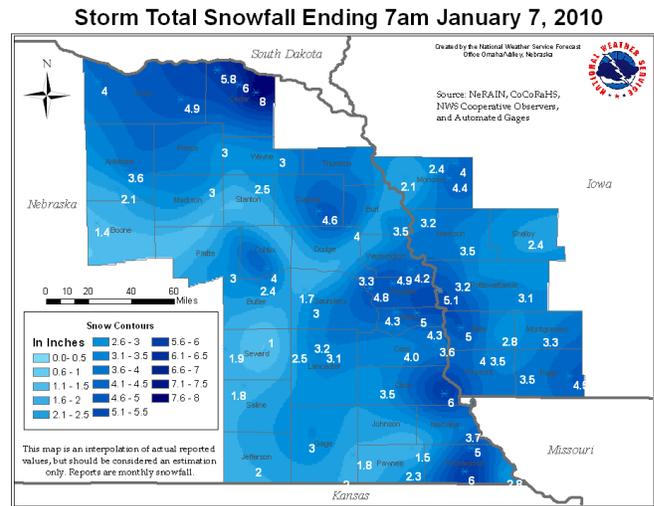
# 2009-2010 Nebraska Winter Season Summary

Winter Weather Awareness Day - November 4, 2010

## Jan 6<sup>th</sup> 2010 Storm

This was the third winter storm in a month to hit eastern Nebraska and southwest Iowa and was caused by an upper level disturbance that dropped out of Canada, closed off over the Central Plains, then finally moved off to the east. This system pulled down Arctic air behind it and not only produced strong winds but also dangerously cold wind chill values. Even though snow amounts from this storm were half or less than the storms in December of 2009 (click on Snowfall Map 3 at right), and winds were similar or perhaps

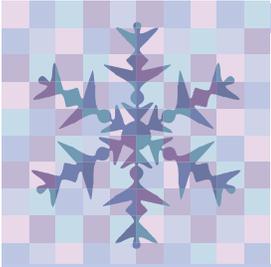
even a bit lighter (refer to the NWS Omaha/Valley Wind Gust Table), however the winds lasted a relatively long time. Plus, the snow from this storm fell on top of a base of older snow that was around 10 to 20 inches deep over much of the area. Thus, substantial blowing and drifting snow was observed with visibilities frequently 1 mile or less. In addition, the drifting snow from this storm was possibly worse than the prior two storms and many, if not most, rural roads became impassable for several days, as did many highways and interstates over the region. The task of snow removal was so daunting in some areas that the Department of Roads sent large rotary plows and other equipment from western Nebraska to help churn snow off the roads in eastern Nebraska. Many schools were closed for 3 days because of the snow and blowing snow at first, then because of the drifting snow and dangerously cold wind chills. Snow totals were generally 2 to 6 inches.



NWS Omaha/Valley Snowfall Map 3

## Extensive Snow Cover & Arctic Air Bring Very Cold Temperatures to the Region

Through the early January 2010 storm, Omaha Eppley had already picked up **36.2 inches of snow**, which was 25 inches above normal! This snow cover and the persistent cold weather pattern contributed to very cold temperatures which began the New Year. The first 10 days of January 2010 were the **3rd coldest** on record in Omaha and also in Norfolk (refer to the table on the next page). The period was the 4th coldest on record in Lincoln.



# 2009-2010 Nebraska Winter Season Summary

Winter Weather Awareness Day - November 4, 2010

## Eastern Nebraska Con't.

Later in January an ice storm hit sections of northeast Nebraska, just to the northwest through north of Omaha. Ice accumulations reached half an inch or slightly more causing scattered tree damage and knocking the power out to a little more than 4,000 customers, in some cases for several days. With the persistent snow cover, a series of storms packing strong winds, but only moderate snow amounts, produced several other blizzard or near-blizzard episodes across eastern Nebraska from late January through mid February.

One storm on January 24<sup>th</sup> and 25<sup>th</sup> hit mainly east central and northeast Nebraska along and north of Highway 30. Locations mostly north of Norfolk were especially hard hit with blizzard or near-blizzard conditions for at least 24 hours closing many roads and stranding motorists (refer to the NWS Omaha/Valley Wind Gust Table). Locations farther south also had a period of greatly reduced visibilities in snow and blowing snow. However, since temperatures had warmed above freezing before the snow started, initial melting and then re-freezing caused locally very slick road conditions causing many cars to slide off area roads including a stretch of Interstate 80 from the Platte River into Omaha. Snow amounts from this storm were mostly in the 2 to 4 inch range with the higher amounts in northeast Nebraska.

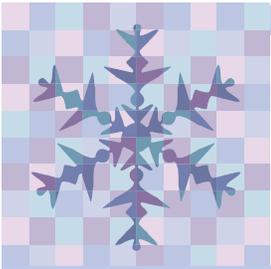
Another storm, this a fast-moving one, hit much of eastern Nebraska on Valentine's Day. Although most additional snowfall was only an inch or two, northwest winds gusted between 35 and 45 mph. This caused relatively brief whiteout conditions that caused numerous multi-car pileups including one on Interstate 80 that claimed a life. As this system ended another fast moving one followed later that night bringing additional light snow and strong winds. This caused numerous accidents later that night into the morning of the 15<sup>th</sup>, including several fatal ones.

The winter basically ended with a winter storm on February 21<sup>st</sup> that dropped around 3 to 5 inches of snow in far southeast Nebraska accompanied by north winds of 20 to 30 mph making some roads nearly impassible and prompting schools to close. Needless to say the heavy snowpack and below normal temperatures caused significant ice jam flooding in March.

## Omaha Area Coldest Average Temperatures, 1/1 - 1/10 (Years of Records: 1871-2010)

Rank Value Ending Date

1	-4.8	1/10/1887
2	0.3	1/10/1912
3	0.9	<b>1/10/2010</b> , 1/10/1974
5	1.2	1/10/1884



# 2009-2010 Nebraska Winter Season Summary

Winter Weather Awareness Day - November 4, 2010

## Eastern Nebraska Con't.

The following table summarizes the winter temperature averages, their normal and departures from normal, and the overall ranking for a few selected cities across the area:

City	Dec 2009 - Feb 2010 Average Temperature	Dec - Feb Normal Average Temperature	Dep.	Ranking
Norfolk	17.8	23.5	-5.7	8 <sup>th</sup> Coldest
Omaha	19.3	25.1	-5.8	11 <sup>th</sup> Coldest
Lincoln	20.1	25.8	-5.7	8 <sup>th</sup> Coldest

## South Central Nebraska - Hastings, NE

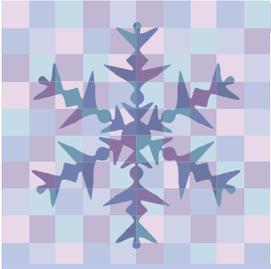
The winter of 2009-2010 was one of those winters which will be remembered for a long time with plenty of snow, wind and cold weather, especially the first half of the winter.

October got things going right from the start. Cold weather settled into south central Nebraska with snow falling as soon the 2<sup>nd</sup> weekend of the month. Though not heavy in nature (i.e. a "fluffy" snow), snow amounts were heavy for northern parts of the area. Arcadia reported 8 to 14" of accumulation, Palmer 5 inches and the Tri-Cities generally 1 to 3 inches of snow. Rainfall of 1/2 to 1 inch 2 days later and a warm ground helped melt the snow quickly. However, it wasn't long before heavy snow fell again, this time late in the month. This time, the heavy snow was primarily west of Kearney with Gothenburg reporting 13" and Cozad 7" to 10" of the white stuff. The eastern edge of the snow had a sharp edge, with only a trace measured in Kearney. It turned out; October was the 2<sup>nd</sup> coldest October on record in Kearney, Hastings and Grand Island, and likely most locations across south central Nebraska. Average temperatures were 7 to 8 degrees below normal for the month and ran 2<sup>nd</sup> only to October of 1925.

Location	2009-2010 Seasonal Snowfall
York	54.1"
Osceola	52.2"
Hastings	45.5"
Grand Island	44.5"
Fullerton	43.8"
Loup City	43.0"
Ord	42.7"
Central City	41.9"
Hebron	39.0"
Greeley	36.0"
Polk	35.3"
Superior	31.2"
Holdrege	31.1"

Table of seasonal 2009-2010 snowfall total at selected locations. Average seasonal snowfall ranges from 25 to 35 inches.

After such a cold October, folks were ready for a reprieve from the cold, and an opportunity to get the harvest in. November provided that break for most of south central



# 2009-2010 Nebraska Winter Season Summary

Winter Weather Awareness Day - November 4, 2010

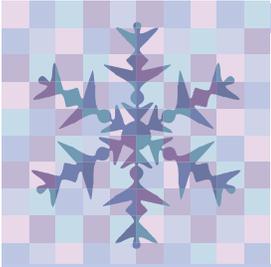
South Central Nebraska Con't.

Nebraska as high temperatures were actually warmer than October on average. About mid-month, one snow event moving up from the south, dealt a glancing blow of snow to Thayer County, where 3 to 8 inches of snow fell. Fortunately, the rest of the month had little in the way of additional snow to offer.

December dealt a cruel combination of heavy snow, cold and wind to the area, punctuated by a Christmas Day blizzard which shut down the entire area. The snow came early and often, starting out with 1 to 6 inches of snow falling on December 6<sup>th</sup>. The heaviest amounts were in and around the Hastings area. A few days later, on December 8-9, a wide swath of 6 to 12 inches of snow fell across south central Nebraska. Grand Island and Hastings both set 24-hour snowfall records for the date with 10 and 11 inches of accumulation respectively. The snow was widespread with a foot falling in Greeley, 10" in St. Paul and 8" in Minden and Loup City. Schools closed and travel was tough as sustained winds near 30 mph with gusts to 50 mph caused extensively blowing and drifting.

The snowstorm early in the month was one worth noted, but it paled in comparison to what took place on Christmas Day. After light snow, sleet and ice accumulations caused some inconvenience on the 23<sup>rd</sup>, a major winter storm was expected on Christmas Day. In the end, it was a good, old fashioned blizzard which pounded the area Christmas Day. Snow began early and just kept coming, especially for areas along and east of U.S. Highway 281. Sustained winds blasted the area, dropping visibilities to near zero for 12 to 18 hours. Travel was nearly impossible and clearing roads was not option. Wind gusts of 60 mph were common through the day and well into the evening hours. By the time it was over, another record setting snow of 6 to 10 inches fell in Grand Island and Hastings. The post storm reported yielded 10 to 20 feet snow drifts common, stranded vehicles and dozens of highways closed, including Interstate 80. Some of the roads were closed or reduced to one-lane travel for over a week until snow equipment was available to move the mountains of snow. For a lot of holiday travelers, getting to Grandma's house was not possible. Fortunately, Santa Clause had run his route on Christmas Eve, a few hours before the storm struck.

The New Year picked up where 2009 left off with a quick 2 to 4 inches of powdery snow fall east of a line from Ord to Hebron. Another light snow event blew into south central Nebraska about a week into January, this aboard a strong arctic cold air mass. Winds gusted over 30 mph and caused more blowing and drifting, Temperatures plummeted below zero, and struggled to reach the single digits on the 7<sup>th</sup>, and didn't do much better on the 8<sup>th</sup> and 9<sup>th</sup>. The arctic air hit its peak on the January 9<sup>th</sup>, with record low temperatures at Grand Island (-16°) and Hastings (-15°). Chill factors were down to 40-below zero at times. Fortunately, temperatures started a slow rebound the last half of



# 2009-2010 Nebraska Winter Season Summary

Winter Weather Awareness Day - November 4, 2010

South Central Nebraska Con't.

January and allowed some thawing of the glacier-like snowfield to at least begin a bit.

As winter headed for the home stretch, the colder than normal had a hard time letting go in February. A quick 1 to 5 inches of snow fell from February 3-5, with the heavier amount generally east of U.S. Highway 281. The not-so-sweet weather continued into the Valentine's Day, when a strong upper level low pressure sent winds gusting to 40 mph by midday. A peak wind of 50 mph was reported in Aurora. A band of snow moved across the eastern half of south central Nebraska again, with 3 inches falling at Gresham in York County. Though not heavy, the strong winds teamed with the snow to cause near white-out conditions for a short time in some spots. A couple of more winter events dropped some light snow amounts, generally 2" or less, slipped across the area late in February. Fortunately March, which is usually one of the snowier winter months, only brought one final snow event. On March 19<sup>th</sup>, 1 to 3 inches of snow fell as winds gusted to 25 mph at times.

Several records for both snow and cold were broken during last winter. Snowfall was generally above normal at most locations, although varied widely from place-to-place. Average temperatures for the winter were below normal, thanks mostly due to the very snowy and subsequently cold six week period in December and January. No doubt, the Winter of 2009-2010 will not be forgotten anytime soon.

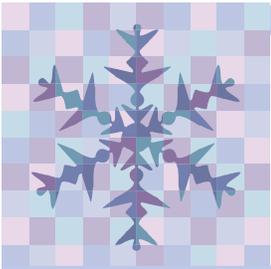
## Extreme Southwest Nebraska - Goodland, NE

### Overview

The weather pattern which set up during the winter of 2009-2010 brought below normal temperatures and near normal snowfall to most locations in extreme southwest Nebraska (Dundy, Hitchcock, Red Willow Counties). Temperatures ranged from 3 to 6 degrees below normal for the months of December 2009 – February 2010 as shown in the table below.

Station	DJF 2009-2010 Temperature	DJF Normal	DJF Departure from Normal
McCook	24.3	30.1	-5.8
Benkelman	26.5	30.0	-3.5
Culbertson	24.7	28.2	-3.5
Haigler	26.0	30.2	-4.2
Trenton Dam	26.1	28.7	-2.6

Table 1: DJF means December 2009, January 2010, February 2010



# 2009-2010 Nebraska Winter Season Summary

Winter Weather Awareness Day - November 4, 2010

## Extreme Southwest Nebraska Con't.

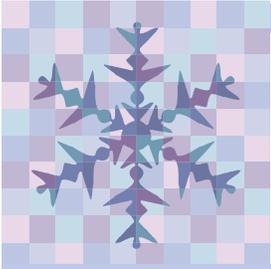
Meanwhile, seasonal snowfall (July 2009 - June 2010) at most locations was close to normal, ranging from 2 inches below normal to 5 inches above normal. Two stations in extreme northern Dundy County are exceptions worth noting however. Several significant snow events across central Nebraska just clipped the northern edge of Dundy County. Stations located 13 miles north of Max and 17 miles north of Parks recorded seasonal snowfall close to 46 inches, well above that reported at stations along Highway 34. The snowfall record for these stations is too short to calculate a 30-year average, but using nearby station averages as a proxy, last year's snowfall at these two sites would likely be about 15 inches (50%) above normal.

Station	2009-2010 Snowfall	30-yr Normal	Departure from Normal
McCook	30.4	32.6	-2.2
Benkelman	31.7	29.2	2.5
Culbertson	29.3	31.8	-2.5
Haigler	22.4	-	-
Max 13N	45.9	-	-
Palisade	34.8	30.0	4.8
Parks 17N	46.6	-	-
Stratton	25.0	-	-
Trenton Dam	28.9	27.9	1.0

Table 2: 2009-2010 Snowfall, 30-year Normal and Departure from Normal

## October

The first hint of winter weather and its associated hazardous travel conditions arrived in late October of 2009. On October 21<sup>st</sup>-22<sup>nd</sup>, a winter-like storm brought three to five inches of snow across Dundy County and one to six inches across Hitchcock County, with the higher totals occurring in the northwest part of the county. This was a wet snow which caused the collapse of nearly 20 utility poles in parts of Dundy and Hitchcock Counties, resulting in power outages. On October 29<sup>th</sup>-30<sup>th</sup>, yet another winter-like storm brought six to ten inches of snow across all of southwest Nebraska, with 5 inches at Culbertson, 6 inches at Indianola, 7 inches at both Benkelman and McCook and 10 inches just north of Stratton. Wind gusts over 25 mph produced low visibility, and blowing and drifting snow.



# 2009-2010 Nebraska Winter Season Summary

Winter Weather Awareness Day - November 4, 2010

Extreme Southwest Nebraska Con't.

## November

November was a quiet month in terms of snowfall. Only one significant snow occurred in the area and it was concentrated across northwest Kansas and eastern Colorado, producing little in the way of travel difficulties in southwest Nebraska.

## December

The next major storm system to affect the region occurred December 8<sup>th</sup>-9<sup>th</sup>. Four to six inches of snow fell across southwest Nebraska with the higher amounts of six inches at McCook and Indianola. Snow totals over a foot occurred further east across south central Nebraska with this storm. Following the snow, the first true blast of Arctic air arrived, resulting in wind chill values as low as -25 F.

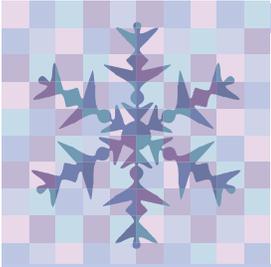
The Christmas storm which crippled the central and eastern parts of Nebraska with heavy snow and high winds produced only a few inches of snow in extreme southwest Nebraska, but we did share in the wind. Gusts of 50 to 60 mph were common December 24<sup>th</sup>-25<sup>th</sup>, producing blowing snow and poor visibility below ¼ mile.

## January-March

Although the 2009-2010 winter season began in earnest in October, records show the last half of winter to be fairly benign in terms of big snow events. The first month of 2010 was noteworthy for its lack of significant snowfall. Rather, the month was characterized by several episodes of dense fog, gusty winds and low temperatures. The coldest air settled in on January 5<sup>th</sup> and 7<sup>th</sup> when wind chill values dropped between minus 15 and minus 25 degrees Fahrenheit.

In February, only one snow and ice event is worth mentioning, and that occurred on the 20<sup>th</sup>-21<sup>st</sup>. Two to four inches of snow fell across northwest Kansas and extreme southwest Nebraska with four inches reported at Culbertson. Freezing rain and drizzle accompanied the light snow resulting in hazardous travel.

One last minor snow event occurred in March on the 18th as one to two inches of wet snow was reported on grassy areas.



# 2009-2010 Nebraska Winter Season Summary

Winter Weather Awareness Day - November 4, 2010

## Extreme Northeast Nebraska - Sioux Falls, SD

Notable events from the 2009-2010 winter season include:

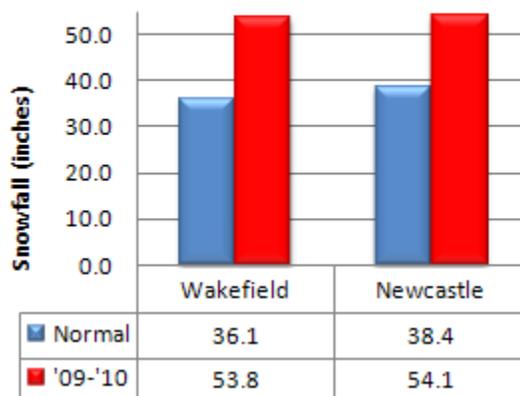
- ◆ An early snowfall of around 1 inch on October 12<sup>th</sup>
- ◆ Very mild and snow-free November
- ◆ 8 to 10 inches of snow and near blizzard conditions from December 7-9
- ◆ The Christmas snowstorm with 20+ inches of snow
- ◆ Extreme cold through the first ten days of January with lows from -15 to -20 deg F
- ◆ Below average temperatures throughout January and February

Snowfall this season in northeast Nebraska was well above normal (140-150% of normal) with 53.8 inches at Wakefield and 54.1 inches at Newcastle

Snowfall by month:

October: Wakefield = 0.2", Newcastle = 1.2"  
November: Wakefield = 0.0", Newcastle = 0.0"  
December: Wakefield = 22.6", Newcastle = 30.9"  
January: Wakefield = 14.3", Newcastle = 9.0"  
February: Wakefield = 13.1", Newcastle = 9.5"  
March: Wakefield = 3.6", Newcastle = 3.5"

### SNOW 2009-2010



FSD Graph: 2009-2010 Snowfall, 1981-2010 Normal for Wakefield and 1988-2010 Normal for Newcastle