Nebraska Winter Weather Awareness Day

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 7th, 2013**, 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. Account for vehicle accidents and fatalities, fires due to dangerous use of heaters and other winter weather fatalities, and you have a significant threat. 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 power poles, can reduce visibilities to white-out conditions, 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 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, power 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.

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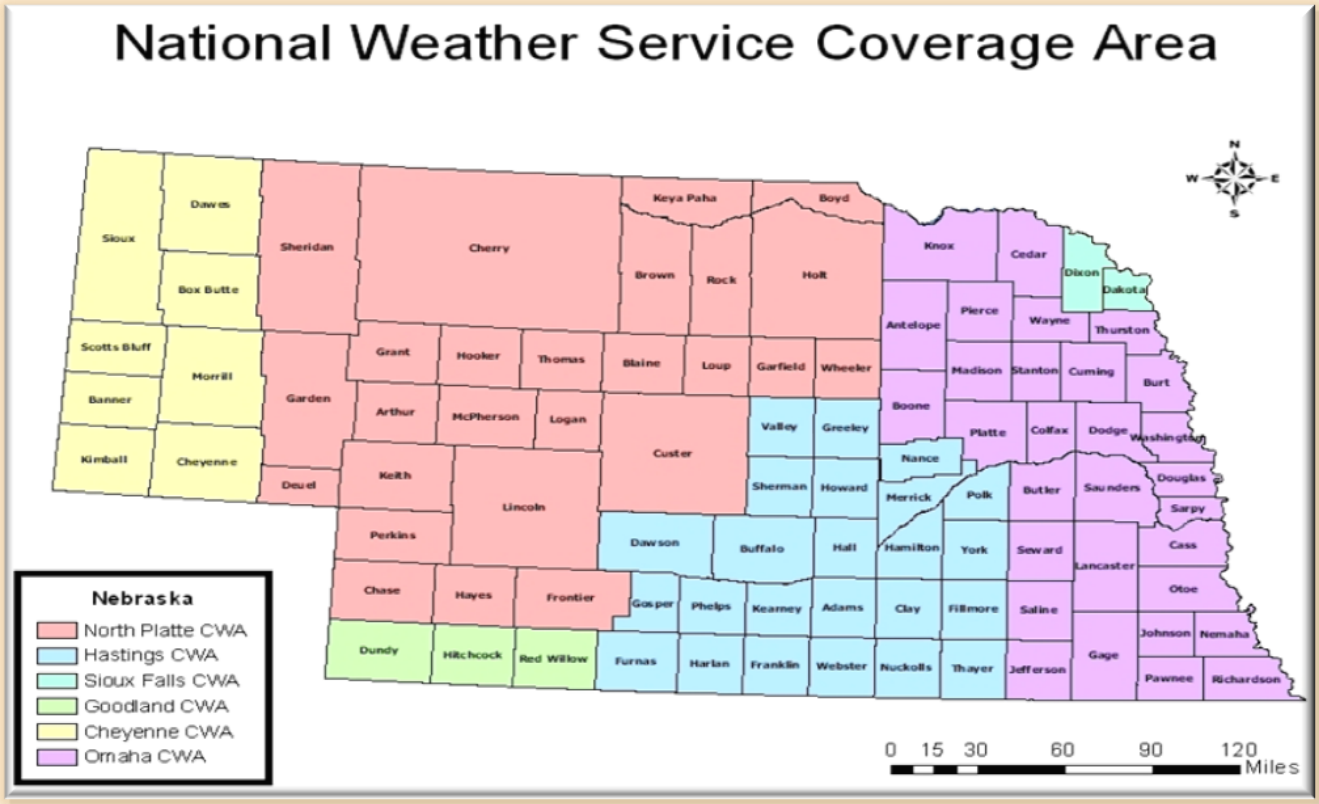
National Weather Service Offices Covering Nebraska



Far West	West and North Central	Southwest
National Weather Service 1301 Airport Parkway Cheyenne, WY 82001 (307) 772-2468 http://www.weather.gov/cys	National Weather Service 5250 E. Lee Bird Drive North Platte, NE 69101 (308) 532-4936 http://www.weather.gov/lbf	National Weather Service 920 Armory Road Goodland, KS 67735 (785) 899-7119 http://www.weather.gov/gld

South Central	East	Far Northeast
National Weather Service 6365 N. Osborne Drive West Hastings, NE 68901 (402) 462-4287 http://www.weather.gov/gid	National Weather Service 6707 North 288th Street Valley, NE 68064 (402) 359-5166 http://www.weather.gov/oax	National Weather Service 26 Weather Lane Sioux Falls, SD 57104 (605) 330-4247 http://www.weather.gov/fsd

NOAA Weather Radio All-Hazards

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 and 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, found in the VHF public service band at these seven frequencies (MHz):

162.400	162.425	162.450	162.475	162.500	162.525	162.550

Coverage information and SAME Codes for every county in Nebraska can be found at:
http://www.weather.gov/nwr/Maps/PHP/nebraska.php

Winter Weather Terminology

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

  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

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°F or colder

Remember to dress for the season!!

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

Winter Weather Dangers

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/windchill/

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

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

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

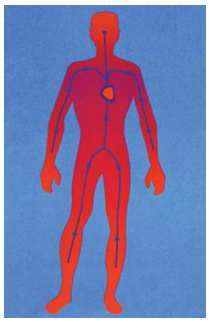
Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Winter Weather Dangers

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

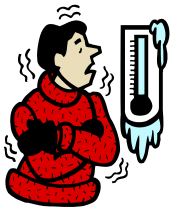
Hypothermia - is a condition brought on when extremities are excessively cold, and the body temperature drops to less than 95°F. It can kill. For those who survive, there are likely to be lasting kidney, liver and pancreas problems. Warning signs include uncontrollable shivering, memory loss, disorientation,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



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

Remember to Avoid Overexertion!

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



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

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. Most animals die from dehydration in winter storms.
- Make sure your pets have plenty of food, water and shelter.

Winter Weather Safety Tips

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 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

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, 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

Road Condition Information

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.511.nebraska.gov/atis/html/index.html

For Nebraska **in-state information 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)

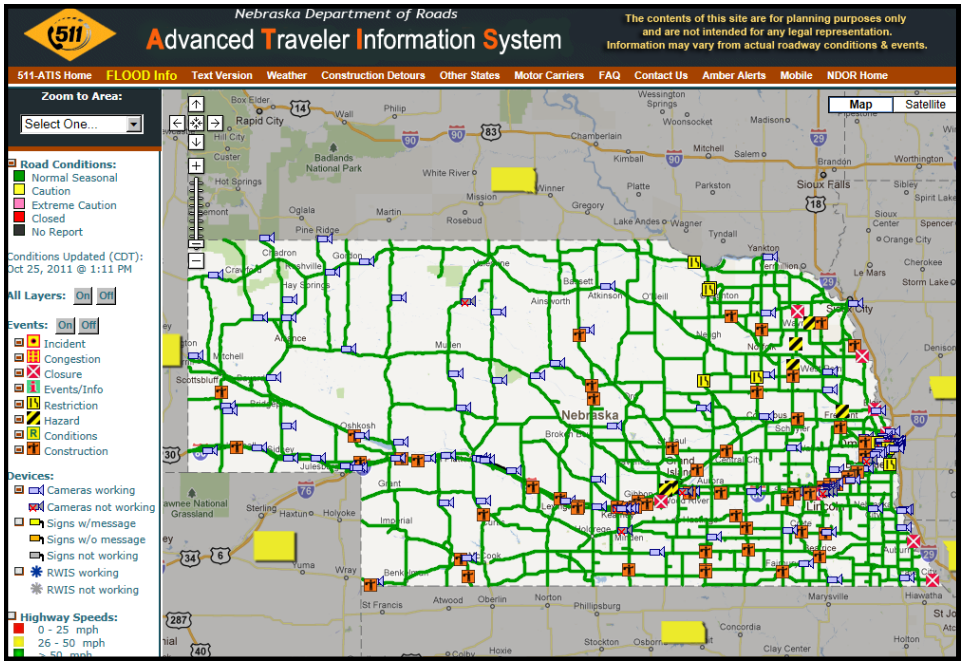
Wyoming: http://map.wyoroad.info/
Out of state: 1-888-WYO-ROAD (1-888-996-7623)

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 (1-886-511-5368)

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

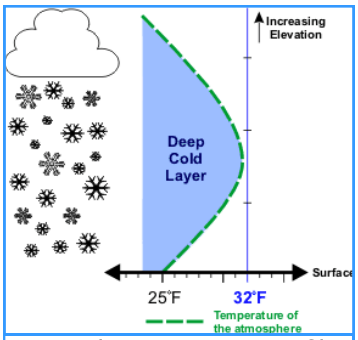


National Traffic and Road Closure Information can be found at:

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

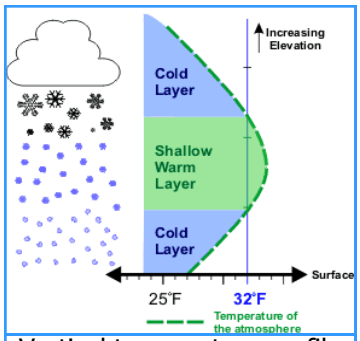
Winter Weather Precipitation Types

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



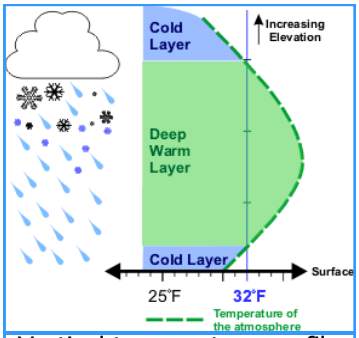
Vertical temperature profile needed for snow

So how does the temperature affect the precipitation type? In general, ice crystals form at heights where the temperature is several degrees below freezing. As they fall the crystals grow by several means, eventually forming snowflakes. If the entire column of the atmosphere remains below freezing all the way to the ground, we get **snow** (left). However, what happens if the snowflakes encounter a warm layer in the atmosphere that is above freezing? If the layer is warm and/or deep enough, the snowflakes melt and we get rain.



Vertical temperature profile needed for sleet

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



Vertical temperature profile needed for freezing rain

Freezing rain process: This process is similar to sleet formation except that the warm layer completely melts the snowflakes into raindrops. But before reaching the ground, the rain falls through another cold layer. If the air 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, etc.), causing a potential hazardous situation known as freezing rain (left).

Forecasters use information from radiosondes (weather balloons) to determine, among other things, 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.

Social Media

You can't go anywhere these days without hearing the words "Like Us On Facebook" or "Follow Us On Twitter." The latest in the technology craze, social media has overtaken the world like wildfire.

Here at the National Weather Service, we are no different. Since joining the Facebook and Twitter worlds, NWS offices have strived to continue to improve our presence on social media and have better interaction with our customers. We use social media in a variety of ways, from educating the public on different weather topics, to weather related trivia. We share beautiful weather related photos, and let you take a look into the day in the life of a meteorologist. During severe weather, we try to keep you up to date on the latest radar trends, as well as reports we are receiving. On the other side of the spectrum, our customers share storm reports and photos directly onto our page, which lets both us and others know what is occurring. They can also ask questions and provide feedback on the services we provide.

However, since these social media platforms are not maintained by NOAA, we do not want our customers to rely strictly on our social media pages for our warning information. Make sure you continue to monitor NOAA Weather Radio, local TV media and our webpage www.weather.gov, for all of your warning information.

NWS Office	Facebook	Twitter
Cheyenne, WY	US National Weather Service Cheyenne	@NWSCheyenne
Goodland, KS	US National Weather Service Goodland	@NWSGoodland
North Platte, NE	US National Weather Service North Platte	@NWSNorthPlatte
Hastings, NE	US National Weather Service Hastings	@NWSHastings
Omaha, NE	US National Weather Service Omaha/Valley	@NWSOmaha
Sioux Falls, SD	US National Weather Service Sioux Falls	@NWSSiouxFalls

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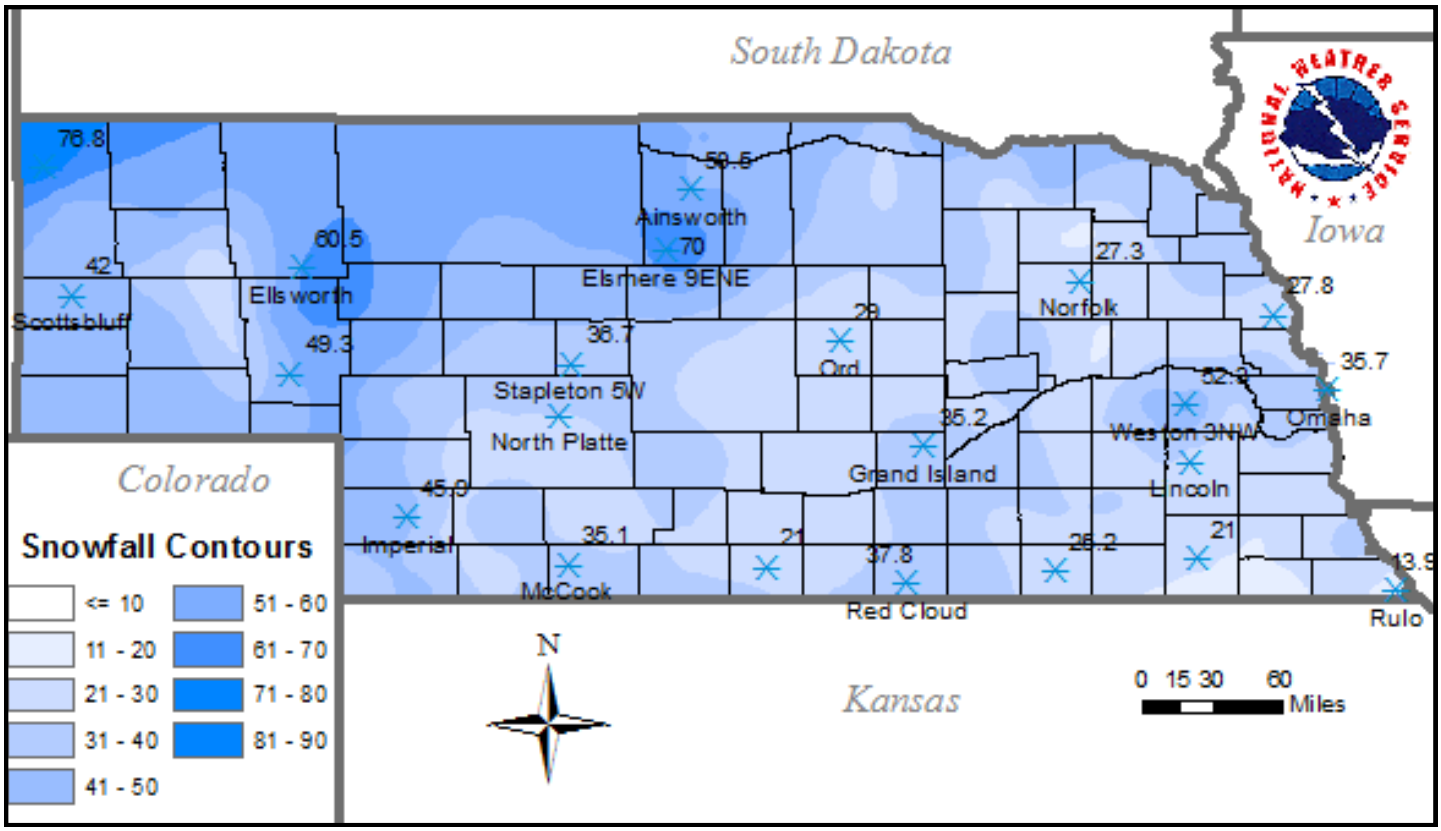
So please, "Like Us On Facebook" and "Follow Us On Twitter." Join in on the latest craze and learn a little about weather as well.

2012 Nebraska Winter Weather Summary

Statewide Snowfall Map 2012-2013



Seasonal Snowfall 2012-2013					
Location	**Normal (1981-2010)**	**2012-2013**	**% Normal**	**2011-2012**	**% Normal**
Scottsbluff	42.1″	42.0″	100%	20.3″	48%
North Platte	28.5″	30.2″	106%	15.6″	55%
Valentine	33.3″	54.0″	162%	15.9″	48%
McCook	28.8″	35.1″	122%	18″	63%
Grand Island	29.0″	35.2″	121%	20.1″	69%
Norfolk	31.5″	27.3″	87%	15.3″	49%
Omaha	26.4″	35.7″	135%	20.4″	77%
Lincoln	25.9″	27.5″	106%	18.8″	73%

2012 Nebraska Winter Weather Summary

Western Nebraska Panhandle - Cheyenne, WY

The winter of 2012-2013, which meteorologically is the period December through February, turned out to be generally a little colder and drier than normal for the southern Nebraska Panhandle while over the central and northern portions of the Panhandle it was a slightly warmer and drier winter compared to normal.

The winter was characterized by a relatively warm December with temperatures generally above normal across the region. January and February saw conditions turn colder than normal over most of the region, except over central and northern portions of the Nebraska Panhandle where temperatures held a little above normal. Given that neither El Nino nor La Nina was in existence during the fall and winter these observed conditions were not too unusual.

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. average temp.	Dec. depart. from norm	Jan. average temp.	Jan. depart. from norm	Feb. average temp.	Feb. depart. from norm	Dec-Feb average temp.	Dec-Feb depart from norm
Alliance	24.6	+1.0	24.0	-0.2	27.5	+0.4	25.4	+0.4
Chadron	25.0	+0.6	25.2	+0.8	30.6	+3.2	26.9	+1.5
Harrison	24.9	+1.6	22.6	-0.8	25.0	-0.8	24.2	0.0
Kimball	27.3	+1.0	25.5	-1.5	26.4	-2.6	26.4	-1.0
Scottsbluff	28.6	+2.5	28.1	+0.9	30.4	0.0	29.0	+1.1
Sidney	27.8	-0.9	27.8	-1.4	28.1	-3.9	27.9	-2.2

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 average temp. and date	Highest daily average temp. and date	Number of days with mins at or below zero
Alliance	**-17** on Jan. 14	**66** on Dec. 5	**-1** on Jan. 14	**47** on Dec. 1	**20 (+3)**
Chadron	**-15** on Dec. 26	**69** on Dec. 2	**-1.5** on Dec. 25	**49.5** on Dec. 2	**12 (-4)**
Harrison	**-13** on Dec. 26	**61** on Dec. 6	**-2.5** on Dec. 26	**46** on Dec. 3	**11 (-3)**
Kimball	**-11** on Jan. 14*	**64** on Jan. 25+	**0** on Jan. 13	**48.5** on Dec. 6	**16 (+7)**
Scottsbluff	**-14** on Jan. 14	**68** on Dec. 5	**1** on Jan. 14	**50.0** on Dec. 5	**7 (-3)**
Sidney	**-11** on Jan. 15	**68** on Dec. 1	**1** on Jan. 12	**50.0** on Dec. 1	**10 (+2)**

* and Jan. 13th

\+ and Dec. 2nd

2012 Nebraska Winter Weather Summary

Western Nebraska Panhandle - Cheyenne, WY

Bitterly cold arctic air intrusions were pretty much absent from the area during the winter. Cold Canadian air was much more common and held in place for somewhat longer periods of time. This produced the generally below normal temperatures in January and February, but at the same time kept the coldest observed temperatures quite limited, mostly to just one event in mid-January.

This winter was significantly colder than the winter of 2011-2012 however due to the ending of La Nina and the Arctic Oscillation switching from strongly positive in the winter of 2011-2012 to negative most of this last winter, allowing for colder Canadian air to drop south into the region as opposed to being shunted more to the east.

Precipitation:

Winter precipitation turned out to be generally below average across the area. In general December and January were rather dry, while February saw a bit higher than average moisture. There were no big snowstorms in the winter but some significant snowfalls did occur in the springtime, especially in April. Total snowfall over the Panhandle for the season ranged generally from 40-50", with locally higher amounts such as Harrison which recorded almost 77", 40 of which fell in the month of April!

The following table tabulates the December through February liquid precipitation amounts and their departures from average:

City	December precip and departure	January precip and departure	February precip and departure	Total precip and departure
Alliance	0.17 (-0.15)	0.22 (+0.04)	0.30 (-0.08)	0.69 (-0.19)
Chadron	0.31 (-0.21)	0.48 (+0.12)	0.37 (-0.24)	1.16 (-0.33)
Harrison	0.16 (-0.24)	0.27 (-0.05)	0.39 (+0.01)	0.82 (-0.28)
Kimball	0.28 (-0.18)	0.11 (-0.18)	0.64 (+0.29)	1.03 (-0.07)
Scottsbluff	0.19 (-0.32)	0.26 (-0.15)	0.28 (-0.32)	0.73 (-0.79)
Sidney	0.40 (-0.14)	0.17 (-0.03)	0.41 (+0.09)	0.98 (-0.08)

2012 Nebraska Winter Weather Summary

Western & North Central Nebraska - North Platte, NE

The winter season of 2012-2013 proved cold, snowy and packed with winds. Five significant winter events stood out with the season's first measurable snowfall on **October 6th**. The morning of **October 7th** some locales west of Highway 61 woke up to 6" of snow on the ground. The snow was a welcomed sight with a widespread snow event on the 25th. The greatest snowfall for the season was recorded across the west and north (see state snowfall map on page 14), with the highest snowfall total recorded for the season at 70" northeast of Elsmere by Cooperative Observer Lester Stufft. The area's snowiest sites are shown below in Table 1.

December - Arctic Air Arrives

A couple of cold fronts moved through in November, but it was the early December arctic plunge that brought winter coats, gloves and hats out. A cold front moved south on the **9th** to produce little snow, but the onset of strong winds and subzero temperatures led to bitter wind chills, the coldest a frigid 33 degrees below zero recorded six miles east of Gordon.

Reporting Station	2012-2013 Total Snowfall
Elsmere 9 ENE	70
Ellsworth	60.5
Gordon 6 N	59
Crescent Lake	56.5
Valentine	54
Arthur	52.7
Kilgore 1 NE	52.5
Big Springs	51.5
Ainsworth	50.5

Table 1 - 2012-2013 Snow Totals

Temperatures did recover for unseasonable warmth through the **18th**, yet on the **19th**, temperatures plummeted again as a potent winter storm developed to produce widespread accumulating snow from the Rockies into the Midwest. The combination of snow and strong winds produced whiteouts that led to numerous vehicle accidents, including one with a fatality in Lincoln County on Interstate 80 before its closure until the 20th.

Active Pattern in February

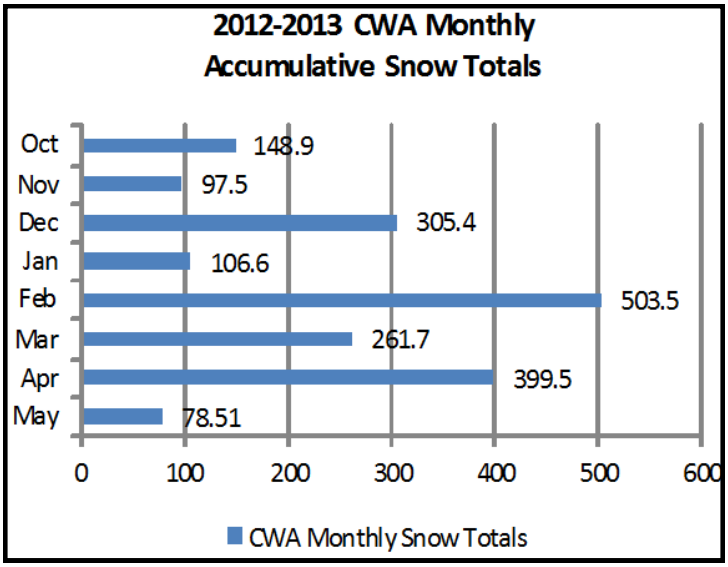
Feb. 20-21 Winter Event
Photo courtesy of Dean Cosgrove.

January 2013 brought a few passing snow showers but ended with average daily temperatures in the normal range and below normal precipitation. February, however, was a stark difference. In February, an active weather pattern brought two significant storm systems and welcomed moisture. The first snow storm occurred on **February 10th**, when widespread snowfall and fierce winds produced whiteouts as winds gusted to over 50 mph. The heaviest snowfall was 10" that was reported 15 miles northwest of Stapleton, in Logan County.

2012 Nebraska Winter Weather Summary

Western & North Central Nebraska - North Platte, NE

The second winter storm arrived on the **20th** to produce a fairly wet, heavy snow that affected the area for two days. Higher snowfall fell across southwest Nebraska with around a foot of snow accumulating in parts of Frontier and Hayes counties before the system exited northeast.



Adding up snow at all reporting sites, the total snowfall recorded in February was just over 500" (shown right). Two daily snowfall records were broken at North Platte as the total snowfall for the month was 11"; more than double the normal snowfall in February.

March Goes Out Like a Lion

March is typically one of the snowiest months, but also brings a mixture of weather as spring begins. Through the month, storm systems clipped northern portions of the area, resulting in above normal precipitation in locations including Valentine, where precipitation for the month totaled 1.57", over 0.50" above normal. Part of that arrived as heavy snow on **March 9th**, when a winter storm tracked northeast to produce a narrow band of heavy snow from Grant County, into north central Nebraska where snowfall amounts reached around a foot. Strong north winds created whiteouts from blowing and drifting snow as well. On the **30th**, a spring storm system produced the first supercell that spawned two brief tornadoes near Sutherland. The tornadoes produced no damaged and were rated as EF-0 on the Enhanced Fujita Scale.

April - Full of Records

In early April, a potent spring storm on the **8th** led to a supercell that bowed out to produce winds estimated at up to 80 mph in Frontier County. The high winds created damage that encompassed over 50 square miles in Frontier County, including 12 farmsteads. As the storm moved northeast, arctic air arrived that drove temperatures down and broke or tied record temperatures that were set as far back as 1928. On the **9th**, the weather hazards and impacts increased as strong winds and a mixture of precipitation caused power outages, wind damage, and school closings. Significant snow fell in the northwest to include 17" of snow and five foot snow drifts in Sheridan County, while snow tapered off further southeast for periods of freezing rain, sleet, and snow in the southwest. The strong winds carried frigid air south that kept daytime temperatures in the teens. Snow rarely lingers into May, yet this year the last snow flew on **May 1st**.

2012 Nebraska Winter Weather Summary

Extreme Southwestern Nebraska - Goodland, KS

The winter of 2012-2013 was characterized by near to below normal temperatures and above normal snowfall in extreme southwest Nebraska (Dundy, Hitchcock, Red Willow counties). This was a stark contrast to the previous unusually mild and dry winter. Two months stand out as being noteworthy in terms of temperature. November 2012 was unusually mild with temperatures averaging 3-4 degrees above normal, while April 2013 was unusually cold with temperatures 3-4 degrees below normal. Snowfall was above normal across the board with some sites receiving 10-12" more than normal. El Nino/Southern Oscillation (ENSO) conditions were neutral last winter, while the previous winter was dominated by cooler than normal ocean temperatures in the equatorial Pacific (La Nina).

	Temperature Departure From Normal						
Station	**Oct 2012**	**Nov 2012**	**Dec 2012**	**Jan 2013**	**Feb 2013**	**Mar 2013**	**Apr 2013**
Benkelman	**-1.9**	**4.1**	**-0.2**	**-0.4**	**-1.1**	**-2.7**	**-4.5**
Culbertson	**-2.8**	**2.9**	**-0.5**	**-0.8**	**-0.9**	**-2.0**	**-3.9**
Haigler	**-2.9**	**4.2**	**-0.8**	**-0.4**	**-0.9**	**-3.2**	**-3.9**
McCook	**-1.3**	**3.4**	**-0.7**	**-0.6**	**0.7**	**-0.8**	**-3.6**
Trenton Dam	**-1.5**	**3.5**	**-0.4**	**0.2**	**1.1**	**-0.7**	**-1.6**

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

Seasonal (Oct 2012 - Apr 2013) snowfall was well above normal across the three counties. Snowfall totals ranged from 27 to 42 inches last season, with normal values ranging from 23 to 30 inches. In comparison, the winter of 2011-12 brought only 8 to 18 inches of snow across the three counties. February and March 2013 were especially snowy. Several potent storm systems dropped a total of 12 inches of snow in February and 6-12 inches of snow in March.

Station	Oct 2012-Apr 2013 Snowfall	1981-2010 Normal	Percent of Normal
Benkelman	**41.8**	**29.8**	**140**
Culbertson	**32.5**	**28.2**	**115**
Haigler	**32.9**	**22.6**	**146**
McCook	**35.1**	**28.7**	**122**
Trenton Dam	**27.3**	**24.5**	**111**

Table 2: Oct 2012 - Apr 2013 Snowfall, Normal Snowfall, Percent of Normal Snowfall

2012 Nebraska Winter Weather Summary

Extreme Southwestern Nebraska - Goodland, KS

October - December 2012

October was a cool month and brought a brief taste of wintry weather. A narrow band of heavy snow of 6-8" fell from north-central Dundy County southeast to near Benkelman on the **6th**. Twelve days later, an intense low pressure system brought winds gusting over 60 mph beginning around mid-morning and continuing through most of the afternoon, reducing visibility to one-quarter mile in blowing dirt.

Drought conditions which began during the summer continued in **November**. Only a few hundredths of an inch of moisture was received during the month, accompanied by unusually mild temperatures.

The month of **December** was quiet with the exception of the **19th**. A strong cold front moved through extreme southwest Nebraska during the early afternoon resulting in a brief period of blizzard conditions. Behind the cold front, winds gusted to 52 mph at McCook. As snow began to fall during the afternoon, the strong winds and blowing snow lead to visibilities of one-quarter mile or less, with many locations reporting white-out conditions. The lack of visibility caused most of the area roads to be closed until the storm passed.

January - April 2013

January was dry in southwest Nebraska. The only noteworthy weather was a continuation of drought conditions from prior months. All of southwest Nebraska was rated as being in D4 (Exceptional) drought. Precipitation during the month was only 40% of normal.

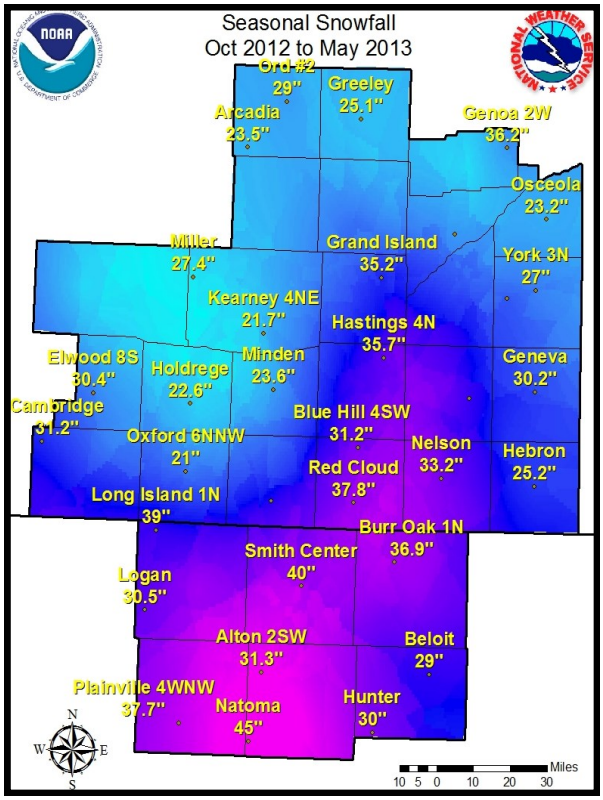
February began on a quiet note, but the weather turned wintry later in the month when a storm system moved over southwest Nebraska on the **20th**. Little wind accompanied this storm. The only reductions in visibility occurred under the heavier bands of snow, which had snowfall rates of an inch or more an hour. Snowfall ranged from 12.5" at McCook, to 10" at Trenton, with 8" at Stratton.

Although precipitation during **March** ranged from 120% to 260% of normal, the area continued in D4 (Exceptional) drought. Moderate to heavy snow occurred on two days, **March 9th** and the **22nd**. Bands of heavy snow fell across Dundy and Hitchcock counties producing blizzard to near blizzard conditions as a storm system moved in from Colorado. On the 22nd, a sluggish, spring storm system affected the region for 36-48 hours. Snowfall totaled 8" at Parks, 8.5" near Stratton and 9" in Benkelman.

In **April**, Mother Nature abruptly shifted gears, introducing southwest Nebraska counties to their first taste of severe weather on the **8th**. A strong weather system brought hail to the size of golf balls near Stratton, Parks and Benkelman. The main weather story was an EF1 tornado which brought significant damage to a farming operation east of Benkelman. Several large outbuildings were destroyed; farm implements pushed or moved while utility poles and fences were broken.

2012 Nebraska Winter Weather Summary

South Central Nebraska - Hastings, NE



The winter season started out fairly quiet across the outlook area, with warm conditions through the month of November and into the start of December, including a few record breaking days. November 10th, 17th and December 2nd all saw high temperature records broken or tied, and the first 5 days of December actually ended up being one of the top 5 warmest starts to the month on record for both Grand Island and Hastings! However, the warm weather would not last as Mother Nature had different plans heading further into December, and the first glimpse of winter sure was a doozy.

December 19th brought the first major winter storm of the season, with widespread snowfall of 3-10" across the area, several hours of blizzard conditions to most counties and even a few lightning strikes. The higher amounts focused in a swath through the heart of the area, including the Interstate 80 and Highway 6 corridors. Officially, this was the first blizzard to blast South Central Nebraska in nearly three years, since Christmas 2009. Winds gusting to 40-45 MPH and blowing snow created white-out conditions, and travel became difficult with reports of numerous accidents and road closures, including Interstate 80. One welcome result of this event was the liquid equivalent of this snow, which exceed 1" in some areas.

Things were fairly quiet through the second half of December, but **New Year's Eve** sent out the month and 2012 with a bang! Widespread 2-5" of snow fell, mainly south of the Highway 6 corridor. North of the main snowfall area, amounts tapered down to a dusting near Interstate 80. Despite visibilities reduced to around one-half mile at times, winds generally averaged no more than 15 MPH, keeping blowing and drifting snow in check.

There was not a lot to talk about through the majority of the first month of 2013, before **January 29-30th** brought 2-5" of new snow to southeast portions of the area, with very localized higher amounts up to 6". There was a sharp divide between those that received 2+" and those farther northwest that hardly saw any snow. Although snow ended in all areas by daybreak on the 30th, morning commuters were met with very slick roads.

The majority of the area experienced its heaviest snowfall of the season on **February 20-21st**. For some locations near the Kansas border, this was actually one of the largest storm total snowfalls on record! This included Red Cloud, with its 13.5" ranking as the 6th highest 2-day total since 1894.

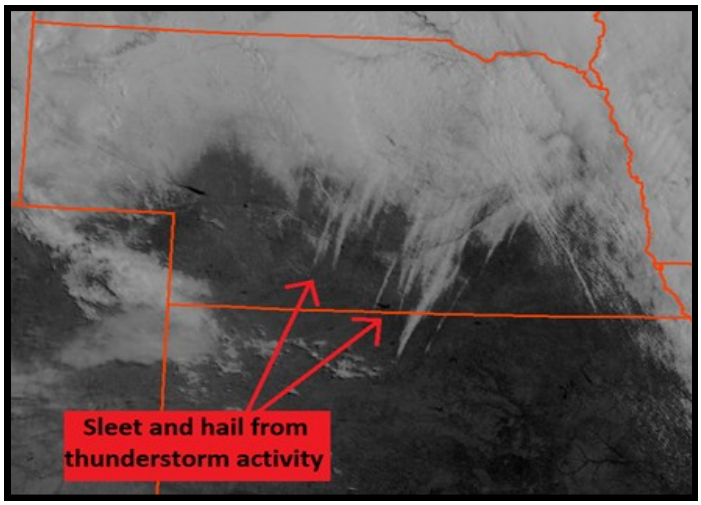
2012 Nebraska Winter Weather Summary

South Central Nebraska - Hastings, NE

Even more snow fell just south of the state line in Kansas, with 18" falling in portions of Osborne and Phillips Counties. Essentially the entire South Central Nebraska area totaled at least 6-10", with the highest amounts of 10-14" concentrated in an area south of a Cozad-Holdrege-Nelson line. Grand Island even set a new daily snowfall record of 8.8" for the 21st (its storm total was 10") and Hastings tied its record of 8" (its storm total was 9.5").

The second official blizzard of the season pounded much of the southeastern half of the area on **March 9-10th**, dropping generally 3-9" of snow whipped by winds which frequently gusted over 40 MPH. The majority of the snow focused east of a Fullerton-Hastings-Franklin line, with the heart of the worst blizzard conditions across Hamilton, York, Clay, Fillmore, Nuckolls and Thayer Counties, though even Hastings reported blizzard conditions with one of the highest known wind gusts of the event at 54 MPH. Interstate 80 was closed for several hours from Grand Island to Lincoln.

In what ended up being one of the top-10 coldest months of April on record, a few late season winter storms brought additional wintry precipitation to South Central Nebraska. The event on **April 9th** was an interesting one for many folks as several thunderstorms developed, but instead of rainfall, most observed an extended period of sleet. There were periods of hail, but sleet was the primary precipitation type, with some locations reporting up near one half of an inch of accumulation. The streaks left behind from the hail and sleet can be seen in this satellite image to the right.



Widespread 1-4" of snow affected most areas on **April 17-18th**, with locations west of Highway 281 seeing the greatest coverage of localized 3+" amounts. Brisk northwest winds gusting up to 35-40 MPH resulted in occasional visibility problems and wind chill temperatures falling to between 10-20 degrees. A few late narrow bands of snow pushed Grand Island to 4", which set a new daily record for the 18th, and was the largest April snowfall in 10 years.

Rounding out the month, far northern areas, mainly Valley, Greeley and Nance Counties, received another shot of 1-4" on **April 22nd** as another quick moving system moved through.

The start of May brought continued cool conditions across the area, but another storm system crossing the Central Plains ushered in a colder air mass, one which supported snow! Many locations received measureable snow on **May 1st**, including Grand Island, which ended up with 0.7", breaking the daily snowfall record of a trace from 1994. More notably, this was the first measureable May snow in Grand Island since 4.3" fell on May 3, 1967 - 46 years ago!

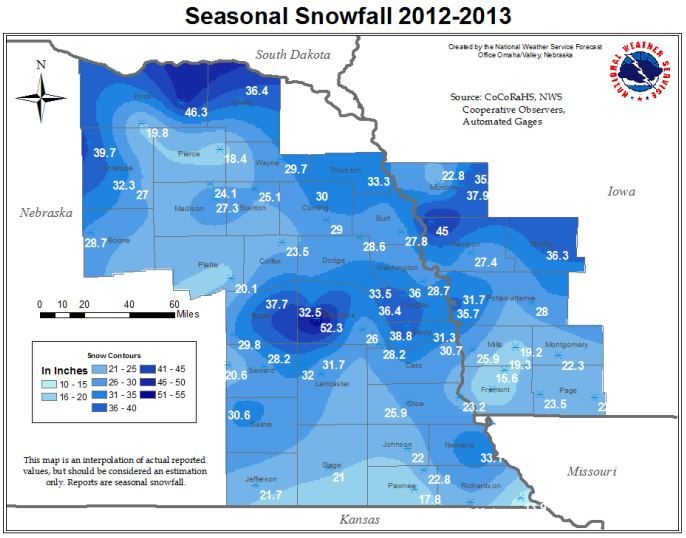
2012 Nebraska Winter Weather Summary

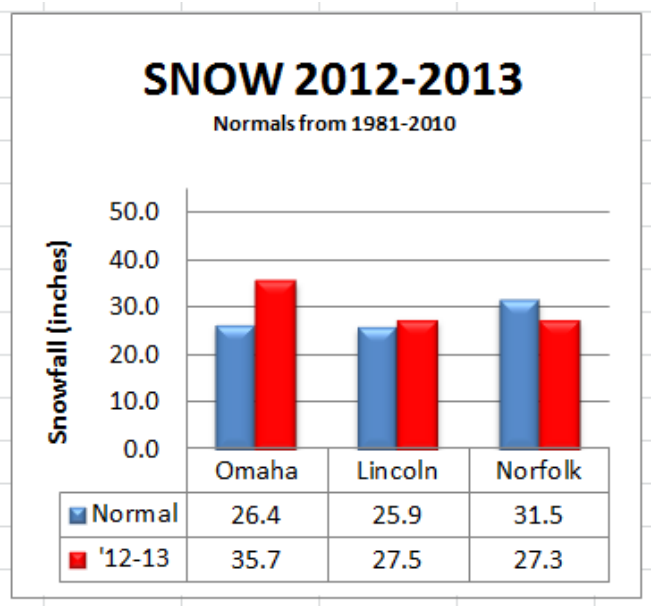
Eastern Nebraska - Omaha/Valley, NE

The first measurable snow of the 2012-2013 season fell in December at most locations. However, since the last snow of the prior winter season ended unusually early, Lincoln and Omaha recorded their longest snow-free streak at 311 and 295 days respectively. Norfolk's streak was 286 days, the 2nd longest on record. Snowfall for the entire winter season, including what fell in April and May, finished at 35.7 inches in Omaha, 27.5" in Lincoln and 27.3" at Norfolk.

The first significant storm of the 2012-2013 season occurred on **December 19th-20th** when a 6-10" swath of snow and blizzard conditions fell near and north of Interstate 80 from around Seward and Lincoln northeast through Omaha and Blair. Although snow amounts were lighter northwest or southeast of this band, strong winds produced blizzard or near blizzard conditions outside the heavy snow area as well.

Two other winter storms of significance were noted last winter, **February 21st-22nd** and **March 9th-10th**. The February storm brought widespread snow amounts of 4-9" to eastern Nebraska with the heaviest across the Omaha metro. The March storm was accompanied by strong winds and blizzard conditions from Lincoln and Seward through Omaha and Blair, similar in areal coverage to the December storm, with 8-12" of snow from this storm.

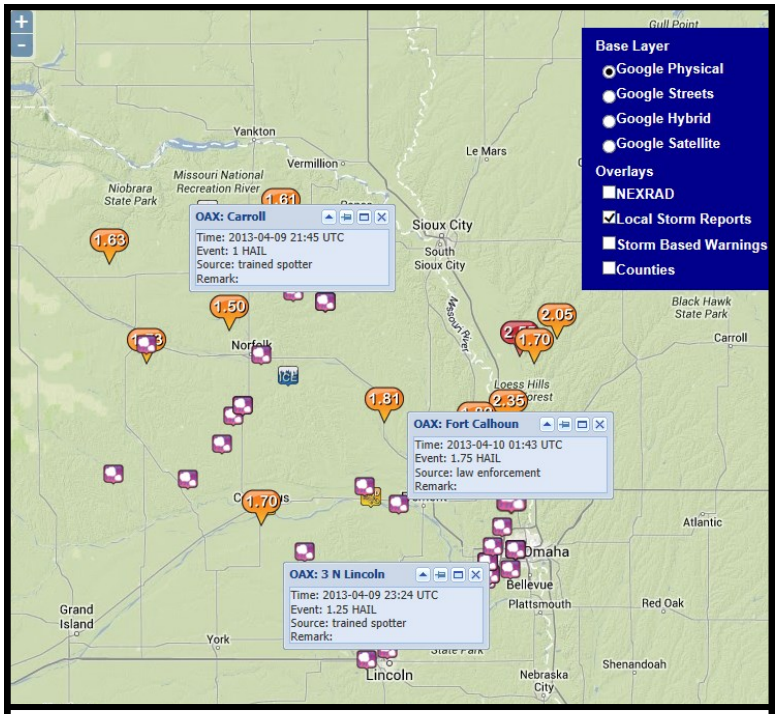




Seasonal snowfall amounts for eastern Nebraska were much improved over 2011-2012 and more typical for this part of the country. The 2012-2013 season generally saw between 20 and 40 inches of snowfall. Typical snowfall amounts are between 25 and 35 inches. For 2011-2012, most locations only reported 10 to 25 inches of snow.

2012 Nebraska Winter Weather Summary

Eastern Nebraska - Omaha/Valley, NE



Local storm reports for April 9th - Heavy rain, freezing rain, damaging winds and large hail

Although the winter of 2012-2013 had its share of winter storms and even a blizzard or two, what was probably most memorable were two storms that occurred in the spring. The first of these spring storms hit **April 9th** as Arctic air undercut a warm and unstable air mass. The result was a very unusual combination of freezing rain, sleet and snow that occurred at the same time severe thunderstorms were embedded in the precipitation mix. Reports of large hail 1 inch or larger were received at the same time temperatures were in the upper 20s to around 30 with freezing rain and sleet! The freezing rain and severe thunderstorm mix generally occurred from central into northeast Nebraska. Although Omaha was on the southeast side of the coldest air, it didn't escape the severe weather as a storm dropped hail up to golf ball size and larger creating substantial house and vehicle damage.

The second spring storm that produced wintry weather was a very rare May snowstorm. A swath of 2-3 inches fell from Lincoln through Omaha with reports of 4-6" just north of those cities. The 3.1" that fell from the storm in Omaha would have been a daily record for any May date, but since the snow occurred late on **May 1st** and early on the 2nd, the totals were split over 2 calendar days. Nonetheless, the daily amounts of 1.9" on May 1 and 1.2" on May 2 were the second and 4th highest amounts ever recorded in May for Omaha. Lincoln recorded 2.5" and 0.2" on those dates, the 2nd and 3rd highest totals for any May dates. Norfolk escaped measurable snow from this storm with only a trace recorded. The snow was accompanied by north winds of 15 to 30 mph with poor visibilities and slushy and difficult driving

Late-season snow the 1st and 2nd of May, 2013