



MINNESOTA WINTER HAZARD AWARENESS WEEK



Winter is the signature season of Minnesota. It's normally a long season of cold temperatures and snow and ice that can last from November through April. Yet winter doesn't slow Minnesotans down – in fact Minnesotans are just as mobile, social and active during winter as they are during the summer months – both indoors and especially outdoors. But in order to ensure a safe and enjoyable winter, it is critical to be informed and aware of the potential risks and hazards associated with winter weather and how to avoid them.

The topics below describe some of the more common features of winter weather, including warnings and alerts and resources for more information.

Keeping Minnesota *Ready*

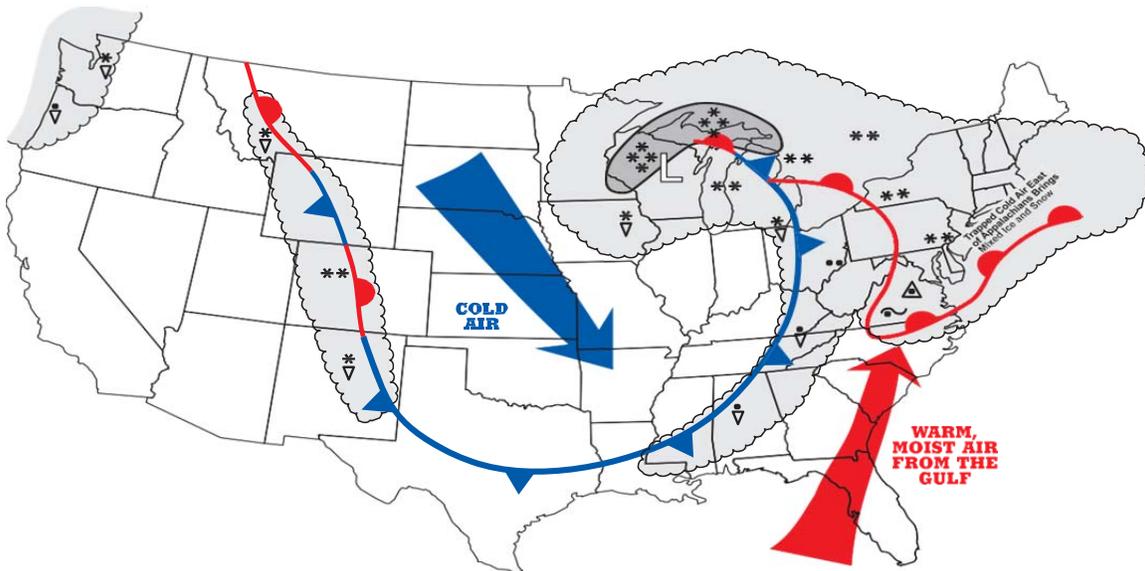


MONDAY – WINTER WEATHER

WINTER STORMS: HOW WINTER STORMS FORM

There are many ways for winter storms to form; however, all have three key components.

- **COLD AIR:** For snow and ice to form, the temperature must be below freezing in the clouds and near the ground.
- **MOISTURE:** Water evaporating from bodies of water, such as a large lake or the ocean, is an excellent source of moisture.
- **LIFT:** Lift causes moisture to rise and form clouds and precipitation. An example of lift is warm air colliding with cold air and being forced to rise. Another example of lift is air flowing up a mountain side.



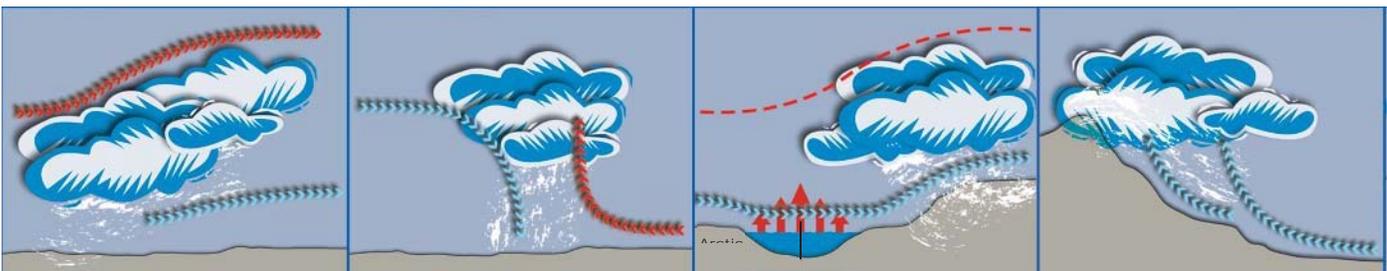
* ▽	Snow Shower	~	Freezing Rain		Cold Front
▽	Rain Shower	△	Sleet		Warm Front
**	Light Snow	**	Heavy Snow		Stationary Front
••	Light Rain				

Warm Front

Cold Front

Lake Effect

Mountain Effect



Keeping Minnesota *Ready*



WARNINGS AND ALERTS: KEEPING AHEAD OF THE STORM

By listening to NOAA Weather Radio, commercial radio and television for the latest winter storm warnings, watches and advisories. The National Weather Service issues outlooks, watches, warnings and advisories for all winter weather hazards. Here's what they mean and what to do. Use the information below to make an informed decision on your risk and what actions should be taken. Remember to listen to your local officials' recommendations and to NOAA Weather Radio for the latest winter storm information.

- **OUTLOOK:** Winter storm conditions are possible in the next 2-5 days. Stay tuned to local media for updates.
- **WATCH:** Winter storm conditions are possible within the next 36-48 hours. Prepare now!
- **WARNING:** Life-threatening severe winter conditions have begun or will begin within 24 hours. Act now!
- **ADVISORY:** Winter weather conditions are expected to cause significant inconveniences and may be hazardous. If you are cautious, these situations should not be life threatening. Electronic equipment available to receive weather information/NOAA (Weather Radio, Radio, TV, Pager, Cell Phone, Two-Way Radio)

Keeping Minnesota *Ready*



WINTER WEATHER TERMS (FROM THE NATIONAL WEATHER SERVICE)

NOAA's National Weather Service urges residents to keep abreast of local forecasts and warnings and familiarize themselves with key weather terminology.

- **Winter Storm Warning:** Issued when hazardous winter weather in the form of heavy snow, heavy freezing rain, or heavy sleet is imminent or occurring. Winter Storm Warnings are usually issued 12 to 24 hours before the event is expected to begin.
- **Winter Storm Watch:** Alerts the public to the possibility of a blizzard, heavy snow, heavy freezing rain, or heavy sleet. Winter Storm Watches are usually issued 12 to 48 hours before the beginning of a Winter Storm.
- **Hazardous Weather Outlook:** Provides up to seven days notice of any hazardous weather, including winter storms. It is issued daily, with more frequent updates whenever the outlook changes.
- **Blizzard Warning:** Issued for sustained or gusty winds of 35 mph or more, and falling or blowing snow creating visibilities at or below $\frac{1}{4}$ mile; these conditions should persist for at least three hours.
- **Lake Effect Snow Warning:** Issued when heavy lake effect snow is imminent or occurring.
- **Lake Effect Snow Advisory:** Issued when accumulation of lake effect snow will cause significant inconvenience.
- **Wind Chill Warning:** Issued when wind chill temperatures are expected to be hazardous to life within several minutes of exposure.
- **Wind Chill Advisory:** Issued when wind chill temperatures are expected to be a significant inconvenience to life with prolonged exposure, and, if caution is not exercised, could lead to hazardous exposure.
- **Winter Weather Advisories:** Issued for accumulations of snow, freezing rain, freezing drizzle, and sleet which will cause significant inconveniences and, if caution is not exercised, could lead to life-threatening situations.
- **Dense Fog Advisory:** Issued when fog will reduce visibility to $\frac{1}{4}$ mile or less over a widespread area.
- **Snow Flurries:** Light snow falling for short durations. No accumulation or light dusting is all that is expected.
- **Snow Showers:** Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- **Snow Squalls:** Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant. Snow squalls are best known in the Great Lakes region.
- **Blowing Snow:** Wind-driven snow that reduces visibility and causes significant drifting. Blowing snow may be snow that is falling and/or loose snow on the ground picked up by the wind.
- **Sleet:** Rain drops that freeze into ice pellets before reaching the ground. Sleet usually bounces when hitting a surface and does not stick to objects. However, it can accumulate like snow and cause a hazard to motorists.
- **Freezing Rain:** Rain that falls onto a surface with a temperature below freezing. This causes it to freeze to surfaces, such as trees, cars, and roads, forming a coating or glaze of ice. Even small accumulations of ice can cause a significant hazard.



EXTREME COLD

At some point every winter, temperatures in Minnesota drop below zero. Adding even a small wind can drive the wind chill effect down to dangerous levels for anyone exposed to it for very long. Naturally, the best way to avoid any danger is to stay indoors in a well heated environment for as much as possible. But if you do feel the need to venture outdoors, make sure to take proper precautions, and know how to spot the signs of frostbite and hypothermia - both for yourself and others – especially for children, elderly or other people at risk.

EXTREME COLD FACTS:

- **Definition of Extreme Cold**

Extended exposure to extremely cold temperatures 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 and from person to person.

Typically in Minnesota, extreme cold means temperatures near or below zero degrees Fahrenheit. However extended exposure to temperatures of 40 degrees Fahrenheit or less can be hazardous to vulnerable people, especially if factored with wind chill.

Injuries Related to Cold

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

- **Wind Chill**

Wind chill is not the actual temperature but rather how wind and cold feel on exposed skin. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the core body temperature. Animals are also affected by wind chill; however, cars, plants and other objects are not. A wind chill of -20 degrees Fahrenheit will cause frostbite in just 30 minutes.

Keeping Minnesota *Ready*



NWS Windchill Chart



Wind (mph)	Temperature (°F)																		
	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	-69
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72	-78
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77	-83
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81	-87
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84	-90
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87	-93
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89	-95
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91	-97
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93	-99
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95	-101
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-96	-102
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98	-104

Frostbite Times: 30 minutes (light blue), 10 minutes (medium blue), 5 minutes (dark blue)

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

- Frostbite** is localized damage to body tissue caused by extreme cold. The condition 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 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.



HEAVY SNOW AND ICE

Heavy snow can immobilize a region and paralyze a city: stranding commuters, closing airports, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can cause roofs to collapse and knock down trees and power lines. Homes and farms may be isolated for days and unprotected livestock may be lost. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on cities and towns.

Injuries Due To Ice and Snow

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

- ❖ **BLIZZARD:** Winds of 35 mph or more with snow and blowing snow reducing visibility to less than ¼ mile for 3 hours or more.
- ❖ **BLOWING SNOW:** Wind-driven snow that reduces visibility.
- ❖ Blowing snow may be falling snow and/or snow on the ground picked up by the wind.
- ❖ **SNOW SQUALLS:** Brief, intense snow showers accompanied by strong, gusty winds. Accumulation may be significant.
- ❖ **SNOW SHOWERS:** Snow falling at varying intensities for brief periods of time. Some accumulation is possible.
- SNOW FLURRIES:** Light snow falling for short durations with little or no accumulation.

Snow Loading Concerns

Snow loading is the downward force exerted on structures by the weight of accumulated snow. It may result in damage to roofs or the actual collapse of the roof itself. In addition to snow accumulation there are other conditions that may contribute to snow loading problems and the potential for roof collapse:

- Adding insulation to the roof without ventilation may cause condensation & eventual rotting of the rafters or deck
- Re-roofing with three or more layers of shingles
- Not correcting observable symptoms of structural problems
- Attic condensation problems and ice dams can lead to extensive damage to home roofs
- Heavy snow loads can lead to barn roof failure

Ice Threats

Heavy accumulations of ice can bring down trees and topple utility poles and communications towers. Ice can disrupt communications and power for days while utility companies repair extensive damage. Even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.