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Severe Winter Weather Toolkit

PERMACULTURE SOLUTIONS FOR REDUCING RISK FROM ICE, SNOW, AND EXTREME COLD

Beta Version: 2026-02-25

WINTER

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Image: Windbreak for diverting snow

Section 1: Introduction

"***There's no such thing as bad weather, only bad gear (or poorly equipped explorers).***" Traditional proverb

A winter storm is coming.

The weight of snow and ice can damage trees, buildings, vehicles, and other infrastructure.

The snow or ice could cut off electricity and make it impossible to travel, perhaps for days or longer, depending on your location.

Risks are compounded because of extreme cold temperatures.

Icy roads or poor visibility during snow storms regularly cause multi-car accidents.

Sometimes winter storms cause unexpected flooding from pipes bursting or rapid snow melt/rain.

How do you prepare?

If you don't have the time or means to prepare to any great degree, **how can you survive and prevent damage with whatever resources you do have?**

This guide is a summary of advice from a range of resources, including winter survival experts, indigenous experience, our own experience, Red Cross, FEMA, and other rescue agencies. It is focused on conditions specific to severe winter weather.

👉 *We recommend you also use our General Guide for all around preparedness.* This guide includes actions you can take to be prepared for many different types of disaster.

While people who have grown up experiencing winters may be aware of a number of these approaches, transplants from warmer parts of the country to colder areas are less familiar with the challenges a winter storm can bring. Additionally, winter storms sometimes impact southern regions that are less prepared than colder climates to deal with them.

Thus, this guide.

What's in the guide?

The section "Understanding Your Risk" discusses the different types of impacts winter storms can have.

We then address **preparation, mitigation and recovery steps**. Many of these steps apply to everybody experiencing winter storms. Some steps apply mainly to people who are caring for land, or who own or control buildings. Some steps are "broadscale" steps that apply to entire communities.

Who this is for

We strive to make these guides as broadly useful as possible, to as many groups as possible.

We have endeavored to organize the information so that you can easily find what applies to you. However, we also urge people to share the information that may not apply to them, to educate others on the steps that may apply to them.

For individuals: Sections on plants and buildings will apply mainly to those who care for land or own or control the buildings involved. Aspects of these sections can still be of interest to renters and apartment dwellers, and we share strategies you can use to get these points addressed by owners, communities and governments in our Community Guide.

For communities: We include broadscale solutions that can benefit everybody living in the region, especially those who are most vulnerable. Anybody can advocate for these solutions in your neighborhood or region.

The Toolkit

Our Toolkit focuses on immediate life saving triage actions and short term preparation. A storm is coming or has come, you could lose electricity, you may be snowed in.

The tips in the section “Surviving a Winter Storm” can save your life or prevent injury. **Consider printing the checklists** [coming soon] **to this guide and keeping them in your “Go Bag” so that they are readily available if you need them.** Most elements in this section apply to everybody.

The Toolkit also offers simple actions you can take to mitigate damage to your home, infrastructure and landscape. You may not have the time or resources to deeply prepare, but this section will reduce your risk of damage, and keep you more comfortable and warm than if you did nothing.

The sections on plants apply mainly to people who are caring for land, but most of the strategies can be applied to any building. **Apartment dwellers may want to share the information with building owners or managers.**

Deep Dive

This guide is a deeper, holistic, and resilient approach to preparing for winter storms or just normal cold. T**his is where, if you can, we strongly recommend you put your energies.** It will help you create more resilience in your life from multiple angles.

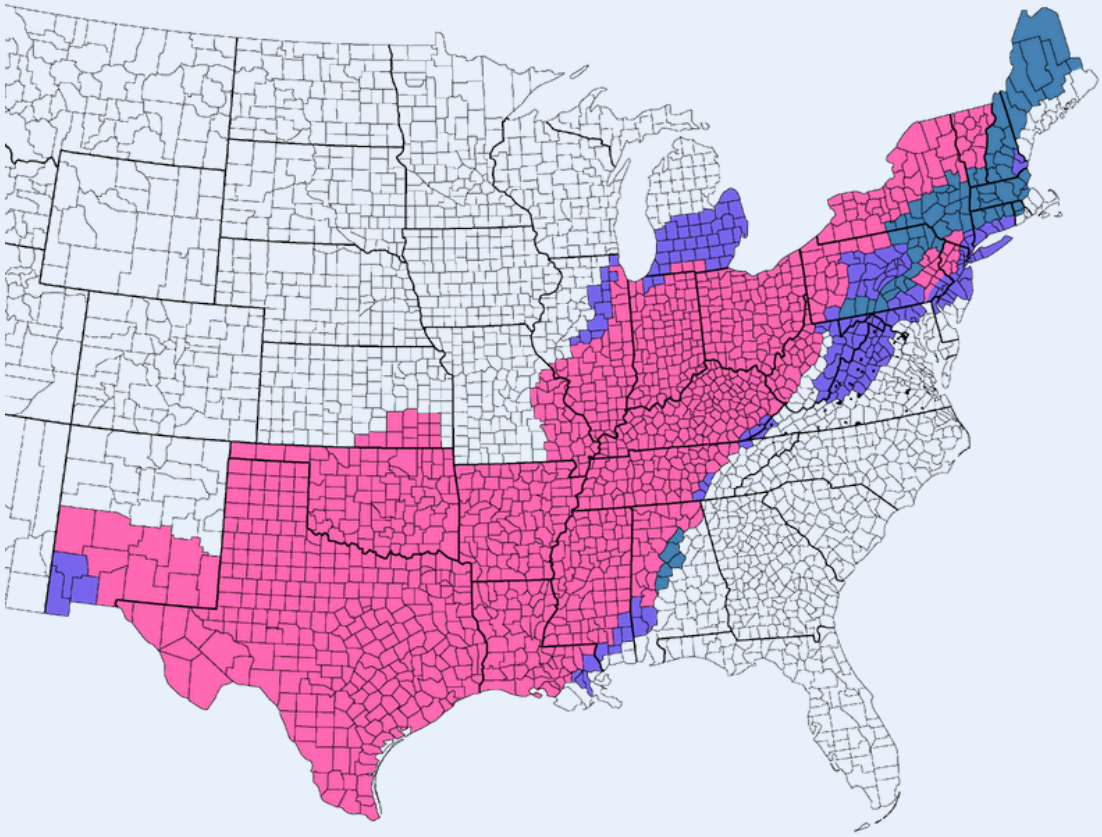
You can relax in a variety of circumstances because you are as ready as you can be for them, regardless of whether electricity goes out or you are snowed in for many days.

Why this guide?

Many areas experience winter storms yearly and are generally prepared. But in some cases, record storms have occurred that affect even the best prepared areas.

Winter storm Uri:

The winter storm of February 2021, given the name of Uri, was one of the most widespread and destructive weather events in the US. Data analysis estimated as many as 700 people died as a result of the event. One analysis found that 64% of deaths were caused by hypothermia. Cabrera, Alejandro Martínez (May 27, 2021). **"Texas Winter Storm Death Toll Could Be Much Higher Than The State's Count, BuzzFeed Data Review Found"**. Houston Public Media.



Winter storm warnings and watches for Winter Storm Uri
By HurricaneCovid - Own work, CC BY-SA 4.0,
https://commons.wikimedia.org/w/index.php?curid=104570048

Impact → Damage cost estimates ranged from $26.5B, from NOAA, to $195B from risk consultant Aon PLC, making winter storm Uri one of the costliest and deadliest disasters in the US. [2021 Winter Storm Uri After-Action Review: Findings Report (PDF) (Report). City of Austin & Travis County. November 4, 2021. **Archived** (PDF) from the original on November 5, 2021.]

Impact → Millions of chickens died during the storm, causing a nationwide chicken shortage.

Impact → Heavy snow and ice caused massive traffic accidents (a 133 car pile up in Ft. Worth, Texas) and shut down travel.

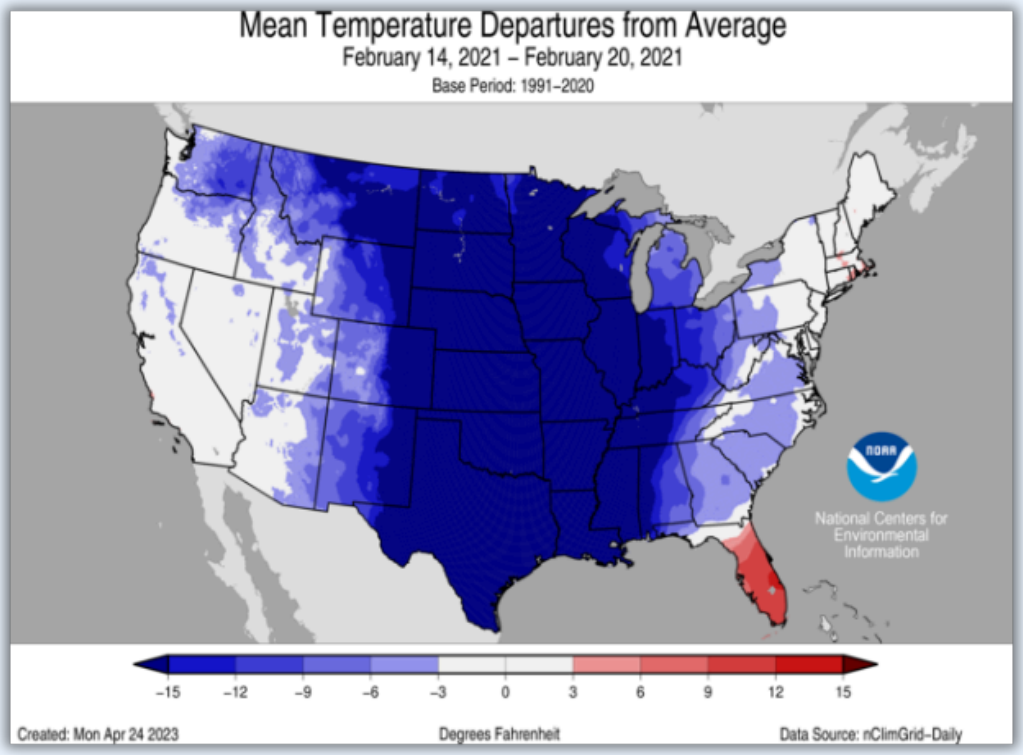
Impact → Over 120 million Americans were under winter or ice storm warnings across the country. The storm brought record breaking cold weather for several days to areas that usually don't experience the cold (like Houston, Texas, a subtropical city which experienced a wind chill of 0 degrees). Every county in Texas received storm warnings. At least 10 million lost power in the US and Northern Mexico, some for many days. [Sullivan, Brian K.; Malick, Nauren S. (February 16, 2021). "5 Million Americans Have Lost Power From Texas to North Dakota After Devastating Winter Storm". Time.]

Impact → Several tornados in the south caused additional damage.

Impact → Many homes in this subtropical location had poor insulation and no heat, especially among rentals in low income areas.

Impact → Gas lines froze in Texas, and 13 million people were ordered to boil water as water systems failed.

Impact → But such problems are not just sub-tropical: fuel oil used in heating systems in places like the Yukon begins to thicken (gelling) below 15°F, and becomes unusable in furnaces.



Record cold wave: https://en.wikipedia.org/wiki/February_13%E2%80%9317,_2021_North_American_winter_storm

01

Section 2: Mental Outlook

This section contains: approach to disaster preparation and the psychology of being cold.

Approach to disaster preparation

Why Prepare?

Peace of Mind:

- Planning and implementing a plan can bring a feeling of security and peace of mind. You know what to do and that you can survive a winter storm!
- Understanding the details of your risk alone can bring some peace of mind, because it's easier to envision specific and finite steps you can take to reduce your risk.
-

Decision Readiness:

- Having a clear plan to both evacuate and to shelter in place makes it easier to make the choice of what to do in the moment. You don't have to wonder where to go or what supplies you might have.

Having drills to practice both procedures is also valuable. You and everybody else in your household will all know what to do and can participate.

How to Approach Preparation

An important part of preparing for disaster is doing it gradiently. **Take one step at a time.** Choose the parts that are most doable. Print our checklists, mark the ones most important to you and work on getting those done.

Any preparation is better than doing nothing! All of it matters. No action is too small. This Guide is very thorough - not every step will apply to everybody. **Complete Risk Assessment:** coming soon! You know your situation and will have an idea of what makes the most sense for you to focus on. Start there!

The psychology of being cold

What Happens?

One sometimes overlooked risk is that **being cold and wet can affect your perception, judgement and mindset**. When you're uncomfortable and shivering, your focus narrows or you can become dispersed or confused. This makes it

harder to navigate, make good decisions, or even find shelter safely. Small mistakes can turn into big problems quickly when your body and mind are stressed.

Why It Matters?

The better you understand the process of what happens when your body gets cold and the more clear you are on what the best actions are to take, the more focused you can stay on taking the most appropriate actions when the situation arises. **This can and has been lifesaving during winter storms.** It can be quite helpful to practice each of these steps outlined below that involve dealing with extreme cold, especially those involving finding or creating shelter and recognizing and treating symptoms of frostbite or hypothermia.

What Is Permaculture?

Permaculture is a contraction of the words ‘permanent’ and ‘agriculture’ which reconcieves annual tillage and soil disturbance-based agriculture into a **perennial-plant based agriculture** favoring tree crops, cover crops, and minimal soil disturbances. From agriculture comes fibers, fuels, medicines, foods, and other essential requirements for culture to persist and thrive. Permaculture has come to now mean ‘**permanent culture**’. As a design science, permaculture studies and catalogues **natural solutions** to flood, fire, extreme heat, droughts, climate adaptation, and ecosystem management techniques both old and new. Using permaculture design, we can build **landscapes, buildings, and communities** that resist disasters by their very design.

Section 3: Understanding your risk

Introduction

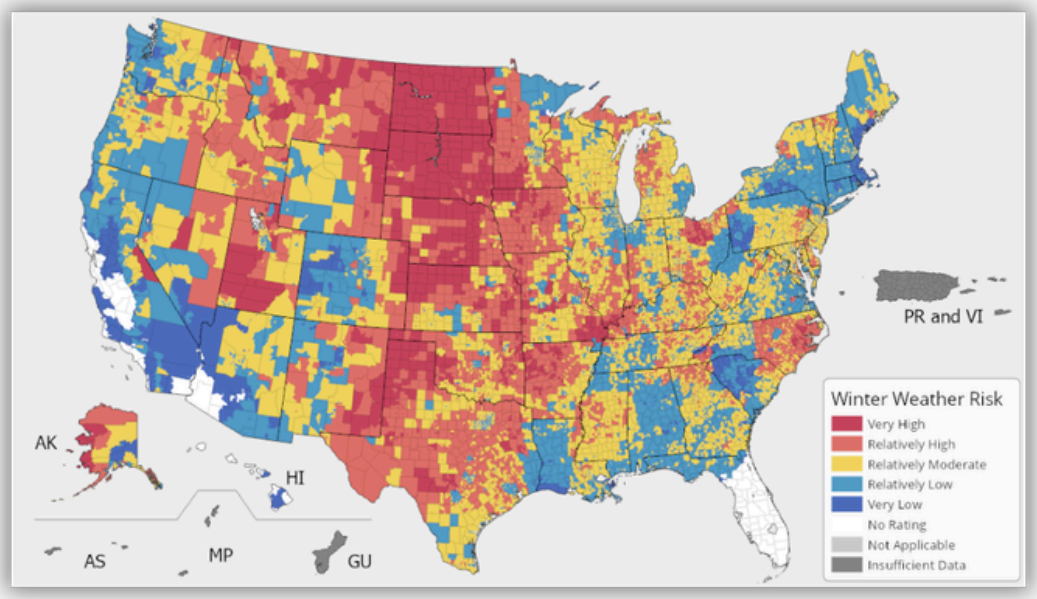
Winter storms can create different impacts and risks depending on what type of storm it is. Understanding the risks for each type of storm - and assessing their risk to your situation - can help you to prepare better. Understanding how the warning systems work enables you to make decisions about when and how to initiate your plan for winter storms.

This section covers:

- types of winter weather and associated risks
- understanding winter advisories, watches and warnings

Types of severe winter weather

In this section: There are multiple risks during severe winter weather. We discuss each major risk and what impacts they can have.



Winter weather risk
https://hazards.fema.gov/nri/winter-weather
This measures the potential loss of value of buildings, value of people who may be injured or die, and value of damaged agriculture because of winter weather.

04

Heavy snow

White Out Snowstorms

Snowstorms can happen so intensively that they cause a “white out,” a condition of almost zero visibility. Heavy snow storms can include heavy winds, ice, and bitter cold. In some areas like mountains or near large lakes, storms can drop many feet of snow within a few hours, causing roads to be inaccessible.

Risks:

- Low visibility, during and after storms, from snow and/or wind.
- Vehicle accidents, including multivehicle pile ups, often deadly.
- Electricity failure.
- Roads become impassable, trapping people in their home.

Wet vs Dry Snow Impacts

Colder air creates “dry” snow, which is lighter and is transported by wind more easily. Temperatures closer to freezing or slightly above can produce “wet” snow that has a higher moisture content and can weigh 2-3X as much per volume. It is sticky enough to cause damage to power lines, trees or roofs. It is also harder to move.

Wet snow risks:

- Damage to trees, power lines, roofs or other infrastructure
- Health risks from shoveling heavy snow

Ice storm

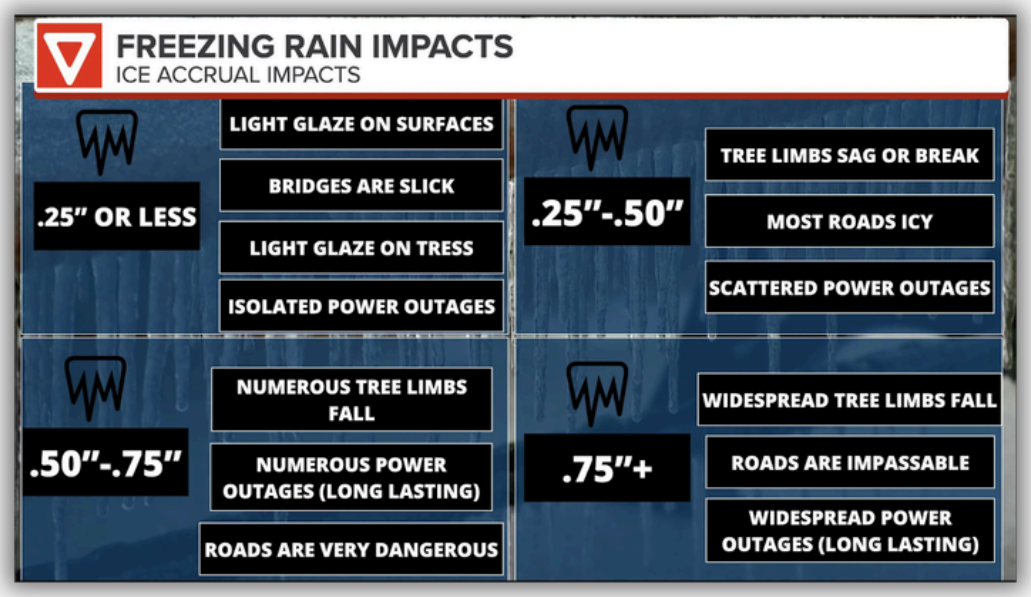
Ice storms are caused by freezing rain.

This can accumulate on buildings, utility wires, trees and other surfaces and become so heavy that it creates a hazard. On surfaces, it can cause severe loss of traction.

Risks:

- Driving or walking conditions become dangerous or deadly
- Roads may become impassable, trapping people in their homes
- Trees, branches, utility poles can break under the weight of ice and injure buildings, vehicles or people. The weight of ice can snap power lines or utility poles, even those with steel frame
- Falling items can block roadways
- Electricity can fail

Ice storms have shut down entire metropolitan areas for days; some areas have gone **without power for a month**. Even less than ½" of ice accumulation can cause significant damage because of its weight over a large area.

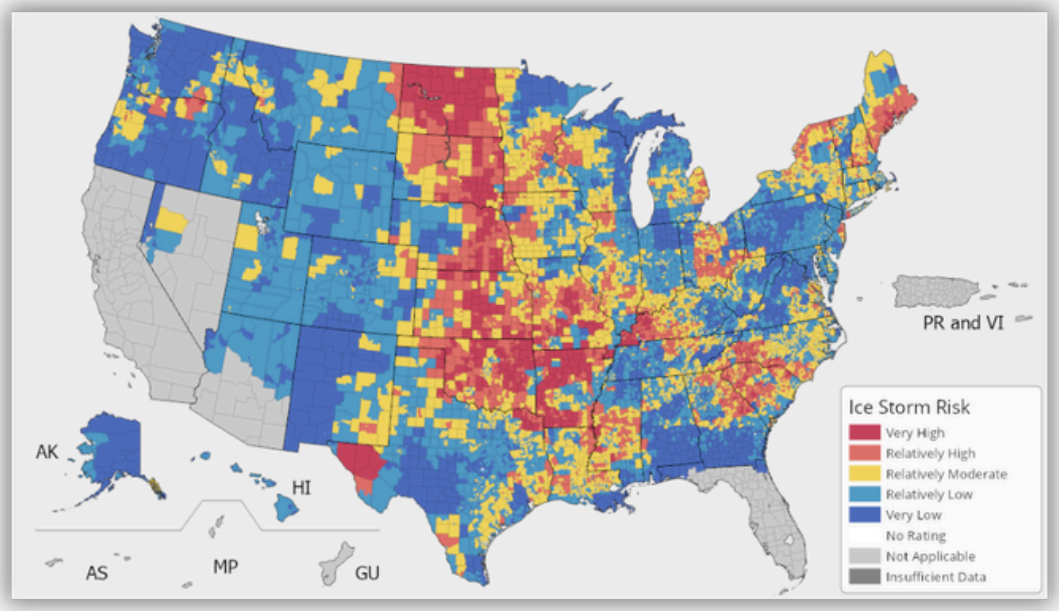


North Carolina Weather Authority

The Midwest ice storm of January 2009 caused dozens of deaths, loss of power to 2 million people, and damage to buildings, cars, utility wires, and other infrastructure.

Michigan forests lost millions of trees from their tops falling off due to the weight of the ice. This blocked over 750 miles of roadway and created a fire hazard.

Source: Mlive



FEMA: Ice Storm Risk Map

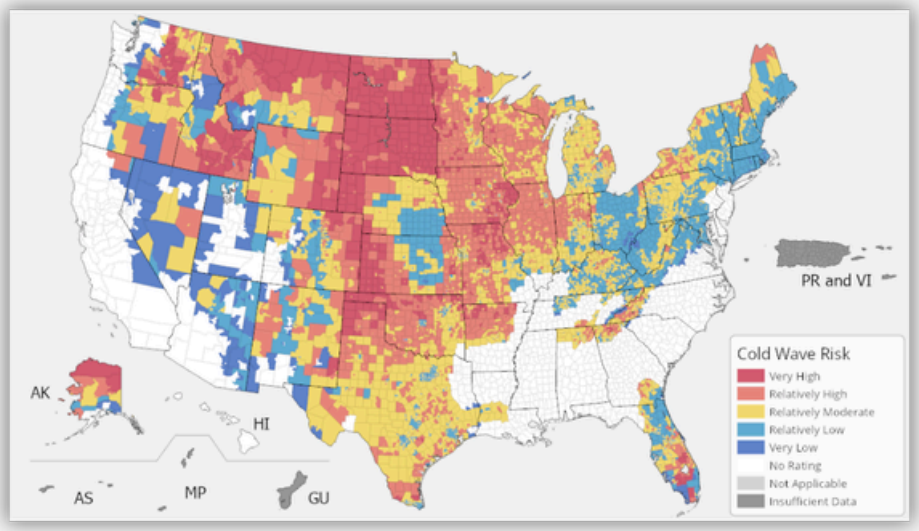
Extreme cold

Cold fronts sometimes happen suddenly, catching people unprepared. This can be especially devastating when they impact areas that normally don't experience such bitter cold. **In south Texas**, a February 2021 cold front caused temperatures to drop up to 50 degrees below normal, down to 0 degrees F with wind chill in some areas of Houston.

The electricity failed, but perhaps more unexpectedly, **gas lines became inoperational** which means that millions of people had neither electric nor fuel heating available to them during a several day bitter cold event.

Risk:

- Electricity and gas can become overloaded, brown outs or blackouts can occur.
- Risk of fires or carbon monoxide poisoning increases as people try to improvise staying warm.
- Areas of the US have experienced a wind chill of -40°F (-40°C). Frostbite can occur on exposed skin in just 15 minutes at -15°F (-26°C). See https://www.weather.gov/safety/cold-wind-chill-chart



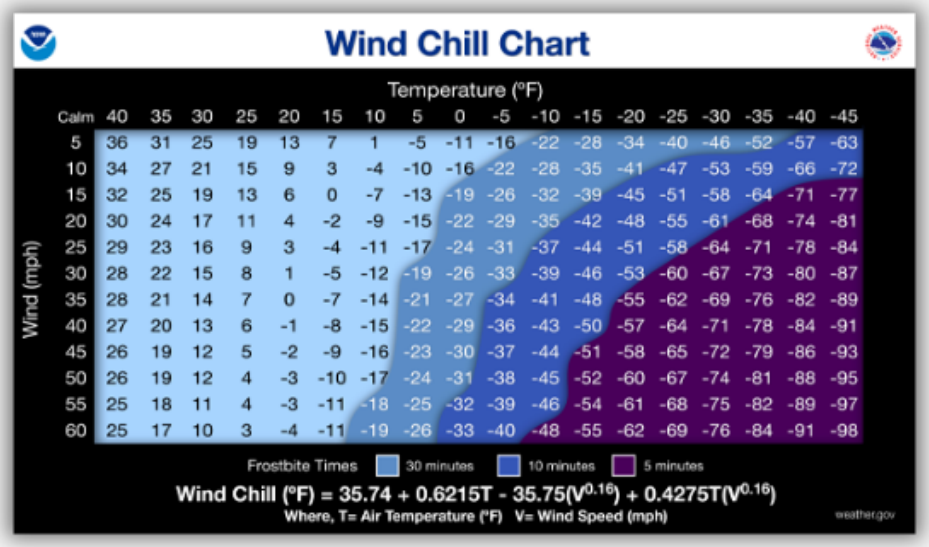
FEMA: Bitter cold wave risk

Wind chill

"*The wind chill temperature is how cold people feel when outside. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. Therefore, the wind makes it FEEL much colder. If the temperature is 0°F and the wind is blowing at 15 mph, the wind chill is -19°F. At this wind chill temperature, exposed skin can freeze in 30 minutes.*" National Weather Service

Risk:

- People not predicting how cold it can feel while outside can quickly get frostbite or hypothermia.
- Wind can damage trees, utility poles or other infrastructure.



Flooding or hail
Winter storms can include destructive hail, or may trigger flooding in spring if snow melt occurs too quickly.

Risk:
- Extensive damage to vehicles, buildings or crops from floods or hail

👉 Please see our Toolkits and Guides on Hail and Flooding (**links**) for more in depth information about each of these types of events.

Early/late freezes
Millions of dollars in crops are lost yearly because of damage from early or late freezes. In some years, this is particularly dramatic. Often this affects specific crops more than others. For instance, in 2023 there were major peach crop losses in **North Carolina** because of a hard freeze late in the season.

Risk:
- Loss of crops or partial loss of crops
- Long term damage to valuable fruit trees

Per the Farm Bureau, in 2024, freezes and frost events resulted in $854 million in damages. https://www.growingproduce.com/vegetables/extreme-weather-in-2024-cost-farmers-more-than-20-billion/

What causes winter storms?

One factor that influences winter storms is warmth in the Arctic, which pushes the cold polar wind, called **the polar vortex**, further south; when the polar vortex moves slowly it can drop a significant amount of snow, sleet or ice. This phenomena sometimes causes snowstorms in areas they don't normally occur, like **New Orleans** or **Georgia**. Other factors that can cause heavy storms include changes in ocean patterns such as El Nino and El Nina or other global patterns.

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Winter storm advisories, watches, or warnings

Both the National Weather Service and your local or regional related public agency(s) has a number of different warnings, watches and advisories.

This section covers:

- Types of Warnings, watches and advisories
- Who Issues Warnings

In this section: The National Weather Service has a number of different warnings, watches and advisories. We're including an explanation of what each one means, below, for reference.

Types of Warnings, Watches and Advisories

Winter storm advisories - Be Aware! indicate a storm can cause significant inconvenience and if caution is not exercised, can threaten life or property. Advisories can sometimes give you days to prepare. They don't guarantee a disaster level storm will occur but it's a good time to ensure your preparations are in place.

A **winter storm watch - Be Prepared!** means that a damaging storm is possible in your area, be alert and listen for more information. Watches are usually issued 24-48 hours in advance.

A **winter storm warning - Take Action!** means that the storm is coming, wrap up any last minute preparations. Conditions pose a threat to life or property and travel will become difficult to impossible.

Sometimes, additional detail is included:

A heavy snow watch or warning means four or more inches of snow in a 12-hour period or six or more inches in a 24-hour period. High winds may blow snow into drifts and cause poor visibility.

A blizzard watch or warning means low visibility (less than ¼ mile) with winds of at least 35 mph. It combines low temperatures, heavy snowfall, and high winds that blow the snow into drifts and reduce visibility to only a few yards. Travel is difficult to impossible.

A severe blizzard warning means considerable falling or blowing snow, winds at least 45 mph, and temperatures of 10°F or lower are expected for several hours.

A freezing rain advisory means accumulation of less than ¼" of ice.

An ice storm watch or warning means ice accumulation of ¼" or more potentially causing damage to buildings and trees.

Cold weather advisory - dangerously cold conditions that are not expected to reach warning criteria. Dress appropriately and cover exposed skin when venturing outdoors.

Extreme cold watch - extremely dangerous cold conditions or wind chill values are possible. Adjust plans to avoid being outside during coldest hours if possible. ENsure your car has at least ½ tank of gas and update your winter survival kit.

Extreme cold warning - Issue when extremely dangerous cold conditions or wind chill values are expected or occurring. Try to stay inside if possible.

Frost advisory means areas of frost are expected or occurring, posing a threat to sensitive vegetation. Expect temperatures of 33-36F with conditions conducive to the formation of frost.

Freeze watch - there is potential for significant, widespread freezing temperatures within the next 24-36 hours. Issued in spring and autumn during growing season.

Freeze warning - temperatures are forecast to go below 32F for a long time which can kill some plants.

Hard freeze warning - Temperatures are forecasted to go below 28F for an extended period of time which can injure or kill many crops.

Travel advisory - Ice and snow are expected to hinder travel but the anticipated weather conditions are not serious enough to require warnings.

Frost Advisory: Be Aware. A Frost Advisory means areas of frost are expected or occurring, posing a threat to sensitive vegetation. Expect temperatures of 33-36F with conditions conducive to frost.

Freeze Watch: Be Prepared. A Freeze Watch is issued when there is a potential for significant, widespread freezing temperatures within the next 24-36 hours. A Freeze Watch is issued in the autumn until the end of the growing season and in the spring at the start of the growing season.

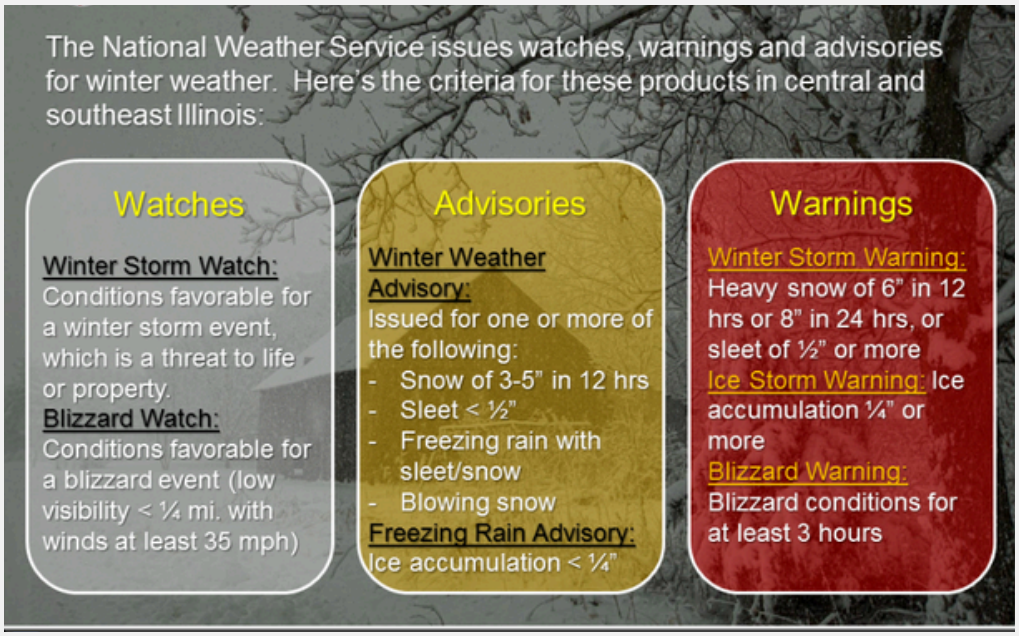
Freeze Warning: Take Action! A Freeze Warning is issued when temperatures are forecasted to go below 32°F for a long period of time. This temperature threshold kills some types of commercial crops and residential plants, while temperatures below 28°F (Hard Freeze Warning) for an extended period of time can kill most types of commercial crops and residential plants.

Who Issues Warnings

The National Weather Service issues advisories, watches and warnings.

Local and regional entities forward these and may issue additional information, such as snow emergency activation and schedule, or road condition ratings for major public thoroughfares.

Below is an National Weather Service example for Lincoln, Illinois.



Here is an example of an advisory mapped out for Iowa

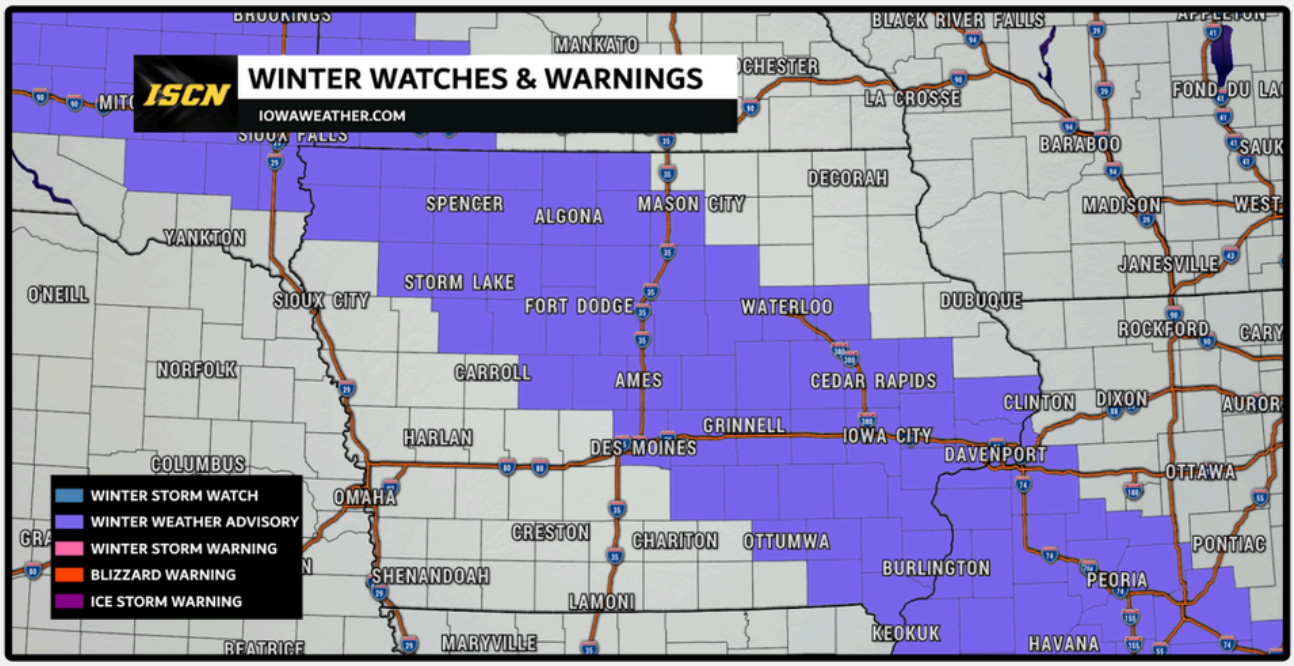


Image Source: https://iowaweather.com/winter-weather-advisory-thursday-in-iowa/

Interlude: Learning From the Edge of the System
Valuable advice from a Native Inupiaq

For my lower-48 friends experiencing **Alaska**'s winter here are some things we do to keep our homes warm during the winter:

1. **Window insulation shrink kit**, those plastic window coverings that you use a hairdryer to shrink to fit. They work wonders to keep drafts away, especially if you don't have triple-panes windows like we do.

2. We have arctic entries here, which trap cold air in that small room (think entryway closet with a door inside) but I know you guys don't and your doors open directly to the outside. So, **place blankets on your doorways**, thick wool blankets or canvas works well. Just nail those suckers over the inside of the door, and the outside of your door as well and deal with the holes later. It will cut down on drafts significantly. Same for windows, if you feel drafts and can't find #1, just use blankets or sheets to cover the windows.

(Edited to add: my Iñupiaq name literally means "**the area where cold air is trapped in a sod house entryway**" the Katak was the area in the arctic entry lower than the home itself that trapped the cold air from the outside to ensure sod homes stayed warm, and has been translated multiple ways, some translating "**keeps people's home warm**" and most translating, "I **fell down into this area**" or the shortened version, "**I fall down**." just a tidbit of info about my name.)

3. We don't have French doors here because of the loss of heat, so blanket up those doors as well. However if you need your blankets, roll up your largest towels, and stuff them on the floor, to ensure there are no drafts coming in.

4. **Keep it as DRY as you can**. Moist cold makes frost bite. So if you're running a humidifier, stop. If you have a dehumidifier, or those silica beads, use those. Try not to boil things or take long, hot showers if you can. Take a quick lukewarm shower. **I'm telling you, it makes a huge difference to keep your home dry**.

5. **If you have a wood stove, use it**. If you have a camping stove, use it. You can make **ceramic heaters with clay pots and candles** (Google it, it does work) or place large rocks (soapstone is actually best) in the oven, or on your wood stove, and put them in your beds, wrap your blankets in them, then you can wrap your blankets on yourself, it's heaven! (Edited to add: if you're using a camp stove make sure you have a vent that goes outside and your fan is on. If you don't have proper ventilation, it's probably a better idea not to use it.)

6. I know most of you may not understand but **use fur/down to keep warm,** natural fur from animals is warmest. When I was a kid we slept on caribou skins. We lined our boots with caribou skin, etc. those down blankets and down pillows are perfect for keeping warm.

7. **Use natural fabrics and textiles. Real wool is the warmest** (muskox up here but sheep, alpaca, etc. work.) and you want natural fabrics to layer in. Silk, wool and 100% cotton. Those are what we use to ensure we are warm. And **Layer, layer, LAYER!** Make sure they're breathable, and if you get chilled, add another layer. (A Christmas story!) Don't use plastic shoes, or tight fitting shoes/boots. Let your feet breathe in its layers, and if you have straw, you can stuff boots that are too big for you and the straw will insulate your boots.

8. **Keep your head and core warm**. Wear a wool or cotton hat all the time. When we sleep at the camp house (no electricity, -20°, wood stove) we go to sleep in wool socks and a wool hat. Keep your head warm, and your body should be fine. You lose the most heat through your head.

9. **Try to sleep all together to maintain body heat for everyone**. Littlest ones in the middle, and the older ones go outward. Elders before middle-aged and you can make it an adventure for the kiddos. Close all doors in your house, and pick a room (usually the living room) to all stay in together. We slept on the floor of our camp house growing up, all piled up together, hot and sweaty usually, even in winter. We rolled up our puuqsraq's (sleeping bags and blankets) and put them in the arctic entry. **Oh yeah and sleep with socks on.**

10. Up here, we eat omega 3 rich seal oil and whale Maktak to warm up from the inside. Down there, I don't suppose you have seals available, so using what the indigenous people all over the US have used for energy works, **pemmican**. **A mixture of meat and fats.** I think suet from Buffalo was traditionally used but if you don't have that, cow suet would work. In a pinch, coconut oil or lard can substitute but if you use lard use it very sparingly. We don't eat a ton of blubber but when we do it keeps our bodies warm and gives us energy for a long time. Energy bars, energy bites, etc can all help. You can Google pemmican and/or energy bites.

11. **Stay home. Stay inside**. One of the most scolded phrases of an arctic circle grandma is, "DON'T GO IN AND OUT." That means don't open the door more often than you need to. The more you open your door the more outside weather comes in.

12. **Check on your neighbors.** Call them, Facebook them, text them, etc. Be sure that they have the above things to stay warm, especially elders, especially single mothers.

13. **Keep busy. We sew, mend things, and keep our hands busy all winter long.** Read by candlelight, learn hand sewing, draw, do crossword puzzles, play board games, play cards, etc. Stay busy so your mind doesn't wander and you end up freaking out with worry.

14. Please don't drive if you don't have to. My car and snowmachine are equipped to handle -45° below. We drive 25 mph or slower all through town. If you absolutely HAVE to use your car to go anywhere, make sure it's full of gas, and you bring gear to survive if it breaks down. **In my car right now I have a parka, snow pants, goggles, a fur hat, gloves and and extra boots. Just in case.** And if you can, go alone to do what you need to do (groery store?) and leave the kids at home.

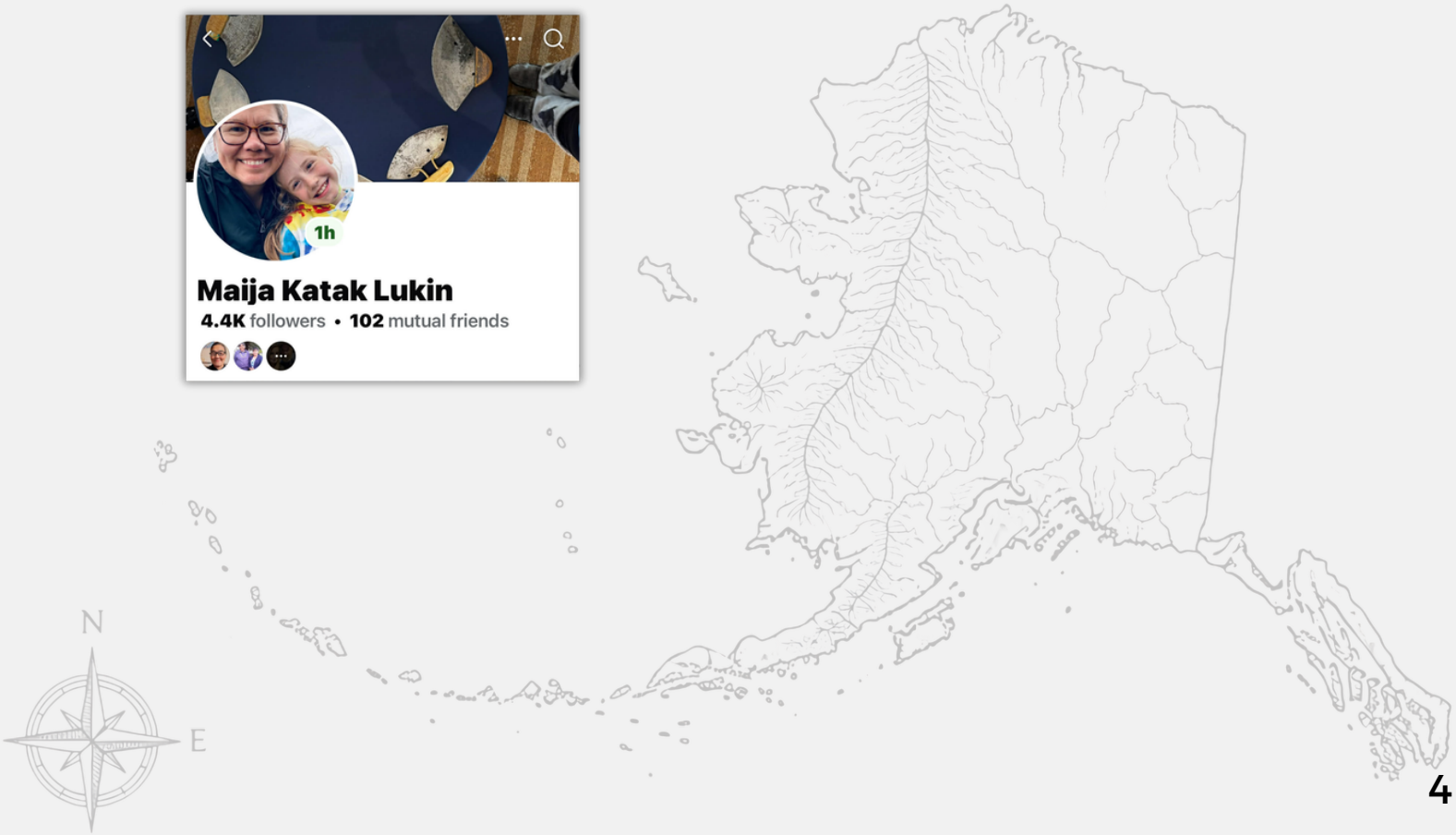
15. **Make it an adventure for the kiddos.** Ask them to figure out things like ceramic heaters, or make up a board game, or take turns writing your own adventure story. My best nights were spent at -40° below making up board games, and making up stories by candlelight and lantern about my adventures. Weirdly they were all in tropical locations! Haha.

16. **Run the water, or flush the toilets at least once an hour.** Unfortunately, that also means at night. We have what's called heat trace here that we just turn on when it gets super cold. But if you don't have that, run the water in every bathroom you have, and flush every toilet. **What's worse than being stuck in a cold house? Being stuck in a cold house that has a frozen sewer line.** Trust me, we know. Take turns waking up and flushing the toilet.

17. (Added) If your water freezes and you don't have running water, **you can melt both (clean fresh) snow and clear ice from a clear pond) to drink**, or to give your animals. Nowadays, we run it through a Brita filter before drinking but when we grew up without running water or electricity, we just chopped ice from the clear ice ponds and "ice lake" back here in sleds, took them home and chilled off a chunk each morning to put on the stove. **Coffee made with fresh ice water is the best coffee you'll ever have.**

I hope you guys stay safe, stay warm, and survive this cold front. I know we joke around all the time about Alaskan weather but we also care about everyone and want to help.

Fellow Alaskans, *am I missing anything?* Please feel free to comment your "stay warm" tricks.



Section 4: Surviving a winter storm

Introduction

This section covers:

A storm is coming or has come, the power goes out, you are snowed in, or ice has knocked power out, roads are impassable, and you are not prepared. What do you do? We share proven techniques to survive severe conditions during a storm and to prepare so you can be comfortable and safe when it happens.

👉 The tips in the section “Surviving a Winter Storm” can save your life. Consider printing the checklists [coming soon] to this guide and keeping them in your “Go Bag” so that they are readily available if you need them.

Evacuate

In this section: You may prefer not to risk being snowed in or being without power for days during a cold snap. If you choose to evacuate, there are steps to take that can achieve a more successful outcome and make a significant difference in your level of stress.

This section covers:

- Shelters
- Have a winter storm party
- When stranded in a car
- Checklist: items to keep in your car for emergency supply/winter weather
- Checklist: items to keep in a bug out bag

Shelters

If you want to leave your home but don’t have good options of where else to go, a shelter may be the best option. Red Cross, schools, churches or non-profits may offer shelters during winter storms in your area. Contact your city/town, county or Red Cross to find out if and where there are shelters available.

Assess first

If it is already snowing or sleeting when you prepare to go to a shelter, understand the risk of driving in icy or snowstorm conditions and weigh that against the risk of being snowed in:

- People freeze in their cars by getting stuck in snow or going off road from ice while trying to get home or someplace safe (see our section on what to do when stranded in your car, below).

- In a white out, you can drive off the road or even get lost going from the house to a neighbor's or to your vehicle.

- Being snowed in can be quite survivable and even pleasant if you follow our recommendations to prepare.

Tips to remember

- Go to the shelter before the storm hits if you may get snowed in or there is a risk of icy streets.
- Let someone know where you are going and when you leave.
- Leave a note indoors for those who may have keys.
- If your electricity goes out and you decide to go to a shelter afterwards, ensure streets are clear enough to get there and that there are openings (call first). Being stuck in frigid weather in a car is worse than being stuck in your home. Some shelters don't accept people after a storm begins, and shelters can fill up and stop accepting more people.
- Check on your neighbors. You may have neighbors who will have difficulty evacuating or staying warm or may need medical treatment. Check to see if they need assistance in getting to a shelter or you may consider hosting them during the storm.

👉 See our General Guide Toolkit and/or Checklists for a list of things to bring to a shelter and how to prepare for the stay.

Have a winter storm party!!

This section contains potential places to evacuate that aren't official shelters, including:

- Weathering the storm with a friend or neighbor
- Place of Business

Weathering the storm with a friend or neighbor

If you feel you'll lose power and have no other way to stay warm, staying at a friend's house who has a wood stove or other alternative energy during a heavy winter storm can be a mutually beneficial solution. In hurricane country, people hold "hurricane parties." A group of friends will go to the home least likely to flood or be impacted by wind and stay together for the hours or days it may take for the storm to move through the area.

In a winter storm, staying at a friend's house who may have "off grid" advantages such as a wood stove can be helpful to both of you. You can experience a more comfortable situation, and help each other recover.

Place of business

Sometimes employers will offer shelter for people who work there. In some cases, businesses have opened their doors to the community to provide shelter and to support recovery. This can be an informal agreement if a storm suddenly makes it difficult to drive, or a formal arrangement with officials. Any organization can agree to do this. Some may agree to it simply by being presented with the idea.

It's highly recommended that you determine your options for where you can stay and have your go bag and other arrangements made well before any storm hits.

If there is time, take the steps in the "Protecting Your Building" section to prepare your home to minimize damage if you choose to evacuate.

When stranded in a car

This section covers:

- Tips of how to survive being stranded in a car
- Checklist:

Tips of how to survive being stranded in a car

If you try to drive somewhere and get stuck, a few actions can save your life.

- Stay in the vehicle and wait for help. Do not leave the vehicle to search for assistance unless help is visible within 100 yards (90 meters), it is not snowing or going to, and you are winter outdoors savvy.
- Display a trouble sign to indicate you need help. Hang a brightly colored cloth (preferably red) on the radio antenna and raise the hood after snow stops falling or use your hazard lights.
- Turn on the engine for about 10 minutes each hour. Use the heater while the engine is running. Ensure to keep the exhaust pipe clear of snow, and slightly open a downwind window for ventilation.
- Leave the overhead light on when the engine is running if it's nighttime so that you can be seen.
- Do light exercises to keep up circulation. Clap your hands and move your body, especially arms and legs every few minutes to keep you alert and awake and your extremities warm. Avoid perspiration as water in contact with your skin will accelerate frostbite if you cannot generate heat.
- If more than one person is in the vehicle, take turns sleeping.
- Huddle with others or pets for warmth if you're not alone. Wrap yourself in newspapers, maps, and even the removable floor mats to help trap more body heat if you don't have sufficient blankets. Note: If traveling in winter, it's always a good idea to have enough clothing/blankets in the car to stay warm.
- Watch for signs of frostbite and hypothermia

👉 See below for checklists on recognizing and treating these under "Safety".

Checklist: Winter car kit

Keep these items in your car at all times during winter months for peace of mind.

- ☐ Jumper cables
- ☐ Ice scraper
- ☐ Snow brush (may be combined with ice scraper or separate)
- ☐ Emergency mylar blankets (more than one)
- ☐ Wool blankets are advised in addition to emergency blankets
- ☐ Wool hat, scarf, gloves, socks
- ☐ Snow-suitable boots
- ☐ Fire starter
- ☐ Emergency strobe, flare or even a red scarf or cloth, tied to antennae can help people see you
- ☐ Sand, salt or kitty litter - or tire chains (illegal in some places, required in others, such as when crossing mountains, useful in an emergency)
- ☐ Towing rope made for towing, or chain
- ☐ Bags or containers for elimination if you are unable to leave the car to eliminate
- ☐ Small can and waterproof matches or fire starter to melt snow for drinking water
- ☐ Small snow shovel
- ☐ Food and water (can help keep you warm)
- ☐ Hand cranked NOAA weather radio (National Oceanic and Atmospheric Administration emergency radio network that shares ongoing information about disasters)
- ☐ First aid kit
- ☐ Phone charger
- ☐ Maps (GPS may not work)
- ☐ HAM radio or walkie talkie, handy if cell service is down

https://www.weather.gov/safety/winter-before

Checklist: Winter bug out backpack

If your car may be stuck somewhere remote where help will not be available, and you may need to walk out, these are essential items. Note: ideally you would be experienced with winter hiking and prepared if you drive somewhere remote when a storm is predicted and you may need to walk out in winter. It is usually safer to stay in your vehicle

- ☐ Compass
- ☐ Detailed map of region
- ☐ Binoculars or monocular
- ☐ Fire starter
- ☐ Good knife
- ☐ Snowshoes or similar if deep snow is possible
- ☐ High protein light weight food
- ☐ Water
- ☐ Sufficient water resistant clothing, including a change of clothing (it's vital to stay dry)
    - ☐ Wool or other heat retaining layers
    - ☐ Waterproof boots and wool socks
    - ☐ Wool hat, gloves, scarves or similar
    - ☐ Temperature appropriate outerwear

Shelter in place

This section covers:

- Protecting yourself, others and pets (includes Checklists)
- Protecting plants
- Protecting animals
- Protecting buildings and infrastructure
- Protecting vehicles

Protecting yourself, others and pets

This section covers: **How to stay warm**

- Staying warm safely
  - Temporary Heaters
  - Tips: For keeping your body warm
  - Checklist: Basic Techniques
  - Checklist: Clothes and Bedding
  - Checklist: Using a fireplace or wood stove
- Useful items to have on hand if you're sheltering in your home during severe winter weather.
  - Assess First
  - Checklist: Useful items to have on hand if you're sheltering in your home during severe winter weather.

👉 In winter storms, you may be snowed in or iced in. We share some strategies in this guide that can help you deal with cold, snow and ice. Please see our General Guide Toolkit (link) for more strategies on how to stay comfortable if you can't access electricity or resources for a few days, including our checklist of supplies (link) to have on hand.

Staying warm safely

Winter storms are often accompanied and followed with much colder temperatures, called cold fronts.

A common pattern with cold fronts is that substantial wind caused by the front may knock out electricity and the front then pulls in much colder temperatures. Getting too cold may be the #1 risk in that scenario. The good news is that

here are multiple safe ways to stay warm or even comfortable, even with no external heat source.

There are a few basic principles to know about staying warm if you've lost electricity and don't have an alternative source of heat.

Temporary heaters

Purchasing a kerosene heater is an option to keep one room warm. Be sure it's rated for indoor use and that you have a carbon monoxide detector operating in that room. Wood stoves and fireplaces are also useful. Most people stay in one room if power is lost and you need to stay warm.

More people die from carbon monoxide poisoning than cold. But fire is the way people have stayed warm for thousands of years and is very effective if electric heat is not available.

👉 See our Safety section below on "Heating with fire" (pg 49)if using a fuel or fire source to stay warm.

👉 See our Deep Dive guide [coming soon] for more information on how to create efficient heating with wood fuel.

Tips: For keeping your body warm

- **You don't have to heat everything - just your body.** This gives you more options for staying warm and keeps it simpler.

- **Insulation is the key to staying warm**. You lose body heat when it isn't insulated against the cold. This can be achieved in two ways -
  - a. insulating materials like wool, and/or
  - b. loose layers of any material with insulation (air) between - air is a good insulator

- **Stay off the ground or other cold surface.** Your body heat will radiate into the colder surface. Heat rises, so it is coldest at ground level. This is why people raised their beds before central heating, and why sleeping under straw in the barn loft has saved lives (insulation, plus a raised platform).

- **Stay dry.** When your body is both wet and cold, it can lose heat faster than it can generate it. If you do get wet, remove wet clothing, get into a protected area, and warm your body with blankets, hot water bottles or body warmth of animals or another person, focusing on the torso first and then the limbs.

- **Set up a tent in your room**. Sleeping in a tent can provide an additional layer of insulation. This can be helpful in large rooms during the day as well. Bring your pet with you, snuggle, and stay warmer together while reading a good book with a booklight.

- **No tent? Create a "blanket fort."** A tent can be created by throwing blankets over a table or other method of creating a "blanket fort". Or create a pillow and blanket nest in your closet. This can retain a lot of body heat.

- **Sleep and stay in the smallest or best insulated room of your house**. Sometimes this is a bathroom in the middle of the house. Insulate that room further by placing towels at the bottom of the doorway. Newspaper is an excellent insulator. Crunch it up and stuff it into larger openings. A leaky door frame can be sealed with flat newspapers between the frame and the door.

- **Cover your windows.** If you don't have thermal curtains, hang up blankets, towels, sheets, whatever you can to help block the cold air from leaking windows. Place something heavy enough to keep the blanket pressed to the wall, or use duct tape to seal the blankets to the wall (this may rip off wallpaper; painters tape is safer). If you do this in one room and keep the door closed, that room will retain heat longer. Some people have used inexpensive Mylar emergency blankets and painters tape to cover windows. Bubble wrap also can work if you have enough.

- **Share body heat.** When possible, sleep and sit together with other people and pets in your home. Sharing body heat is a very effective way to stay warm. Two bodies will heat each other, works best with minimal clothing inside, for example, two sleeping bags zipped together.

- **Use a hot water heating pad or bottle with warm water** to further warm your body if warm water is available.

Checklist - Clothing and bedding

- **Keep your ears, nose, face, fingers and toes warm as priority**. These are the first to get frostbite. Use insulating materials like wool or double up on loose layers.

- **Double up on blankets.** Air is an excellent insulator, it doesn't conduct heat or cold well. Therefore, layers are more effective than a single thick blanket. Wool is also an effective insulator. If you bundle up in a couple of wool blankets, they can keep you much warmer than a single thick comforter or thick blanket.

No wool? Quilted blankets have some air insulation and are useful even if not real down. Any blanket is warmer when layered. We have found decent blankets at thrift stores for a couple of bucks. Army surplus may have very inexpensive wool blankets though they are often treated with fire retardant and/or pesticides, be aware. In a life threatening situation, we would use them without hesitation.

A good zero degree sleeping bag is great, but one or more wool or other blankets on top of it make it even better. Unless it is a high quality sleeping bag purchased from a reputable manufacturer, many "zero degree" sleeping bags don't keep you very warm. They are more useful if you put any kind of blanket on top of them.

- **Use towels, curtains or clothing if you don't have enough blankets**. Any layer is better than no layer! Cover your head when sleeping - your head is where you lose the most body heat so it's worth it to keep it warm at all times. It's possible to cover yourself completely except for a breathing hole. If you have sufficient insulation, you can stay warm and toasty all night that way.

- **Use emergency blankets if needed**. Emergency mylar thermal blankets or sleeping bags keep your body heat reflected and inside the blanket. They are small and light, can be very inexpensive, they take up almost no room, and everybody in cold climates should have these in their car and/or home.

- **Get out of wet clothing if possible**. If you are sweating, remove some layers to avoid moisture. Wool, alpaca and similar materials wick moisture away from your body. Cotton is not advised; it retains moisture longer and doesn't wick.

- **Dress in loose layers of clothing**. Remember, air is an insulator! If sleeping with someone, it's warmer to sleep with minimal or no clothing and blanket layers.

Note: Cotton is not the best material next to the skin. It holds moisture and can actually make you colder. Synthetics made to wick moisture and natural fibers that wick, like wool, are recommended as the layer next to your skin.

- **Layer up when outdoors.** Layers of loose sweaters and light jackets can be more effective than a heavy, cheap coat in many cases. The trick is to keep things loose - remember, what keeps you warm is the air between the layers. When outdoors, the outer layer should be wind resistant and moisture proof.

What is Merino wool? Merino wool is a natural, soft, fine fiber produced by Merino sheep, renowned for its softness, breathability, fire resistance, eco-friendly and temperature-regulating properties. Merino sheep are raised in places like Australia and New Zealand, and the wool is valued for its easy cleaning and natural resilience.

Merino wool underwear or clothing and other light clothing that offers effective insulation is great too. Proper clothing like this can be expensive, but it is a long term investment. Some companies selling wool clothing will guarantee it for life. A single purchase of quality clothing can end up being less expensive than buying multiple versions of "fast fashion" that fall apart. Alpaca and yak hair have similar qualities.

Checklist - Using a fireplace or wood stove

☐ **Use fire safety at all times indoors.** If you haven't used or cleaned your fireplace, it can be life risking to use it (see the "Safety" section below).

☐ **Conserve wood.** Before the age of gas and electric heating, people slept near the fireplace, and let it burn down to coals overnight while staying toasty under layers of blankets.

☐ **Stack stones or bricks near fire to retain heat and release it slowly**. These can provide heat long after the fire has gone out.

☐ **Use warm bricks to heat your body**. Add some bricks to the fire and pull them out, wrap them in towels and set near the feet to heat up the bed at night. This is a medieval technique that works well; they knew how to stay warm without any of our modern conveniences. Combine this with a "blanket fort" and layers and you could be relatively comfortable even in severe cold.

☐ **Use only fire equipment rated safe for indoor use.** There are propane or other heaters that are rated for indoor use. Be sure!. See Carbon Monoxide Risks under Safety for more info.

👉 See more solutions to staying warm in our Winter Guide - Deep Dive. Items to have in the home during winter storms

Assess First

If you live remotely and there may be issues with access, power, or water, you may want to prepare for weeks of off-grid living. If this doesn't feel doable or practical, consider leaving your location before the storm and be prepared to stay somewhere else for an extended period of time.

In many remote areas, at least one neighbor usually has a snow plow and can help open up roads. But if you don't know that person and have their agreement to plow you out, be prepared!

Tip: Make a list beforehand of what you will need with you for that length of time.

👉 Please see our comprehensive checklist in our General Guide for a recommended list of items to have at home in case of a long term disaster.

Checklist - Necessities for the home during winter storms

▢ **Dry firewood or fuel** for indoor safe heater/cooking device if you have such
▢ **Fire extinguisher** and/or fire blankets if you heat with fire, gas, wood stove, etc
▢ **Water filter** (such as Berkey brand or other robust filter).
▢ **Stored water** for all people and all animals at your location in a location that won't freeze. We recommend enough emergency water for 2 weeks or more. Each person needs 3-5 gallons per day to drink, wash dishes, etc. We store water in 5 gallon containers, it keeps for a long time if in a dark location. Important note: Water expands when it freezes and can break or crack containers. Keep it above freezing or store in an open container like a tub if you may lose power.
▢ **Safe heat source** for cooking and melting snow/ice and cooking if needed. Canned heat or alcohol burners can be used indoors. Don't use any kind of flame in a tightly enclosed space though. Keep in mind that if you are snowed or iced in, you have an abundant source of water if you have a way of melting it.
▢ **Multiple blankets**. Wool, down, down substitute or quilted blankets are superior for heat retention.
▢ **Layers of warm clothing**. Wool or alpaca are superior for heat retention but any layers are better than none. Good socks, multiple pairs (if they get wet) are essential.
▢ **Warm gloves** that allow you to maneuver. Thin acrylic gloves are just about useless with any length of exposure. Take your gloves off and warm your hands with your body periodically if hands get too cold.
▢ **Warm scarfs and hats.** It is important to keep your head (nose, ears) warm.
▢ **Snow shovel(s),** snow blower or other solution to dig yourself out. Keep a shovel inside the house, in case you get snowed in.
▢ **Low tech transport for snow** if you may need to walk any distance in deep snow, such as snowshoes, cross country skis, sleds for carrying things, whatever works for you.
▢ **Winter boots**
▢ **Winter bugout bag** for outdoor winter hiking (see list under Evacuation section)
▢ **Snow tires** or easily removable chains for your car (for private or very remote dirt roads) if you want to be mobile. Note that it is illegal to drive on roads with chains in many states because of the extensive damage they do to roads, so be prepared to remove them once on cleared roads. Chains can serve a double purpose of being able to pull your car out of a ditch with the help of another vehicle, if it lands up there.

Protecting plants

In this section, we share some ways you can protect plants vulnerable to freeze or frost damage. If you have outdoor plants in the ground that may die or be injured during a record freeze or early or late severe freeze, there are a few simple things you can do that may save them. Most vulnerable are young trees and bushes.

👉 See our Winter Guide: Deep Dive [coming soon] for more strategies for protecting plants in winter weather.

Checklist: Protect plants from freeze damage

☐ **Water plants regularly before freezes.** Ground that freezes and thaws rapidly can cause root damage. Water provides some insulation, stays warmer longer, and slows the freeze and thaw process. Water before a hard freeze occurs so the ground and plant can absorb the water. Aim for moist, not soggy soil.

☐ **Insulate smaller plants or bushes** with straw, weeds, leaves or other material. Some people create a cage around a young, tender plant to hold the mulch with hardware cloth or other fencing. Cover the insulation with a blanket to ensure it doesn't blow away and to offer extra protection.

One successful action is to purchase comforters or sheets from a thrift store and utilize those to cover plants. This is preferred to using plastic or frost clothes as it tends to be better insulation. If plastic touches a plant, it can cause freeze burn or damage.

☐ **Mulch the roots i**f you can't insulate the entire plant. Lay 4-6" of straw, leaves or bark mulch around the tree. Keep it 6" from the stem to prevent mice from nesting and damaging the stem. Preventing roots from freezing can save the plant. Even plants that are hardy can be damaged if they have not gone into full dormancy and a sudden hard freeze occurs. Mulch also helps prevent ground heaving from freeze/thaw cycles that can damage roots.

☐ **Use sprinklers.** In Florida citrus groves, farmers use low sprinklers to keep the fruit from freezing. Water releases heat when freezing, this heat rises and the fruit stays warmer. While this is effective at keeping fruit warmer, there are risks. When this is done over thousands of acres, it has caused sinkholes to appear or other damage to land or aquifers. If it gets cold enough, small pipes can freeze or burst even with water running. Be aware of what issues can occur if you choose this pathway.

Protecting animals

This section covers how you can protect pets or large animals from severe winter weather. Animals are often well adapted to cold weather but if they don't have a winter coat, or there are not enough of them to keep each other warm: take action to protect them.

Checklist: Pets

☐ **Ensure your pet has enough food and water and medicine**, and a warm place to sleep. Many people choose to sleep with their pet for warmth.
☐ **Provide an enclosed shelter** for outdoor cats and dogs during extreme cold periods. Even a box filled with straw is better than nothing - it may save the life of a stray cat or dog especially.

Checklist: Large Animals

☐ **Move large animals to a central location.** You may not be able to get feed to them if they're remote.

☐ **Ensure all outdoor animals have a water source** that won't turn to ice. A common way animals die in a snowstorm is not from freezing, but dehydration.

☐ **Ensure outdoor animals have extra food** that they can access, even if there is deep snow (should have some cover, could be a lean-to or shelter belt

☐ **Provide shelter for large animals.** Animals with no winter coat or during bitterly cold periods who are not adapted especially, should be kept in an enclosed location. Putting multiple animals in a single location can help them stay warmer. An open sided shed can be given more protection with straw bales, tarps or other material.

☐ **Provide a dry surface.** If possible, provide a dry, protected surface for outdoor animals to stand on in wind, rain/sleet or snow.

☐ **Use shelter belts.** If you have trees on site, shelter belts can sometimes be better protection for large animals from cold and sleet than pole barns or 1-3 sided sheds. A group of trees can hold warmth better than a pole barn or open shed.

☐ **Create a quick fix shelter for livestock if needed.** Chickens can usually keep each other warm if there are enough of them. If it is bitterly cold, they may need a more insulated place to stay during that time period. A quick fix might be a chicken coop with straw bales piled around it or any kind of material that can provide some insulation.

☐ **Use small spaces.** The smaller the space they are in, the easier it will be for them to keep each other warm. Forming a small space with stacked bales with a pole or stick for them to roost on fixed between bales may be better for them than a large coop.

Protecting your buildings and infrastructure

Buildings can experience various types of damage in severe winter weather from extreme cold or heavy snow or ice. This section covers ways in which you can protect buildings from damage from extreme cold. See our Recovery section for ways to protect buildings from heavy snow or ice after a storm.

Protect your pipes from freezing

Frozen pipes can and frequently do burst, which can cause expensive damage to the home or to your belongings. Sufficient damage can make the home unlivable because of mold and other issues and be expensive to repair. During a record cold spell, your pipes may not be sufficiently protected.

Checklist: Preventing damage to buildings or infrastructure

- ▢ **Protect pipes most exposed to cold (basement, attic, outdoors, garage) with insulation.** Even newspaper or several inches of straw wrapped in a blanket affixed around the pipes, can help during a short and not too deep freeze.
- ▢ **Set your thermostat to at least 55°F.**
- ▢ **Keep bathroom or kitchen cabinet doors with pipes inside open so warm air can circulate around harder-to-reach pipes.**
- ▢ **Temporarily cover or close crawl space vents.**
- ▢ **If still concerned, leave water running in taps to keep it from freezing.** If you are doing this, note that you have to run it in sufficient volume or it will freeze anyway if cold enough. A few drops won't help, a steady stream is more likely to not freeze. Also note that if using a septic system, a significant flow can overstress the system and cause sewage backup.
- ▢ **If this is not feasible, shut off the main valve for water to your home** if you're not sure you can protect pipes otherwise. Be sure you know where this is located and to have the tool to turn it off that is known and accessible. Don't leave tools in the access box as it opens the door for them to rust and allows unauthorized people to turn off your water. Leave faucets open to allow excess water to escape. This does not completely empty the pipes, only what is above the lowest faucet, so there is still some risk but it is reduced. If a pipe does burst, water damage will be minimal.
- ▢ **Turn on the main temporarily**, if you turn off the water and temporarily need water. Continue running water through your pipes at a reduced rate while the main is on, to prevent them from freezing. Ensure that the flowing water has a place to escape.

☐ **Protect hoses, swimming pool equipment, and irrigation from freezing** by draining the lines at their lowest spigots. Don't leave plastic and rubber hoses outside as they will deteriorate. Leaving irrigation on during a freeze can prevent pipes from bursting and is standardly used by growers to also protect their crop.

☐ **Emergency water supply**

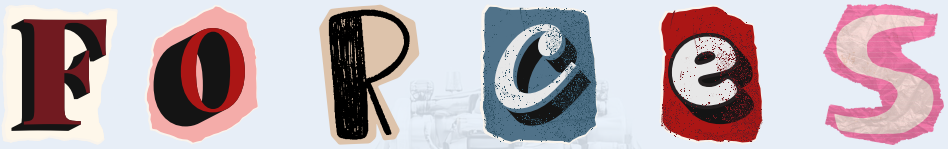
Store extra water. Electricity and even natural gas delivery can fail in a deep freeze or ice storm. If there is a risk you will lose electricity, your well pump or other water source may not work. Ensure you have plenty of water stored. One effective method is to have several five gallon containers filled and stored in a cool dark place at all times. Outdoor water storage tanks may freeze. You can also fill your bathtub or other containers.

Protecting your vehicles

Vehicles can experience difficulties in extreme cold or heavy winter storms. This section shares some simple tips to help you protect your vehicles from damage and keep them running.

Internal Combustion Engines

The acronym FORCES is a reminder of special needs of internal combustion vehicles in winter weather, especially when it becomes very cold.



Fuel. Fuel lines can clog because of ice crystals that form in cold weather; sometimes thaw/freeze weather is the worst as that encourage condensation. You car may not start or run properly if this occurs. Keeping the tank at least ½ full can help prevent this from happening. Use winter blends of fuel, gas line antifreeze, or avoid low quality fuel which can contain water. For diesel fuel, consider adding an anti-gel agent to prevent build up.
Oil. Keep oil leveled up, low levels can contribute to freeze problems
Rubber. Cold air contracts. Your tires may be running lower than usual.
Coolant. Ensure antifreeze is appropriate for expected temperatures.
Electronics. Old batteries or batteries with low charge can lose their charge in very cold weather. Ensure your battery is in good condition and fully charged.
Shield wash. Ensure your wash container is full. Snow can leave dirt and streaks as it melts, especially in cities

Additional tips:

- In severe cold, a block heater, battery warmer or other warming device may be appropriate. Newer cars often have features built in to properly start and run vehicles in severe cold. Check with your mechanic for recommendations.
- Keeping vehicles in a garage during severe cold is recommended where possible

Protecting electric vehicles

Tips: for protecting electric vehicles include:

- If storing for a long time, storing in a climate-controlled environment at 50-60% charge is ideal
- Keep the battery above 20% state of charge when possible,
- Minimize aggressive charging
- Precondition (warm) the battery if available - some EVs can warm (or cool) the battery to the most appropriate temperature for charging; you can program your car to precondition your battery before you start charging
- Ensure charging equipment meets safety standards while considering slower charging and reduced range in subzero temperatures
- Avoid deep discharges
- Use gentle braking
- Park in a heated or insulated garage if possible

Move vehicles away from large trees

There is a chance that large limbs of trees could fail in a heavy enough snow or ice storm. Don't park your vehicle under such branches if you can avoid doing so.

Large snow drifts created by snow plows can also create risk for vehicles. You may be blocked by plows if parked on the street, and these drifts may collapse.

Safety Issues

In this section we share proven ways to avoid injury from the most common ways that people get hurt or lose their life in winter weather. This section covers:

- Accidents when driving on ice or snow or winter events
- Winter health risks from cold
- Injury from improper or unsafe heating

Accidents when driving on ice or snow
This section covers:

- Black Ice
- How to drive safely in ice or snow (If you must travel when roads are icy or slick)
- Tips: If your vehicle slips on ice or snow
- Tips: If you get stuck in snow
- Tips: If you are in a car accident in low visibility or slick conditions

Case in Point———> A 2015 study from the University of Georgia noted that winter storms directly claimed 571 lives between 1996 and 2011; however, this number jumps to 13,852 deaths over the same period if you include car and plane crashes caused by winter storms. Sleet can increase the risk, as can black ice or visible icy sections.
Black ice

Black ice is perhaps the most dangerous type of ice because it is invisible. It is a thin, transparent, patchy ice that coats roads and sidewalks. It kills more people yearly than tornadoes, hurricanes, lightning and floods.

Slow down in places you suspect may have black ice and use the safety tips in this section for driving in slippery conditions. The best way to avoid accidents on slippery roads is to avoid driving until they have cleared, if at all possible.

Where Black ice is especially found:

- After plowing, melting and refreezing
- In shaded areas (underpasses, under trees)
- On bridges (the cold underneath can cause surfaces to freeze even if temperatures are above freezing)
- At night (especially hard to see) or early morning
- After snow melt or rainfall when temperatures drop below freezing.

- From condensation from moist air (fog, for instance), even with no snow or rainfall
- Black ice can form anywhere that has the right conditions

How to drive safely, if you must travel when roads are slick

Assess First

If you don't have to drive during icy or slick snow conditions, please don't. This makes it safer for those who must drive, as well as for you.
https://www.msn.com/en-us/public-safety-and-emergencies/health-and-safety-alerts/how-long-does-it-take-to-stop-a-car-on-icy-conditions/ar-AA1yMjL4

Tips: How to Drive Safely

- **Slow down!** This is the #1 way to prevent accidents. On bare pavement when traveling 50 miles per hour, a car requires about 7 car lengths to come to a complete stop. On packed snow, that distance can increase to 28 car lengths! But on ice it can take up to 30 seconds or ¼ of a mile to stop! A quarter of a mile is too many car lengths to count. This is why massive pile ups of dozens of cars occur in winter storms. At 30 miles per hour, stopping on ice gets reduced to 20 car lengths or less. The lesson? Slow down! And keep your distance behind other vehicles.
- Travel during the daylight if possible,
- Let someone know where you're going,
- Stay on main roads where possible,
- Ensure your car has good winter rated tires
- Ensure you have an emergency winter car kit in the car (see suggested list below).
- Be aware that bridges and shaded areas can remain icy long after other areas have melted, and that when snow is compacted in those areas, it can become as slick as ice.
- Slow down (go slower than the posted speed limit if there is a chance of slick roads).
- Turn off cruise control! You want to be able to respond quickly and the cruise control can cause your vehicle to accelerate at the wrong moment.
- Be especially alert in conditions where black ice forms (see section on Black Ice).

- Pay attention to your car's warnings - many new cars will inform you of potentially dangerous conditions based on temperature.
- Brake and accelerate in a slow and steady manner.
- Approach bridges and overpasses with extreme caution since they accumulate ice first. Do not apply your brakes while on a bridge.
- Come to a complete stop or yield the right of way when approaching an intersection where traffic lights are out. Treat this scenario as a four-way stop. Start slowing gradually well before you reach the intersection. Numerous accidents happen at intersections where one or more cars couldn't stop in time.
- Clear as much snow and ice from your vehicle as possible before driving it – from the windows, mirrors, roof, hood, trunk, bumper, headlights and tail lights - to keep it from blowing off and obscuring your view or hitting other drivers' vehicles.
- Drive smoothly, without sudden accelerating, braking or turning.
- Keep your distance! Stay behind other vehicles.

Tips: If your vehicle slips on ice or snow

- Slow down - take your foot off the gas but don't brake yet. Applying the brakes will cause you to further lose control of your vehicle.
- Turn into the skid - turn the steering wheel - gently! - in the direction of the slide.
- For 4 wheel, all wheel or rear wheel drives, turn into the skid
- For front wheel drives, shift into neutral if time, and don't try to steer immediately. When your vehicle starts to slow down, turn the wheel in the direction you want the car to go
- Avoid using your brakes, if possible. If you have to, use them gently. (Apply gentle, steady pressure to anti-lock brakes in newer vehicles. In older vehicles with brakes that are not anti-lock, pump the brake pedal gently to avoid locking up).
- It's a good idea to get familiar with how your brakes work and when/how to use them before driving in snow.
- Wait for your vehicle to slow down enough to fully regain traction before gently accelerating.
- It is well worth practicing coming out of a skid in an empty parking lot or otherwise safe location before driving in ice or snow, not only so that you know what to do but so that you know how your car responds.

Tips: If you get stuck in snow

- Don't spin your wheels: doing so will only dig you in deeper. Instead, turn them from side to side to help clear snow, and then turn the steering wheel so the tires are as straight as possible.
- Use a shovel to clear the snow in front of and behind your tires.
- Spread cat litter, sand or salt in the cleared areas around your drive wheels (good to have a bag or bucket in your car in winter).
- The foot mats in your vehicle may provide enough traction, if placed under the wheels, to get you out of the snow.
- There may be other traction in the vicinity you can use to help give the tires a grip, such as boards or sticks.

Tips: If you are in a car accident in low visibility or slick conditions

- This is where pileups happen. Pileup accidents, or accidents that involve many cars (sometimes dozens) at once, are a significant hazard during winter storms.
- Quickly assess the situation as best you can
- If you’re able to drive your car off the road, do so, as far away from the accident as you can
- If not, when you feel safe to do so, grab your go bag or blankets, leave your car and move off the road as far as you can. Your car could be further crushed if a pile up is happening.
- Stay alert, you may need to keep moving out of the way if cars are still piling up

Winter Health Risks

Frostbite and hypothermia

Frostbite and hypothermia can occur when your body loses heat faster than it can replace it. That condition can rapidly become life or limb threatening. How do you recognize and treat it?

Cold and wet: extra risks

Hypothermia is cold-related emergency that may quickly become life threatening. Hypothermia can set in at temperatures as high as 10°C (50°F). Hypothermia is caused by the cooling of the body caused by the failure of the body’s warming system. Contributing factors include:

- **Moisture**: If you're wet and exposed to wind, moisture reduces your body heat faster than usual. As your core body temperature drops, you can start to feel extremely fatigued, confused, and shivery. In severe cases, this can be life-threatening. If you've ever shivered uncontrollably in wet clothes, you've felt the early stages of this process.
- **Wind Chill**: This situation can become worse when you combine wet clothes with wind. Wind chill accelerates heat loss, making it feel much colder than the actual temperature. Like moisture, even in mild cold, wind chill can become deadly.

Frostbite is the freezing of a specific body part such as fingers, toes, the nose or earlobes. Signals of frostbite include: lack of feeling in the affected area; skin that appears waxy, is cold to the touch, or is discolored (flushed, white or gray, yellow or blue).

Assess first

A key to preventing cold-related emergencies includes not starting an activity in, on, or around cold water unless you are prepared, properly dressed, and know you can get help quickly in an emergency.

Tips: To avoid or minimize frostbite or hypothermia

- Dress appropriately and avoid staying in the cold too long if possible.
- Wear a hat and gloves when appropriate, with loose layers of clothing.
- Stay hydrated, it helps keep you warmer.
- Avoid alcohol and caffeine as they can decrease your body's ability to retain heat.
- If you have a safe way to heat food or drink, warm fluids can helps!
- Take frequent breaks from the cold if possible.
- Try not to leave any part of your body exposed to cold for long periods
- Remove jewelry or other items that can restrict blood flow to extremities.
- Warm extremities using body warmth when needed (hands under armpits for instance). These are most vulnerable to frostbite.
- Get out of the cold immediately if the signals of hypothermia or frostbite appear.

Frostbite treatment

1. Move the person to a warm place.
2. Ensure the person has no wet clothing and cover them with dry layers.
3. Immediate treatment do's and dont's for affected areas
   1. Handle the injured area gently; never rub the affected area.
   2. Warm gently by soaking the affected area in warm water (100–105 degrees F) until it appears red and feels warm.
   3. Loosely bandage the injured area with dry, sterile dressings.
   4. If the person's fingers or toes are frostbitten, place dry, sterile gauze between them to keep them separated. Avoid breaking any blisters.
8. Do not allow the affected area to refreeze.
9. Seek professional medical care as soon as possible.

ttps://www.weather.gov/wrn/infographics_winter

Hypothermia treatment

The goals of first aid for hypothermia are to restore normal body temperature and to care for any conditions while waiting for EMS personnel.

Learn to recognize the signs and signals of hypothermia, which include: shivering, numbness, glassy stare; apathy, weakness, impaired judgment; loss of consciousness.

Procedure: Steps to follow for hypothermia

Step 1. CALL 9-1-1 or the local emergency number.
Step 2. Gently move the person to a warm place.
Step 3. Monitor breathing and circulation.
Step 4. Give rescue breathing and CPR if needed.
Step 5. Remove any wet clothing and dry the person.
Step 6. Warm the person slowly by wrapping in blankets or by putting dry clothing on the person.

- Hot water bottles and chemical hot packs may be used when first wrapped in a towel or blanket before applying.
- Do not warm the person too quickly, such as by immersing him or her in warm water. Rapid warming may cause dangerous heart arrhythmias.
- Warm the core first (trunk, abdomen), not the extremities (hands, feet). This is important to mention because most people will try to warm hands and feet first and that can cause shock.

Step 7. Get the person to drink warm drinks (no caffeine or alcohol) to warm from the inside.

Source:
https://www.redcross.org/content/dam/redcross/atg/PDF_s/Preparedness__Disaster_Recovery/Disaster_Preparedness/Winter_Storm/Frostbite_and_Hypothermia.pdf

Heating with fire or fuel: toxicity and fire risk

This section covers:

- Carbon monoxide - the silent killer
- Fire
- Creosote buildup in fireplaces/flues

Carbon monoxide - the silent killer

Impact → More people die from carbon monoxide poisoning in cold spells than from the cold itself.

Checklist - Prevent Carbon Monoxide Poisoning

☐ **Ensure** carbon monoxide and smoke detectors are working properly, updated and with fresh batteries if you use natural gas, wood stove, fireplace or any type of burning fuel.

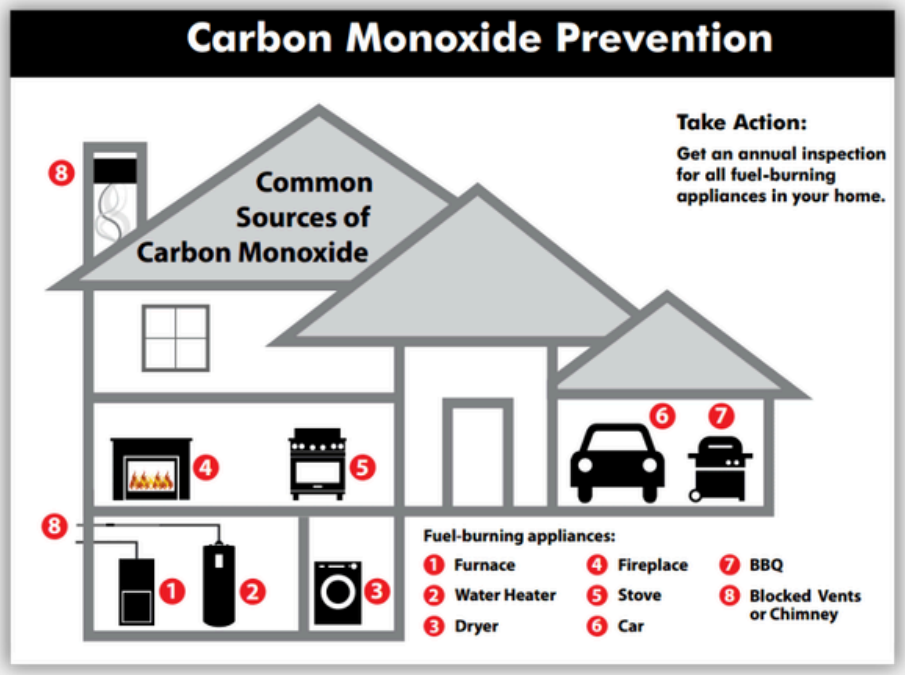
☐ **Never use a** generator, grill, camp stove or other gasoline, propane, natural gas or charcoal-burning devices inside a home, garage, basement, crawlspace or any partially enclosed area unless it is specifically rated for indoor use. Propane, canned heat, or alcohol stoves or heaters specifically rated for indoor use are safe to use when used as directed.

☐ **When cooking outdoors**, ensure you are away from doors, windows and vents that could allow carbon monoxide to come indoors .

☐ **Ensure your home** allows fresh air exchange with the outside. Sealing the home helps keep heat in - it can also make the air unhealthy and allow for carbon dioxide or other unhealthy buildup. An air exchanger is the most efficient way to do this as it uses air leaving the home to heat the incoming air. Indoor propane and kerosene heaters will include instructions for venting. Use them!

☐ **Ensure your fireplace** or woodstove and chimney is properly cleaned. This should be done before winter hits, by someone who knows how to do it. Creosote build up can create toxins or start a house fire.

☐ **If trapped** in a combustion engine car, ensure the exhaust pipe isn't covered with snow and that a window is cracked for fresh air when running the car and heater.



Common sources of carbon monoxide in the home (gas appliances/heaters).
https://fireline.seattle.gov/wp-content/uploads/sites/21/2023/02/CoSafety.png

Fire

This section covers safety practices to prevent home fires. Home fires can occur when trying to stay warm in winter. Leading causes of winter home fires are heating equipment (space heaters, furnaces, boilers) and increased candle usage.

Checklist - Preventing indoor fires

☐ Get your gas appliances and furnace inspected by a professional yearly for safety before the winter season starts.

☐ Inspect your chimney or flue yearly for creosote buildup. If you're using the fireplace or stove daily, chimney cleaners recommend cleaning it more often, even as often as every two to three months

Creosote is the build up of not fully burnt fuel. This can stick to the sides of a chimney or flue. When there is enough build up, it can combust and burn hot enough to crack a chimney and allow flames to enter the home. Creosote build up causes fires in homes regularly. It can also cause off-gassing of deadly carbon monoxide into your home.

Source: https://fullservicechimney.com/what-is-creosote/

- **Prevent creosote, chimney fires, or unhealthy particulate inhalation:**
  - Keep the damper fully open while using the stove or fireplace
  - Avoid burning unseasoned wood
  - Don't burn wet wood
  - Choose hardwoods like oak or maple versus softwoods like pine or spruce with more creosote-forming resins
  - Very hot, large fires and slow fires (reduced air flow to burn overnight) can cause more creosote build up
  - Don't overload the firebox with wood
  - Have your chimney cleaned and inspected at least once a year.
- **Use only indoor rated heating elements such as special propane or kerosene heaters.** Be sure to follow directions for ventilation. Some examples are Vesta, Buddy heater, canned heat.
- **Keep fuel burning devices away from any other object**. Ensure heaters, candles or any flame source is kept away from flammable items such as blankets, clothing, or paper and protected from children or animals that could knock them over.
- **Keep a fire extinguisher and/or fire blankets** in an accessible place in your home.
- Generator safety
- **Use properly rated extension cords.** Home fires can also be caused by improper use of electric cords. Sometimes people will use extension cords running from a house that does have electricity to run a space heater in their own home. There are risks if using extension cords that are improperly rated.

Section 5: Recovery

This section has information on how to recover from damage to your home, and how to prevent further damage from snow load or other issues. Even if you haven't experienced damage, it's recommended to read the Safety sections.

This section covers:

- Safety First
  - Inside the home
  - Outside the home
  - Checklist: winter bug out backpack items
- Using Salt on Ice
  - Risks
  - Better Solutions
- Preventing Injuries
  - Slips and Falls
    - Foot gear
    - Apply materials to prevent ice or slippage
  - Shoveling snow
  - Injures from snow and ice breakage

Safety first

After a storm, take the following actions, as appropriate, before starting recovery work

Checklist - Inside the home

Keep in mind that any of the below items, upon your inspection, may require your evacuation for your safety.

☐ **Be sure to document any damage** with photographs and notes, if possible.
☐ **Check for signs of gas leaks in the home**. If there are any signs of this, shut off the gas at the main.
☐ **Check for any burst pipes or water damage**. If so, turn the water off at the main until pipes are repaired. See our Flooding Toolkit for strategies on repairing water damage. This should be done as soon as possible to prevent further damage such as mold.
☐ **Check your carbon monoxide** and smoke detectors to ensure they're working.
☐ **Check for structural damage** to the home - look for sagging or cracking features both inside and outside of the home. This could be caused by tree fall or the weight of snow or ice on the roof.
☐ **If building is damaged**, check for obvious damage to electrical wires and turn off your electricity at the breaker box if you see any
☐ **Damaged structures** may continue to collapse. If possible, you should evacuate the home until it can be examined for safety. You will have to assess the risk of traveling vs the risk of staying in a damaged home. If you can't leave, be sure to stay as far from damaged infrastructure as possible and remain alert. If you evacuate, consider going no further than a neighbor's house until it is safe to travel.
☐ **If it is safe** to do so, board up or cover any damage to the roof or windows with a tarp or other covering.

Checklist - Outside the home

If you find that any of the following situations exist, you may need professional help to remedy, depending on the severity. We share remedies for some of these below.

Clear the entry way and walkway around the home so you can access it safely
☐ **Check outdoor surfaces** - are they dangerously slippery? If so, see section "slips and falls" below for remedies.
☐ **Check for downed power lines**. Avoid the area around them if they exist.
☐ **Check for downed or weakened tree branches**, trees leaning or stressed that could fall on buildings, vehicles or people
☐ **Check for snow or ice** load on trees and roofs.

Departing for safety, if necessary

If your home is damaged and you need to walk out to get to a place of safety, the safest thing you could do is to shelter with a nearby neighbor until roads are cleared. If there is an emergency and you need to walk further, **you should have a clear destination in mind and know the route to get there.** Be sure to take a winter bug-out bag with you, especially if traveling any distance. It could save your life.

Checklist - Winter bug out backpack items

Note: Some of these items are more useful for wilderness situations: you can decide what is most important.

- ☐ Compass
- ☐ Detailed map of region
- ☐ Binoculars or monocular
- ☐ Fire starter
- ☐ Good knife
- ☐ Snowshoes or similar if deep snow is possible
- ☐ High protein light weight food
- ☐ Water
- ☐ Sufficient water resistant clothing, including a change of clothing (it's vital to stay dry)
    - ☐ Wool or other heat retaining layers
    - ☐ Waterproof boots and wool socks
    - ☐ Wool hat, gloves, scarves or similar
    - ☐ Temperature appropriate outerwear

👉 See our General Guide Checklist - Bug Out Bag for more items that may be useful.

Using salt on ice

Icy sidewalks and driveways can create serious risk of injury. Rock salt has been the most common de-icing material for years.

This section covers some of the risks of using rock salt and some alternative methods for handling slippery surfaces.

Risks

Rock salt can be damaging for humans and pets and cause severe damage to vehicles, environments, plants and infrastructure - a hidden cost that can add up to more than 35 times the initial cost of salt. We don't recommend using it, for that reason.

The areas most vulnerable to damage are:

Children, pets and animals: Salt can poison animals that eat enough of it. Pets have died from such poisoning. It can irritate their paws. Likewise, it can irritate or burn children's mouths or skin.

Exterior walls and foundations :Salt can accumulate on exterior walls over time. This buildup can seep into porous materials like brick or concrete, weakening your structure's integrity.

Driveways and walkways: Regular exposure can degrade concrete and asphalt, leading to cracks, pitting, and surface erosion.

Roofs and gutters: The combination of salt and moisture harms metal roofing materials and gutters. Over time, this can result in rust and corrosion, compromising the effectiveness of your roof and leading to leaks or water damage inside your home.

Windows and doors: Metal frames, locks, and hinges are especially prone to rust in salty environments. If you live near the coast, you've probably noticed how quickly these elements can begin to degrade.

Interior damage: Salt acts like sandpaper on floors, carpets and clothing.

Landscapes: Salt disrupts soil chemistry, harms vegetation and permanently reduces soil health and fertility unless removed.

Salt damaged foliage
https://resources.sima.org/snow-and-ice-resource-center/the-true-cost-of-salt
https://www.epa.gov/snep/winter-coming-and-it-tons-salt-our-roads

Better solutions

CMA. A commercial alternative to salt is CMA (**calcium magnesium acetate**), which is less corrosive than traditional salts—gentle on concrete, metals, plants, landscaping, and pavement. Also look for “pet safe” ice melting substances.

Beet juice. People have also used brine solutions made from beet juice, cheese and pickle brine, molasses, corn, and soyabean oil. White vinegar can be used for smaller applications like de-icing car windows or front steps.

If you must use salt: applying it before ice or snow hit can reduce the amount needed and make cleanup easier. **Sand mixed with salt and grit** is also an alternative that can be re-used for 3-4 applications and reduces the amount of salt needed.

👉 See our Winter Storms Deep Dive Guide for more in-depth solutions to this issue [coming soon]

Preventing injuries

Slips and falls

Slips and falls are common sources of injury after winter storms. Ice is not often visible. Ankle fractures or sprains are common. The most serious injuries include hip fractures or head injuries, including concussion or intracranial bleeding.

In this section, we share some alternative ways to protect yourself without using toxic and harmful products. This section covers:

- Foot gear
- Tips: Applying materials to reduce ice or slippage

Foot gear

Metal Ice Cleats. The number one way to protect from falls on ice is to install metal ice cleats on your shoes or boots.

- You can buy shoes or boots with cleats, but these can damage indoor floors and can be expensive.
- Some shoes have retractable cleats. They are not as effective as non-retractable types.

- Removable cleats are much less expensive and can be used on different shoes. You can remove them before you go inside, to protect floors. Newer models use coils that aren't as damaging to surfaces like concrete.

Specially made winter shoes with rubber grips do provide benefit on snow or slushy ice but do not work as well on hard ice or black ice. Only metal cleats work consistently on ice.

Walking sticks with grips on the bottom are also helpful.

The best winter shoes will have ankle support, insulation, and water resistance.

Tips: Applying material to reduce ice or slippage

- **Applying some de-icer material before it snows** can help prevent build up and reduce the amount of de-icer needed.
- **CMA (calcium magnesium acetate) is a salt free melting agent** made from limestone and acetic acid that is considered biodegradable.
- **Beet juice, pickle juice, soy oil, or molasses** are new options for de-icing. Some of these have anti-corrosive properties, making it safer for concrete and won't harm plants.
- **Buckets of wood ash, used coffee grounds, alfalfa meal, fine gravel, sand or kitty litter** (the plain clay variety) can be used to increase grip on ice.
    - Use a metal container to store ash.
    - Coffee grounds and wood ash can melt ice slowly, but these substances are mainly useful to provide more traction.
    - Coffee grounds and alfalfa meal feed plants in spring rather than poisoning them.
    - Wood ash can be used as a garden amendment in the spring, though a heavy concentration of it is not desirable. It works best when used in a thin layer along with a good nitrogen source like fresh manure. The best way to utilize it is to scoop it off your driveway/sidewalk once the snow is melted and use it in thin layers in your compost pile or store it, and sprinkle on your garden beds in the spring.

Note, while these substances are more environmentally friendly than salt, they can be messy when tracked into your home (as can salt), so take your boots off!

- **If possible, use a shovel before using a deicer**; it will greatly reduce the amount of deicer that you need, or eliminate it.
- **Spread the material** only where you will be walking or driving.

Shoveling snow

Impact. → Over 200,000 people were treated in emergency departments from injuries sustained while shoveling or removing snow or ice. These include slip and fall, lifting, overexertion, dehydration and more. Injuries can range from back injury to a fatal heart attack.

Tips when shoveling snow:

- Wear cleats if the surface is very slippery.
- Or use sand or another suitable material on slippery areas to prevent falling.
- Warm up prior to shoveling.
- Stay hydrated.
- Dress appropriately to prevent frostbite. Consider delaying shoveling if it is too cold.
- Push the snow. It is better for your back to push the snow out of the way rather than lifting it.
- If you have to lift, make sure your knees are bending and straightening to lift the shovel instead of leaning forward and straightening with your back.
- Pace yourself, and take frequent breaks.
- Gently stretch your back, arms, and legs before returning to work.
- Consider using a snowblower or asking for help if you have health concerns.
- Sleet or wet snow is much heavier than powdery snow and can cause stress faster. Pace yourself!

Injury from snow or ice breakage

Impact → People are injured standing under ice damaged branches, icicles on roofs or other hazards. A common nickname for damaged branches are “widow makers” for a reason.

Tips

- Don’t stand under ice or snow laden branches, damaged branches, power lines or buildings without taking safety precautions, and stay alert.
- A special place to be alert is under the eaves of homes where icicles form and fall or snow on the roof may slip off. This can happen dramatically if the temperature rises above freezing.

Check on neighbors

Winter storms impact everyone differently, so it's important to check on elderly neighbors or those with disabilities who may need extra help. You can also consider donating to organizations providing winter storm relief to further support your community.

- **Could a neighbor be hungry?** If you have food that will go bad, consider sharing it with a neighbor. At the same time, you can check to see if they know how to stay warm and have enough clothing and blankets to do so or offer assistance by shoveling driveways or delivering supplies to those in need.
- **Consider having a "housewarming party" for neighbors who are cold**. The more people in a room, the easier it is to stay warm. It's a great opportunity to get to know your neighbors better and to ensure everybody stays safe.

Section 6: Recovery first steps

Impact → Winter storms can create damage after the fact, and often the most severe damage to buildings or infrastructure can occur after the storm.

This section includes steps to take to prevent further damage to your home after the storm. Much of the damage from winter storms can happen as a result of the **weight of snow and ice or further cold**.

These steps can apply to anybody whether you rent or own your home, though in some cases, the property owner will do the work. It also outlines a number of worst case scenarios of damage to your home. In most cases, these things do not happen. We hope they never happen to you!

This section covers:

- Preventing further damage
- Protect your water pipes
- Remove heavy snow/ice from your roof and other risky locations
- Protect your yard or vehicle from salt
- Handling flooding

Remember! If there is damage, photograph first, then repair. Documenting every bit of damage is important for insurance purposes.

👉 Please refer to our Recovery section in our General Guide: Toolkit for key information about documenting damage and other resources for recovery from any disaster.

👉 See our Severe Winter Weather Guide: Deep Dive [coming soon] for more in-depth information on avoiding damage to your structure

Protect your water pipes

Tips to protect your water pipes:

- **If pipes appear intact** and there is no flooding, keep faucets dripping if there is a flow – there is still a risk of freezing as long as bitter cold continues.
- **Check pipes for cracks** – look for leaks in exposed plumbing or signs of leaks such as moisture on walls or ceiling, musty odor, or lowered pressure from faucet.
- **Slowly thaw frozen pipes** – Use a hairdryer or warm towels; never use an open flame.

Remove heavy snow/ice from roof or other risky locations

This section covers:

- Snow load risks
  - definition
  - what can increase risk of damage from snow load
- Ice load risks
- Removing snow or ice from roof
- When to get help

Snow load risks

Most homes in colder climates have roofs rated for snow loads expected in their area. Homes further south have lower ratings or may have none at all. Those roofs may be more vulnerable to extreme winter storms.

Snow load: Sufficient snow on roofs or greenhouse structures can cause collapse or damage if the roof is not rated to take the weight. It's water - it may look fluffy but it can be quite heavy. Even a few inches of heavy "wet" snow can damage a roof, especially those not built for snow loads. Less than an inch of ice can damage some structures and break tree limbs.

What can increase risk of damage from snow load

- A slight roof pitch or flat roof
- Shaded areas (where snow doesn't melt or melts slowly and turns to ice)
- Large snow drifts near walls or parapets
- A home that isn't built for heavy snow loads, or receiving record snow unusual for the region

Ice load risks

Ice loads can happen in a couple of different ways:

- **Ice storms**: When there is freezing rain, an ice load build up of even ½" can be heavy enough to create roof damage in some cases.

- **Ice dams**: When snow slowly melts, it can refreeze at night, collecting in gutters and creating a "dam" in the gutter and at the edge of your roof. This happens especially if heat is not evenly distributed in the attic because of insufficient insulation or ventilation issues. As the size of this dam increases and prevents snowmelt from leaving your roof, it can cause damage to your gutters and the edge of your roof from the weight.

Remember! Overload signs can appear gradually or suddenly.

How to recognize snow load/ice dam damage

- Visible roof sagging
- Bending or cracking in soffits, fascia, or walls
- Gaps where the ceiling meets walls
- Doors or windows becoming harder to open and close
- Interior ceilings showing sudden changes
- Persistent leaks or dampness after heavy snowfall
- Popping noises during snowfall or windy periods

If you see any of these signs of damage, get a professional to remove the snow and assess the risk and damage. Prolonged exposure can cause progressive damage or even collapse of some of the roof.

Removing snow or ice from the roof

People have been buried in avalanches from their rooftop when not careful, or have seen their driveway or home access buried in feet of snow when it suddenly slipped off in a heap, or have fallen and injured themselves, so it's something to think through and plan before you actually need to remove the snow.

Checklist - Removing snow or ice from the roof

☐ **Prioritize removing snow from flat or low pitch rooftops such as porch roofs.** These are often built for less load in the first place. Even a few inches of snow can create an impact.

☐ **Avoid climbing on your roof if at all possible. Use a ladder if it is snowy or icy.** There are a number of ways to remove it without risking injury.

☐ **Be alert for large patches of snow sliding off your roof**, especially as you begin clearing it off.

☐ **When possible, remove snow frequently rather than letting it build up**. It can compress and become harder to remove and heavier build up risks more potential damage. In heavy snow, this should be done soon after the storm ends. This may not be practical if you're heavily snowed in and access is an issue. Even if you can get some portion of it off the roof, it can help.

☐ **Remove snow a little at a time.** Don't try to move large patches at once which can strain your roof or cause injury or other damage. Snow can be very heavy!

☐ **Use a roof rake or other safe tool to remove snow**. Roof rakes have telescoping handles up to 30 feet in length, and allow you to remove snow gently. **NOTE**: There are different types of roof rakes for different kinds of roof, and even solar panels. Be sure to get the correct kind so that you don't damage your roof. Start at the edges and work your way up, foot by foot.

☐ **Rope method.** Two people holding the ends of a long rope can throw it on the roof and pull snow off in that way. The safest proven way to remove snow is with a roof rake. However, people have devised other safe ways to remove feet of snow from a roof when they don't have a rake. There are a number of YouTube videos showing different ways to remove snow from the roof.

☐ **Don't use sharp tools or heat to remove snow from your roof**. These have the potential to damage your roof which can cost more than hiring professionals to remove the snow or ice.

☐ **Ensure attic vents are open and unencumbered.** If the attic gets too warm from lack of ventilation, it can cause uneven snow melt and ice dams which can be damaging to the roof or gutters. This can also happen because of inadequate or uneven insulation.

☐ **Don't overexert.** Use the same principles as you would shoveling snow. Removing snow from the roof can be physically taxing. Take breaks!

▢ **Be sure to remove snow from around downspouts** so that when snow melts, water can flow away from the building.
▢ **Avoid use of chemicals on the roof:** most of them can damage the roof. However,
▢ **If an ice dam forms, melting it with de-icing chemicals** may be the safest way to handle it.
    ▢ Use environmentally friendly chemicals such as “pet friendly” de-icers or CMA without chloride; chloride found in most de-icers is the damaging element.
    ▢ Try to de-ice with an extension, placing the material on the gutter and downspout without climbing a ladder, if at all possible. If possible, use professionals.

https://www.onehourheatandair.com/expert-tips/energy-efficiency/should-you-shovel-snow-off-your-roof/

When to get help

Consider hiring a professional crew to remove the snow from the roof if you encounter any of the following scenarios:

- A ladder is necessary to remove the snow.
- There is more than a foot of snow on the roof.
- The roof rake is not enough to reach the snow higher on the roof.
- Ice dams are forming on the roof or in the gutter system.
- Signs of a roof leak appear inside.

→ Remember: if structural changes occur, like a sagging roof, warped door frames, or buckling walls. It’s important that this gets addressed by a knowledgeable person to avoid further damage.

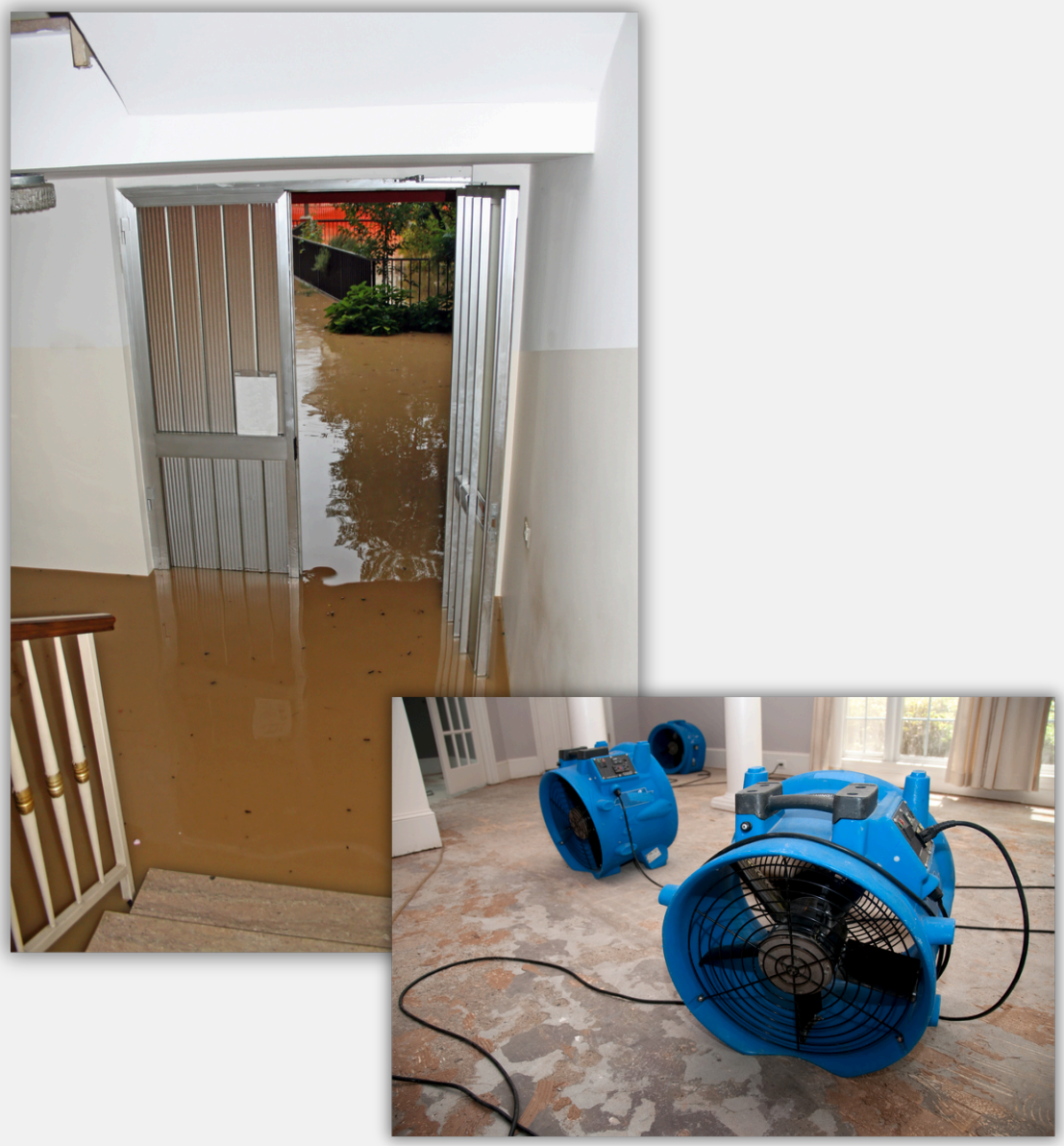
Protect your vehicle or yard from salt

- **Regular Vehicle Maintenance**: Washing your car regularly in winter, especially the undercarriage, can help reduce salt damage.
- **Remove salt from soil and plants:** Watering plants and soil where salt buildup can occur near sidewalks and roads can reduce the damage. This does not keep the salt out of aquifers, however.

Handling flooding

If your pipes burst, you have water in your basement from snowmelt, or other impact from water. Specific steps are needed to recover from flood waters in your home while preventing further damage, which are beyond the scope of this Toolkit.

👉 Please see our Flooding Toolkit recovery section.



Section 7: More resources for recovery

👉 Please see our General Guide Toolkit, Recovery section, for information on how you can get help to recover from government, agencies, and/or other sources, and for further valuable information on how to recover from damage on your own.

References

Free class on understanding winter weather and how to survive in it
https://www.chrisoutdoors.ca/natureinwinter/

Please see our reference library on severe winter storms for more information.

https://www.yahoo.com/news/ice-storm-texas-leads-deadly-123148531.html
A 130+ vehicle pile up during a winter storm in Texas, resulting in six deaths. These pile ups almost always result in multiple deaths.

What Is Bioregionalism?

Bioregionalism is the idea that our communities, economies, and identities should be rooted in the natural characteristics of the place we inhabit—its **watersheds, soils, native plants, animals, climates, and landforms**—instead of political borders or abstract markets. Rather than forcing a one-size-fits-all model onto every landscape, bioregionalism calls on us to **live within the ecological limits of our home region**, drawing our food, energy, materials, and culture from what can be produced sustainably within it. By aligning our lifestyles, governance, and trade with the unique patterns of each bioregion, we reduce ecological footprints, strengthen local resilience, and foster a deep sense of belonging to the land itself.