



United States Department of Agriculture

### **Forest Service**

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<https://www.fs.usda.gov/mbs/>



## **BASIC GUIDELINES FOR TRAVEL IN THE NATIONAL FOREST**

Notify a responsible person of your planned route of travel. Mark it on a map. Give your planned time of departure and return. Be sure to check with that person when you get back. Get back before dark.

### **Where to Go**

Most of the National Forest is open for winter travel; however, some parts have restrictions. These restrictions include motorized vehicle closures, avalanche area closures, and hazardous roads. General recreation maps are available at your local Ranger Station.

### **Information**

Check [local weather forecasts](#). Avalanches may occur at any time during the winter so call or listen to local avalanche advisories where available. Advice on avalanche conditions is also available at [NWAC.us](http://NWAC.us) or your local Forest Service Office. You can also contact the forest Service snow ranger or the nearest winter sports area ski patrol.

### **Clothing and Equipment to Take Along**

Layers of clothing which can be adjusted to prevailing conditions are best. A good quality windbreaker jacket and wind pants are excellent. Avoid tight-fitting clothes and boots which may restrict circulation. Take extra socks and gloves or mittens, warm hat, matches in a waterproof container, candle, fire starter (000 steel wool works well when pulled apart), nylon cord, general purpose knife, high-energy food, plastic tarp, space blanket, signal mirror, first aid kit, wide tape for repairs, metal container for melting snow, map, compass, and hatchet.

Snowmobilers should be certain to have tools for emergency repairs, extra spark plugs, extra gas, emergency flares, and drive belt. Experienced snowmobilers always carry snowshoes (in case of equipment failure) as well as the normal emergency and survival gear for winter.



## **Food and Water**

A good rule is "lightweight but loaded," meaning loaded with calories. Plan your meals to ensure a diet of high-energy foods.

Water is often difficult to find in winter. All that is available may be what you carry in containers or melt from snow. The body loses as much as 2 to 4 quarts of fluid per day under exertion. Replacement of fluid loss is very important for maintaining physical condition. Eating snow provides only limited water (10 to 20 percent), drains energy, and cools the body temperature. Avoid melting snow by body contact. Travel equipped to melt snow. Save your energy.

## **Litter and Sanitation**

Litter and debris can mar the quality of a recreation experience - particularly when viewed against a mantle of white snow. Help others enjoy winter travel in National Forests by carrying out what you carry in. Take food in easily compressed packages that require little space in your pack.

Avoid leaving human waste near any water course. If you are in a group, avoid concentrating wastes. Nature can assimilate only small quantities at a time.

## **On and Off the Trail**

All winter travelers should:

- Match trail difficulty and length of trip to your physical condition and ability. Be physically fit - Top physical condition may be required to walk out if equipment fails.
- Know storm warning signs - Mountain weather is unpredictable. Pay attention to changing conditions.
- Stay on safe routes and avoid avalanche terrain.
- A list of marked cross-country skiing and snowmobile trails is usually available Forest Service Ranger Stations.

## **Cross Country Skiing**

Cross-country ski trails are not regularly packed or groomed. Stumps, rocks, and other obstructions are sometimes present. Ski under control.

Dogs can ruin ski tracks, especially those that have been groomed. For the benefit and enjoyment of others, consider leaving your pet at home. If you do take your dog, consider skiing in non-groomed or lightly used areas.

## **Snowmobiling**



Travel in a group using at least two machines. Avoid sudden dips (washouts) at stream crossings and (blowouts) around the base of trees.

### **Sharing Routes Safely**

In some areas of the National Forests, those traveling by skis, snowshoes, and snowmobiles must share the same routes and areas. The following suggestions will help provide safe routes for everyone.

Operate snowmobiles at minimum speed near skiers or snowshoers. Travel slowly until well beyond those on foot. Snowmobilers should be able to stop within half of the visible distance ahead.

Skiers and snowshoers should realize that snowmobile operators generally can't hear other approaching trail users. On steep slopes snowmobilers are generally limited to the developed trail surface, so give them the right of way. Use common courtesy and respect so that all trail users can enjoy their winter travel.

Snowmobiles are not permitted on developed ski trails used for cross-country skiing. Restrictions are posted but check with the local ranger for full information.

### **Maps**

There are three basic types of maps useful for winter travel in National Forests. National Forest Recreation Maps are sold at Forest Service Ranger Stations and Visitor Centers.

Topographic maps are available at many outdoor stores or from:

U.S. Geologic Service  
Western Distribution Branch  
P.O. Box 25286  
Denver, CO 80225  
(303)236-7477

Maps may be purchased on-line as well. Two sites that offer on-line maps sales are:

[National Forest Store](#) - The National Forest Store now offers secure on-line sales. Use this web site to purchase maps of many national forests.

[USGS MAPS](#) - The USGS website has several Forest Service maps that can be purchased.

On the USGS website, click [Enter USGS Store](#); then select [U.S. Forest Service Maps](#) in the left column and follow the instructions.

Outdoor recreation and conservation organizations also make useful maps such as winter trail maps. These maps can be obtained directly from the organizations and are often available at retail stores specializing in outdoor recreation. Many are free.

### **Snow Avalanches**

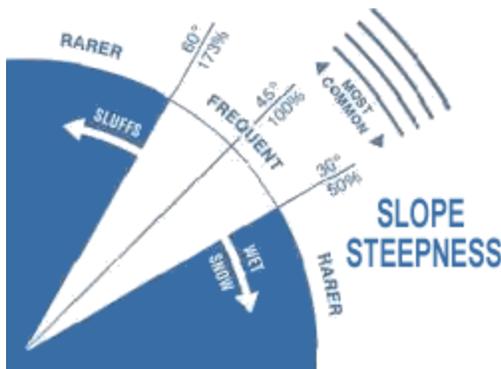
Large and small avalanches can have tremendous force and are a serious threat to winter travelers. The more time you spend in skiing, snowshoeing, snowmobiling, and other winter activities, the greater your

chances are of being caught by snow avalanches. Knowledge can help you avoid being caught by a snow avalanche and it will help you survive if buried.

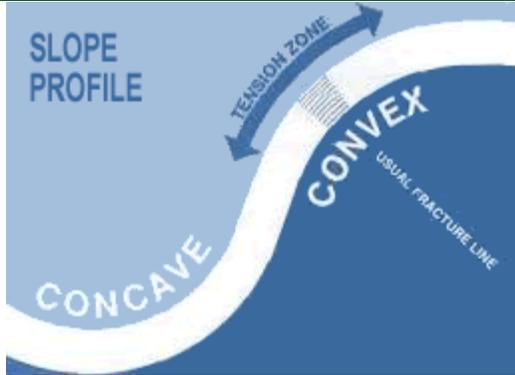
Snow avalanches are complex, natural phenomena. Experts do not fully understand all the causes. No one can predict avalanche conditions with certainty. But these general guidelines will help a thinking observer develop judgment about the presence and degree of avalanche danger.

- Play safe. If in doubt, stay out of avalanche hazard areas. During periods of high or extreme avalanche hazard, back-country travel is not recommended and should be confined to avalanche-free areas.
- There are two principle types of snow avalanches. These are loose snow and slab avalanches.
  - **Loose snow avalanches** start at a point or over a small area. They grow in size and the quantity of snow involved increases as they descend. Loose snow moves as a formless mass with little internal cohesion. Loose slides which trap victims are usually triggered by other members of the party or are triggered naturally.
  - **Slab avalanches**, on the other hand, start when a large area of snow begins to slide at once. There is a well-defined fracture where the moving snow breaks away from the stable snow. There may be angular blocks of chunks of snow in the slide. Slab avalanches are often triggered by victims themselves. Their weight on the stressed snow slab is enough to break the often fragile bonds that hold it to the slope or other snow layers.

### Terrain Factors



**Slope Steepness** - Avalanches are most common on slopes 30 to 45 degrees (60 to 100 percent), but may occur on slopes ranging from 25 to 45 degrees. This diagram shows the slopes where avalanches are most common.



**Slope Profile** - Dangerous slab avalanches are more likely to occur on convex slopes, but may also occur on concave slopes. Short slopes may be as dangerous as long slopes. 42 percent of all avalanche fatalities result from slides running less than 300 feet.

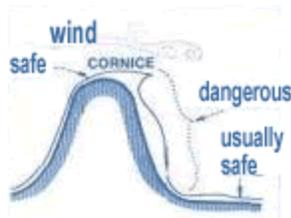


**Elevation** - Although the avalanche danger generally increases with elevation, unusual weather conditions (temperature inversion, for example) combined with local topography may reverse this relationship from time to time.

**Slope Aspects** - snow on north-facing slopes may be slower to stabilize than other aspects. South-facing slopes are especially dangerous in the spring due to solar heating.

**Ground Cover** - Large rocks, trees, and heavy brush help anchor the snow. Smooth, open slopes are more dangerous, but avalanches can start even among trees.

**Weather Factors**



**Wind** - Even during clear weather, sustained winds of over 15 miles per hour may cause danger to increase rapidly when loose surface snow is available for transport. Snow plumes from ridges and peaks indicate that snow is being moved onto leeward slopes. This can create dangerous situations. Leeward slopes are dangerous because win-deposited snows add depth and may



create unstable wind slabs. Windward slopes generally have less snow and the snow is compacted and usually more stable toward the leeward slopes.

**Storms** - A high percentage of all avalanches occur shortly before, during, and shortly after storms. Be extra cautious during these periods.

Rate of Snowfall - Snow falling at one inch per hour or more increases avalanche danger rapidly.

**Crystal Types** - Observe snow-crystal types by letting them fall on a dark ski mitt or parka sleeve. Small crystals, needles, and pellets often result in more dangerous conditions than the classic star-shaped crystals.

**New Snow** - Be alert to dangerous conditions with a foot or more of new snow. Remember that new snow depth may vary considerably with slope elevation and aspect.

**Old Snow** - When old snow depth covers natural anchors, such as rocks and brush, new snow layers slide more readily. The nature of the old snow surface is important. For example, cold snow falling on hard refrozen snow, such as rain crusts, may form a weak bond. Also, a loose, underlying snow level is more dangerous than a compacted one. Check the underlying snow layer with a ski pole, ski, or probe.

**Temperature** - Cold temperatures will maintain an unstable snow pack while warm temperatures (near or just above freezing) allow for snow settlement and increasing stability.

Storms starting with low temperatures and dry snow, followed by rising temperatures, are more likely to cause avalanches. The dry snow at the start forms a poor bond to the old snow surface and has insufficient strength to support the heavier snow deposited late in the storm.

**Be alert to weather changes.** Rapid changes in weather conditions (wind, temperature, snowfall) may affect snow stability and cause an avalanche.

**Temperature Inversion** - It may be warmer at higher elevations when warm air moves over cold air trapped near the ground. This weather situation can occur in avalanche terrain and may produce dangerous, unpredictable changes in local snow stability.

**Wet Snow** - Rainstorms or spring weather with warm winds and cloudy nights can warm the snow cover. Percolating water may cause wet snow avalanches. Wet snow avalanches are more likely on south slopes and slopes under exposed rocks.

### **Danger Signs!!**

**Old Slide Paths** - Generally, avalanches occur in the same areas. Watch for avalanche paths. Look for small trees that have been pushed over, or have limbs broken off. Avoid steep, open gullies and slopes.

**Recent Avalanche Activity** - If you see new avalanches or suspect dangerous conditions, leave the area immediately. Beware when snowballs or "cartwheels" roll down the slope.

**Sounds and Cracks** - If the snow sounds hollow, particularly on a leeward slope, conditions are probably dangerous. If the snow cracks while you pass over it, and the snow cracks run (enlarge laterally or horizontally), this indicates slab avalanche danger is high.

### **What do Avalanche Hazard Reports Mean?**

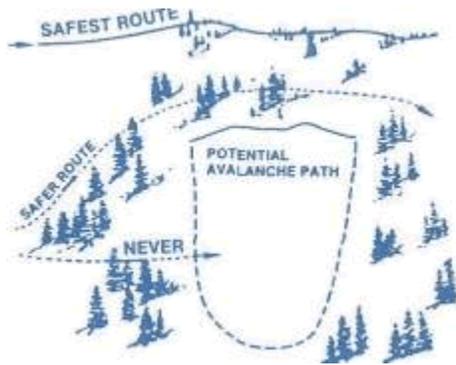


**Low Avalanche Hazard** - Mostly stable snow. Avalanches are unlikely except in isolated pockets on steep snow-covered, open slopes and gullies. Back country travel is usually safe.

**Moderate Avalanche Hazard** - Mostly unstable snow avalanches are likely on steep, snow-covered open slopes and gullies. Back country travelers should use caution.

**High Avalanche Hazard** - Mostly unstable snow. Avalanches are likely on steep, snow-covered open slopes and gullies. Back country travel is not recommended.

**Extreme Avalanche Hazard** - Wide spread areas of unstable snow. Avalanches are certain on some steep, snow-covered open slopes and gullies. Large destructive avalanches are possible. Back country travel should be avoided.



**Crossing Dangerous Slopes**

The safest routes are on ridge tops and slightly on the windward side away from cornices. Windward slopes are usually safer than leeward slopes. If you cannot travel on ridges, the next safest route is out in the valley, far from the bottom of slopes. Obey signs posted to close slopes due to avalanche danger.

**Route Selection** - If you must cross dangerous slopes, stay high and near the top. If you see avalanche fracture lines in the snow, avoid them and similar snow areas. If you must ascend or descend a dangerous slope, go straight up or down; do not make traverses back and forth across the slope. Avoid disturbing cornices from below or above. Gain ridge tops by detouring around cornice areas.

Take advantage of areas of dense timber, ridges, or rocky outcrops as islands of safety. Use them for lunch and rest stops. Spend as little time as possible on open slopes.

Snowmobiles should not cross the lower part of slopes. Do not drive a snowmobile across especially long open slopes or known avalanche paths.

Only one person at a time should cross a dangerous or questionable slope. All others should watch that person. Remove ski pole straps, loosen all equipment, put on mitts, cap, and fasten clothing before you travel in any areas where there is avalanche danger.

Carry and use an avalanche transceiver. Carry a sectional probe and collapsible shovel.

### **Avalanche Survival**

If you are caught in an avalanche:

- Discard all equipment.



- Get away from your snowmobile.
- Make swimming motions. Try to stay on top; work your way to the side of the avalanche.
- Before coming to a stop, get your hands in front of your face and try to make an air space in the snow as you are coming to a stop.
- Try to remain calm.

If you are the survivor:

- Mark the place where you last saw the victim.
- Search for victim downslide in the flow line below the last seen area. If the victim is not on the surface, scuff or probe the snow with a ski pole or stick.
- You are the victim's best hope for survival.
- If you find the victim, attempt to free him/her with a ski, a shovel, or other digging tool.

Do not desert the victim and go for help unless help is only a few minutes away. Remember, you must consider not only the time required for you to get help, but the time required for help to return. After one half hour, the buried victim has only a 50 percent chance of surviving.

**First Aid** - Treat for suffocation, shock, and physical injury.

### **Hypothermia**

Be aware of the danger of hypothermia - subnormal temperature of the body. Lowering of internal temperature of the body leads to mental and physical collapse.

Hypothermia is caused by exposure to cold and it is aggravated by wet, wind, and exhaustion. **It is the number one killer of recreationists.**

Cold Kills in Two Distance Steps:

1. The first step is exposure and exhaustion. The moment you begin to lose heat faster than your body produces it, you are undergoing exposure. Two things happen: You voluntarily exercise to stay warm, and your body makes involuntary adjustments to preserve normal temperature in the vital organs. Both responses drain your energy reserves. The only way to stop the drain is to reduce the degree of exposure.
2. The second stop is hypothermia. If exposure continues until your energy reserves are exhausted, cold reaches the brain, depriving you of judgment and reasoning power. You will not be aware that this is happening. This is hypothermia. Your internal temperature is sliding downward. Without treatment, this slide leads to stupor, collapse, and death.

**The time to prevent hypothermia is during the period of exposure and gradual exhaustion.**



Most hypothermia cases develop in air temperatures between 30 and 50 degrees. Most recreationists simply can't believe such temperatures can be dangerous. They underestimate the danger of being wet at such temperatures - with fatal results.

Fifty degree [F] water is unbearably cold. The cold that kills is cold water running down neck and lets, cold water held against the body by sopping wet clothes, and cold water flushing body heat from the surface of the clothes. Don't ask "How cold is the air?" Ask instead, "How cold is the water against my body?"

#### **Defense Against Hypothermia:**

- **Stay Dry** - Staying dry and maintaining body heat are the key to avoiding hypothermia. Wool has been the standard when staying warm and dry are required and is still a good choice. New synthetic materials also offer the advantages of being lightweight and fast drying if wet.
- **Dress in layers** with lightweight undergarments (to wick moisture away from the skin) and then wool or fleece pile for insulating warmth. A tight weave water repellent wind breaker completes the three layer system for all weather conditions. Whether using wool or synthetic, layering your clothing will enable you to shed layers as you warm up or add them again as you cool down. Include a knit cap that can protect neck and chin. Cotton is useless when wet because it actually makes you colder.
- **Beware of the Wind** - A slight breeze carries heat away from bare skin much faster than still air. Wind drives cold air under and through clothing. Wind refrigerates wet clothes by evaporating moisture from the surface. Wind multiplies the problem of staying dry. Choose rain clothes that are proof against wind-driven rain and cover head, neck, body, and legs. Ponchos are poor protection from the wind.
- **Use Your Clothes** - Put on rain gear before you get wet. Put on wool clothes before you start shivering.
- **End Exposure** - If you cannot stay dry and warm under existing weather conditions using the clothes you have with you, end exposure. Be smart enough to give up reaching the peak or getting the fish or whatever you had in mind.
- **Get Out of the Wind and Rain** - Build a fire. Concentrate on making your camp or bivouac as secure and comfortable as possible. Never ignore shivering. Persistent or violent shivering is clear warning that you are on the verge of hypothermia. A storm proof tent gives best shelter. Take plastic sheeting and nylon twine with you for rigging additional foul-weather shelter.



- Carry trail food - nuts, jerky, and candy - and keep nibbling during hypothermia weather. Take a gas stove or a plumber's candle, flammable paste, or other reliable fire starters.
- Don't wait for an emergency. Use these items to avoid or minimize exposure. Take heed of "hypothermia weather." Watch carefully for warning symptoms.
- Prevent Exhaustion - Make camp while you still have a reserve of energy. Allow for the fact that exposure greatly reduces your normal endurance.
- Be aware that exercise drains energy reserves. If exhaustion forces you to stop, however briefly, your body heat production instantly drops 50 percent or more. Violent incapacitating shivering may begin immediately and you may slip into hypothermia in a matter of minutes.
- Appoint a Foul Weather Leader - make the best protected member of your party responsible for calling a halt before the least protected member becomes exhausted or goes into violent shivering.
- Symptoms - If your party is exposed to wind, cold, and wet, think hypothermia. Watch yourself and others for symptoms.
  - Uncontrollable fits of shivering
  - Vague, slow, slurred speech.
  - memory lapses, incoherence.
  - Immobile, fumbling hands.
  - Frequent stumbling. Lurching gait
  - Drowsiness - to sleep is to die.
  - Apparent exhaustion, inability to get up after a rest.

### **Treatment for Hypothermia**

The victim may deny he/she is in trouble. Believe the symptoms, not the victim. Even mild symptoms demand immediate, drastic treatment.

Get the victim out of the wind and rain. Strip off all wet clothes. If the victim is only mildly impaired, give warm drinks. Get the victim into warm clothes and a warm sleeping bag. Well-wrapped, warm (not hot) rocks or canteens will hasten recovery.

If the victim is semiconscious or worse, try to keep him/her awake. Give warm drinks. Leave victim stripped. Put the victim in a sleeping bag with another person - also stripped.



If you have a double bag, put the victim between two warm donors. Skin-to-skin contact is the most effective treatment.

Build a fire to warm the camp.

### **Other Potential Dangers**

#### **Wind Chill**

Wind temperature, and moisture are factors which can greatly affect the safety of a winter traveler. Each contributes to the loss of body heat. The "wind chill" chart illustrates the effect of wind and temperature on a dry, properly clothed person. If clothing is wet from perspiration or precipitation, the net effect of wind and temperature is much greater.

#### **Frostbite**

Frostbite is caused by exposure of inadequately protected flesh to subfreezing temperatures. Tissue damage is caused by the reduced blood flow to the extremities as opposed to hypothermia, which causes lowering of the body's rate of metabolism.

- **Symptoms** - Loss of feeling and a dead-white appearance.
- **Treatment** - Restore body temperature as rapidly as possible, preferably by immersion in a water bath of less than 110 degrees temperature or by other means. If it is necessary to continue moving, the affected part should be kept covered and the victim moved to a location where effective treatment and vehicle evacuation can be obtained.
- **Prevention** - Party members should periodically observe their companions, especially nose and cheeks, for signs of frostbite. Snowmobilers, due to their speed of travel, are particularly susceptible to frostbite.

#### **Dehydration**

An adult, at rest, requires 2 quarts of water daily. Up to 4 quarts are required for strenuous activity. There is a 25 percent loss of stamina when an adult loses 1.5 quarts of water. Avoid dehydration - simply drink as often as you feel thirsty.

#### **Altitude Sickness**

At 10,000 feet, air contains only two-thirds of the volume of oxygen that it does at sea level. In addition, the higher air pressure at sea level easily forces the available oxygen through the thin lining of the lungs into the bloodstream. At higher elevations there is less air pressure and the available oxygen is not so easily forced through the lung walls.

- **Symptoms** - Listlessness, loss of appetite, weakness, apathy, nausea, dizziness, and drowsiness.
- **Treatment** - Stop and rest, breathe deeply a few times, obtain nourishment from simple sugar like candy or fruit juices. Travel to lower elevations.
- **Prevention** - Keep in good physical condition and eat a well-balanced diet. Avoid sudden trips to high altitudes which involve immediate physical exercise.

### Hyperventilation

- **Symptoms** - This reaction to altitude is caused by too rapid breathing and decrease of the carbon dioxide level in the blood, causing a lightheadedness and cold feeling. Victims are apprehensive and excited.
- **Treatment** - Calm the victim, have him/her relax and breathe into a glove, bag, or hat until normal breathing is restored.
- **Prevention** - Keep in good physical condition and eat a well-balanced diet. Avoid sudden trips to high altitudes which involve immediate physical exercise.

### Lost or Injured



Avoid becoming lost by taking a good map. Learn to use a compass and believe it. Check weather forecasts and avoid storms. It is easy to become disoriented in the whiteouts of winter or when physically exhausted.

If you are lost, injured, or your equipment failed - KEEP CALM.

Decide on a plan. Trust your compass. Backtrack if possible, but if it's not practical, remain in place. Stay together if possible. If not, send at least two people for help.

Don't abandon your snowshoes or skis. Build a fire and shelter. Stay warm. Mark your base camp so it is visible from the air.

**Distress Signals** - Three smokes, three blasts of a whistle, three shouts, three flashes of light, three of anything that will attract attention.

**Ground to Air Signals** - Visible emergency signals are easily made in large open areas. SOS can be stamped in snowfields or grassy meadows. Brush piles or evergreen boughs can also be used. The graphic lists the tile emergency codes for ground to air signals.

### Overdue Party



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When someone is overdue - KEEP CALM. Notify the County Sheriff or District Ranger in the trip area. Either of these will take steps to alert or activate the local search and rescue organization. If the missing person returns later, be sure to advise the Sheriff or Ranger.