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# GUIDE TO WINTER CAMPING

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*Winter camping is an activity with inherent risks. This information is intended to be a general guide, not a substitute for experience and training. Neither the author nor the product manufacturers take responsibility for the use of any of the materials or methods described. In following any of the procedures discussed within, you do so at your own risk.*

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## **1 INTRODUCTION TO WINTER CAMPING**

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Perhaps you are intrigued by the thought of winter camping because:

- You want to visit a popular location, like the Adirondack High Peaks, without crowds.
- You have good warm weather camping skills and want to extend your skill base.
- You are a gear junkie who needs an excuse to acquire more equipment.
- You have a crazy friend/relative/boyfriend who wants you to accompany them.

Winter camping is an activity with inherent risks. The material presented within is intended to be a general guide, not a substitute for experience or training. The author of this material does not take responsibility for the use of any of the materials or methods described. In following any of the procedures described within, you do so at your own risk.

This book is not a guide to mountaineering, high altitude trekking, expeditions, ice climbing, glacier travel, bush craft, scouting, scout craft or survivalism.

The intent of this guide is to assist individuals with summer or three season camping experience in making the transition to winter camping. People are often reluctant to try winter camping due to a lack of gear, a lack of knowledge, and/or a general fear of the unknown. This winter camping guide is designed to abate those concerns by providing knowledge, gear discussions and personal experience.

This guide offers alternative definitions of winter camping, describes reasons to go winter camping and gives suggestions on how to get started winter camping. There is a description of aspects of Leave No Trace unique to winter camping. The guide offers suggestions for trip preparation, transportation of persons and gear in a winter landscape, considerations while on the trail and alternative shelters appropriate for winter camping. The reader gets recommendations for winter clothing from head to feet.

There are suggestions for winter camping foods and fluids and cooking over stoves and fires. A methodology for sleeping warm and winter camping sanitation is presented. Winter camping health is covered in a discussion of wilderness first aid and dealing with cold injuries and hypothermia. Finally, there is advice on how to do winter camping with your dog.

### **1.1 WHY GO WINTER CAMPING?**

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Winter camping is not for everyone. The day light hours are short and the nights can be cold and long. It's an activity that requires planning and preparation, physical stamina, the right equipment, an adventuresome spirit and, most of all, a positive mental attitude. In the winter, the margin for mistakes is small, with discomfort or worse as the penalty. Compared to three-season camping experiences, there are reasons why people may not want to go winter camping:

- Conditions may appear uncomfortable
- Snow may slow your travel and/or make route-finding more difficult
- There is more preparation
- More gear may be necessary
- The impact of mistakes is greater.

However, a winter landscape offers campers solitude, inspiration, natural quiet, and a place to get away. Winter camping can provide a haven from the pressures of our fast-paced, industrialized society, providing a place where one can seek relief from the noise, haste, and crowds. Winter camping has several advantages over summer camping:

1. Winter makes the landscape more traversable than during the other three seasons. Hikers can easily cross frozen lakes and ponds to directly access locations that might require lengthy hikes during other seasons. Snow provides a Leave No Trace approved durable surface that smoothes the ground, masks weeds and small scrubs, and bridges wet areas. You can reach areas that are too wet or overgrown during other seasons. In fact, these are often ideal destinations for winter camping.
2. Snow covers rocks, roots and uneven ground under your tent. With enough snow one can sculpt seats, kitchens, or snow/wind walls. Motivated winter campers can make entire shelters such as igloos or quinzees from snow.
3. The clear and open view is unparalleled. Deciduous trees shed their leaves and provide unobstructed vistas of the surrounding landscape.
4. Clear night skies offer great star gazing opportunities for amateur astronomers.
5. Night time sounds carry easily enhancing an audio landscape of coyotes, owls, trees snapping and ice cracking.
6. Winter camping provides a different perspective into nature than offered during the other three seasons.
7. Camping in the winter inspires emotions of independence and accomplishment. Overcoming the challenge of winter camping provides a reward in a feeling of satisfaction.
8. A successful winter camping trip gives you confidence in your survival skills. The skills one gains from winter camping (e.g. dressing properly, recognizing signs of hypothermia) can make one deal more comfortably with winter conditions encountered during regular life.
9. There is pride in learning new skills or enhancing/extending your current outdoor skills.
10. One gets to practice snowshoeing and XC skiing skills.
11. Winter camping provides solitude and a feeling of exploration; even heavily traveled trails can seem like virgin territory when covered by a fresh blanket of snow.
12. There is little competition from other campers. Camping sites that are overly popular during summer months are rarely visited or usually only visited by day hikers.
13. There are no bugs, varmints or bears.
14. One can justify eating excessive amounts of snacks and chocolate for energy.
15. It is a great way to de-compress. As stated by Bill Bryson "Life takes on a neat simplicity, too. Time ceases to have any meaning. When it is dark, you go to bed, and when it is light

again you get up, and everything in between is just in between. It's quite wonderful, really."<sup>1</sup>

Over 80% of the planet's biosphere never gets above 41 degrees. Living in the northern latitudes winters can seem long. One's activity level can drop and outdoor exercise can be hard to achieve. You can move, complain about the conditions, or adapt to them. By embracing the winter camping experience you can add to your enjoyment of the winter season and gain a greater appreciation of the natural environment.

Finally, no one wants to admit it, but one advantage of winter camping is that you're doing something abnormal. When the gang at the water cooler asks how your weekend was you will have a unique story.

I heard of the winter camping experience described on a quarter system where 25% of the participants hate it, 50% of participants are ambivalent about it, and the other 25% love it. By sharing knowledge gained through my winter camping experiences I hope you are in the last quadrant.

## 1.2 WHEN IS IT "WINTER CAMPING"?

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Winter is associated with migration, hibernation, changes in animal behavior, plants becoming dormant, and humans experiencing special health concerns ranging from hypothermia to seasonal depression. Winter even invokes its own special vocabularies to describe the conditions (e.g. black ice, whiteouts, and corn snow).

Descriptions of winter camping depend on geographic location, opportunities to go camping and desire to impress your friends and relatives. There are groups from northern Canada to the Ozarks that claim winter camping experience; although I am sure their conditions and experiences are greatly different.

How you define winter camping might depend on your definition of 'winter'.

Meteorological or thermological winter is defined as the three month period associated with the coldest average temperatures so the start of meteorological winter can change depending on how far north one lives. This corresponds to the months of December, January and February in the Northern Hemisphere and June, July and August in the Southern Hemisphere.

Astronomically, winter can be defined as beginning on the winter solstice, the day of the year which has fewest hours of daylight, and ending on the following equinox. In the USA this defines winter as roughly beginning December 21 or 22 and ending about March 20 or 21.

The organization with perhaps the most winter camping experience, or at least the most participants, the Boys Scouts of America, define cold weather camping as taking place when the temperature is below 50F and involves cold, wet and/or windy conditions.

Many view permanent snow cover and/or ice as a critical aspect of winter camping, requiring cross-country skis or snowshoes to traverse the winter landscape.

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<sup>1</sup> Bill Bryson - A Walk in the Woods

One might decide that winter camping is camping which requires specialized cold weather gear such as snow shovels, white gas stoves, crampons, insulated clothing and four season tents and/or require specialized skills such as building snow shelters.

Regardless of your location, most agree that nighttime dominates the winter season and lower temperatures are part of the equation. Dealing with the weather, cold temperatures and inclement conditions challenge a winter camper's physical comfort.

Winter camping has been described to me as a time when one switched from "camping to enable hiking to hiking to enable camping."

Regardless of the definition you chose, winter camping provides an opportunity to be out of doors 24 hours a day. Winter camping is not an end in itself; it is merely the vehicle that allows us to enjoy being outside.

Everyone fears being cold. I dislike being cold just as much as the next person and so I take care to prevent that from happening. When winter camping is done right you won't be cold. So let's learn more and get into it.

### 1.3 ACKNOWLEDGEMENTS

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This book is the outcome of an association with WinterCampers.com; a casual group of adults who practice and enjoy winter camping. The WinterCampers.com group claims it's origin from a January 1995 overnight camping trip in New York State's Adirondack Park Johns Pond taken by Matthew Hay and Jim Muller. Although we had experienced summer time and some winter camping prior to this event; this event launched the practice of frequent and regular cold weather camping trips with the intent of broadening our winter camping experience and introducing other participants to the pleasures of winter camping.

This winter camping group endorses and strives to achieve the following principles:

- **The "Jamboree Spirit".** This is a mutation of the Boy Scout theme to encompass the notion of teamwork and individual sacrifice for the good of the team experience.
- **Leave No Trace (LNT).** We strive to employ the seven principles of LNT: We endorse acquiring LNT Trainer and/or Master Educator Training.
- **The "6 P's" – (Prior Preparation Prevents Piss Poor Performance).** Winter camping deserves to be taken seriously to avoid unpleasanties.
- **"It's the journey, not the destination".** We strive to enjoy our time in the backcountry. Robert Louis Stevenson said 'It is better to travel hopefully than arrive'.<sup>2</sup> Stevenson was expressing the same idea as a Taoist saying – "The journey is the reward" indicating how hope can be pleasant in itself. Robert Louis Stevenson's famous quip from Travels With a Donkey — "I travel not to go anywhere, but to go" embodies this spirit.

The credo; 'It's the journey, not the destination'; was expressed during a trip to Peaked Mountain in New York State's Adirondack Park. The Peaked Mountain trail is an easy 2.5 miles and leads through a pretty mixed hardware and coniferous forest. The summit of

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<sup>2</sup> Virginibus Puerisque, 1881

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Peaked Mountain is at 2,919 feet and the last third of a mile is rough climbing to ascend the last 600 feet. This last part of the ascent can be slippery depending upon snow and ice conditions. The spectacular views from the summit include Peaked Mountain Pond and Big and Little Thirteenth Lakes. There are also views of the Adirondack High Peaks to the north. During one of our trips to Peaked Mountain we got a late start and did not reach the ascent, but enjoyed an excellent overnight camping trip none the less. It was at this point that we started to focus on the winter camping experience and less on recording the accomplishment.

- **Celebrate the winter camping experience.** The objective is to improve our winter camping practices, comfort and enjoyment or conversely, “Experience can be what you get when you don’t get what you want.”<sup>3</sup>

Through an association with WinterCampers.com I have enjoyed many winter camping trips and decided to share these experiences and the knowledge gained through this Guide to Winter Camping.

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<sup>3</sup> Dan Stanford





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IT'S THE JOURNEY, NOT THE DESTINATION.

**Be prepared.** Research books, internet web sites, discussion boards and blogs devoted to winter camping for tips and recommendations. There are a number of resources that one can read to get "How-To" advice to help get you started winter camping or just pick up some additional tips.



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#### WINTER CAMPING REQUIRES ADVANCED PLANNING

Online resources include websites such as [WinterCampers.com](http://www.WinterCampers.com)<sup>4</sup>, Princeton's [Outdoor Action Guide to Winter Camping](http://www.princeton.edu/~oa/winter/wintcamp.shtml)<sup>5</sup> and [WinterTrekking.com](http://www.wintertrekking.com/)<sup>6</sup>.

Books include:

- *Allen & Mike's Really Cool Backcountry Ski Book*, Allen O'Bannon
- *Backcountry Skier*, Jean Vives
- *Hypothermia, Frostbite, and Other Cold Injuries: Prevention, Recognition and Pre-Hospital Treatment*, James A. Wilkerson
- *NOLS Winter Camping*, Buck Tilton
- *Okpik: Cold-Weather Camping*
- *Paradise Below Zero: The Classic Guide to Winter Camping*, Calvin Rutstrum
- *Secrets of Warmth for Comfort or Survival*, Hal Weiss
- *Snow Caves for Fun and Survival*, Ernest Wilkinson

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<sup>4</sup> <http://www.WinterCampers.com>

<sup>5</sup> <http://www.princeton.edu/~oa/winter/wintcamp.shtml>

<sup>6</sup> <http://www.wintertrekking.com/>

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- *Snow Walker's Companion: Winter Camping Skills for the North*, Garrett & Alexandra Conover
- *Surviving Cold Weather: Simply Survival*, Gregory J. Davenport
- *The Complete Guide to Cross-Country Ski Preparation*, Nat Brown
- *The Outward Bound Staying Warm in the Outdoors Handbook*, Glenn Randall
- *Winter Backpacking: A Guide to Warm and Safe Winter Camping and Day Trips*, Ben Shillington
- *Winter Camping*, 2nd, Stephen Gorman
- *Winter Hiking & Camping: Managing Cold for Comfort & Safety*, Michael L. Lanza

Make sure your preparation includes a contingency plan to bail out if weather conditions turn extreme or someone is injured.

**Borrow, rent or improvise gear for your initial trips.** Winter camping can be gear intensive. Snowshoes, sleeping bags, down booties, and extra clothing can be expensive – especially if they are only used once. If you can't borrow gear, improvise; use two summer sleeping bags instead of an expensive down winter bag. Quality gear tends to last for years so you want to make the right decision when you buy or can be stuck with something you don't like or need for a very long time.



WINTER CAMPING CAN BE GEAR INTENSIVE

**Start by extending your camping season.** Winter camping in late March or early April still provides snow, but temperatures are moderate and there is more daylight.

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SPRING PROVIDES MODERATE CONDITIONS.

**Take extended day hikes and prepare a meal.** This is a great way to introduce kids and novices to winter camping and to acquire initial skills without worrying about sleeping over-night in cold temperatures. An extension of this philosophy is to try a hut-to-hut excursion.



DAY TRIPS ARE A GOOD WAY TO INTRODUCE KIDS AND NOVICES TO WINTER CONDITIONS.



**Join experienced friends and/or hiking organizations to learn winter camping skills.** There is no shame in learning from veterans and most experienced winter campers will love sharing their insights.

- Search the internet for local outing clubs, online forums, and environmental organizations. There are national organizations with local chapters (think NOLS<sup>7</sup> or Boys Scouts), regional clubs such as Appalachian Mountain Club<sup>8</sup> and local 'tramp and trail' groups. Most colleges sponsor an outing club and can help provide gear.
- Ask sales representatives at a business that caters to outdoor recreation (e.g. REI, LL Bean, Gander Mountain, Cabelas). They often host workshops and clinics.
- Attend a winter camping workshop such as Winter Camping Symposium<sup>9</sup> or Winter Camping Rendezvous<sup>10</sup> or a Okpik Winter Camping Training Course offered by the Boys Scouts.
- Engage a commercial guide service either through a certification service (i.e. NYS Outdoor Guide Association<sup>11</sup>) or directly with a commercial firm.

You can also use these contacts as a source to borrow your initial gear.

**Keep it close.** You only need to be outside in the woods, you don't need to go very far in the winter to escape civilization. The closeness of your home or vehicle gives you a bail-out option if things go badly.

**Take the 10 essentials.** No matter what the situation, there are essential items that need be included to ensure your comfort and survival – the famous 10 essentials. The 10 essentials include navigation aids, a light source, extra food and water, extra clothes, protection from the sun, 1st aid kit, a knife or multi-purpose tool, and fire making tools. The 10 essentials are important enough to warrant a separate discussion later in the book.

Consider tailoring your list of essential items depending upon your situation. For example, if you are taking a novice or a child and have the space think of including some chemical hand warmers. Chemical warmers can make a big difference to little hands and feet especially when falling asleep at night.

**Consider a sled.** If the trip is short and level you can bring additional gear by towing a sled. This lets you start with heavy gear and transition to lighter gear as you get more serious. If you don't have lightweight down booties you can add your Sorel Pac boots to the sled and ensure warm feet in camp. A later section presents 'sled' options including toboggans, sleds and pulks.

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<sup>7</sup> <http://www.nols.edu>

<sup>8</sup> <http://www.outdoors.org/>

<sup>9</sup> <http://www.wintercampingsymposium.com/>

<sup>10</sup> <http://www.wintercampingrendezvous.com/>

<sup>11</sup> <http://www.nysoga.org/>

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A SLED MAY BE SUITABLE FOR TOWING YOUR WINTER CAMPING GEAR.

**Go, apply your lessons learned and go again.** Use a checklist, such as the one included in this book, to plan your first trip and help ensure you aren't forgetting a vital item. On the ride back home from your winter camping trip discuss 'lessons learned' with your camping partners. What equipment would you alter or leave home next time? Were there items you wish you had included? What would you do differently? Document these in your checklist to help smooth out your next trip and help you winnow out little used, nonessential items.

### **3 LEAVE NO TRACE (LNT) FOR WINTER CAMPERS**

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Winter back country use has increased 27% in national parks over the past ten years, while summer use has only increased 7%.<sup>12</sup> As more people experience outdoor recreational opportunities Leave No Trace guidelines become more important. Leave No Trace is a set of ethical and sustainable practices which promote environmental sustainability and conservation of natural resources. LNT practices make people more concerned about their environment and help them protect it for future generations. Leave No Trace helps one to better understand and appreciate nature and strengthens respect toward the environment. One person with thoughtless behavior can spoil the outdoor experience for others in the future.

Winter is a wonderful time to experience the back country. Many find that winter offers solitude, scenic beauty, and a chance to hone back country skills. With winter use on the rise, users and land managers are beginning to witness more winter recreation-related impacts such as user conflicts, inappropriate human waste disposal, vegetation damage and significant impacts on wildlife. As a growing number of skiers, snowboarders, snowshoers, and telemarkers venture out in winter for day or overnight trips, the need to practice Leave No Trace winter techniques is greater than ever.

Fortunately, many of the usual concerns about the impacts of three-season back country use are of little concern in winter. Although growing, the visitor numbers are significantly lower than those of other seasons, and in northern latitudes the soil and vegetation are covered with a thick covering of snow which greatly minimizes impacts. Leave No Trace winter use principles help to ensure protection of resources and the quality of winter experiences for future users.

The following seven tenets are taken from LNT and adapted for winter camping conditions.

#### **3.1 PLAN AHEAD AND PREPARE**

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Planning ahead and preparing starts with knowledge of the area you are traveling in and what to expect. Check avalanche and weather reports prior to departure. Always consult maps and local authorities about high danger areas, safety information, and regulations for the area you plan to visit. Be prepared for extreme weather, hazards and emergencies. Monitor snow conditions frequently. Carry and be ready to use an avalanche beacon, a snow probe and shovel. Educate yourself by taking a winter backcountry travel course.

Know how to use a map and compass to eliminate the need for tree markings, rock cairns or flagging to mark your route. Visit the backcountry in small groups, but never alone. Leave your itinerary with family or friends.

#### **3.2 TRAVEL AND CAMP ON SAFE, DURABLE SURFACES**

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The concept of durability is an important one for back country travelers to understand. Natural surfaces respond differently to backcountry travel. Durability refers to the ability of surfaces to withstand wear or to remain in a stable condition. Snow cover provides a durable surface that protects under lying vegetation and soils from damage.

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##### **3.2.1 TRAVELING ON A DURABLE SURFACE**

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<sup>12</sup> [http://www.lnt.org/mediaCenter/tracker\\_archives/Tracker03Winter.pdf](http://www.lnt.org/mediaCenter/tracker_archives/Tracker03Winter.pdf)

The effect of travel across ice and snow is temporary, making snow and ice good choices for travel assuming good safety precautions are followed and the snow layer is of sufficient depth to prevent vegetation damage. Snow deeper than 6 inches adequately protects underlying vegetation from trampling. Thus, nearly any surface covered by enough snow is considered “durable”. The impact of traveling and/or camping on snow is temporary- usually erased by the next snowfall or melt.

The goal of back country travel is to move through the back country while avoiding damage to the land. Land management agencies typically construct trails in back country areas to provide identifiable routes that concentrate foot traffic. The constructed trails are themselves an impact on the land; however, they are a necessary response to the fact that people travel in the back country. Concentrating travel on trails reduces the likelihood that multiple routes will develop and scar the landscape. It is better to have one well-designed route than many poorly chosen paths. Trail use is recommended whenever possible. Travel on deep snow cover whenever possible. Travel and camp safely away from avalanche paths, cornices, steep slopes and unstable snow.

Avoid traveling close to tree limbs and brush as when these are frozen, they are fragile and can be easily broken. Provide space for other hikers if taking a break along a well used trail. The principles of off-trail travel should be practiced if the decision is made to move off-trail for breaks. Hikers in the same group should periodically stop to rest and talk. Avoid communicating by shouting while hiking as loud noises usually are not welcome in natural areas.

Crampons may be helpful on icy trails, but they damage rock and are quickly worn down from rock. Be prepared to take them on and off as needed or do without.

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### 3.2.2 CAMPING ON DURABLE SURFACES

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Winter camping in remote areas increases the likelihood that you will see few visitors, and have no obvious impacts. Selecting an appropriate campsite is perhaps the most important aspect of low-impact back country use. It requires information, the use of judgment and often involves making trade-offs between minimizing ecological and social impacts.

At camp choose a site with a durable snow surface at a safe, stable site out of view of heavily-traveled routes and trails. In setting up camp, disperse tents, cooking areas and storage of backpacks on durable snow sites. Use removable tent anchors, such as ice axes, ice screws, and poles rather than moving rocks or tying to trees.

### 3.3 DISPOSE OF WASTE PROPERLY

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When packing for your trip, think about reducing litter at the source—before you leave home. Leave excess packaging at home and plan meals to avoid excess leftovers.

Adhere to “Pack It In, Pack It Out” by packing out everything you bring with you – yes, everything. Burying trash and litter in the snow or ground is unacceptable. Pick up all food scraps, wax shavings and pieces of litter. Make it easy by packing plastic bags for people to store trash. Pack out all trash - yours and others. You should pack out all solid human waste. Use toilet paper or wipes sparingly and pack them out.

Keep pollutants out of water sources by camping at least 200 feet (roughly 70 adult steps) removed from lakes and streams. If snow cover is obscuring the landscape it may be necessary to consult your map to estimate underlying water courses.

Inspect your campsite for any trash and evidence of your stay. Dismantle all snow shelters, igloos or wind breaks. Naturalize the area before you leave.

### 3.4 LEAVE WHAT YOU FIND

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You probably have heard the expression “leave only footprints and take only memories”. Leave plants, rocks, animals and historical or cultural artifacts as you find them.

### 3.5 MINIMIZE CAMPFIRE IMPACTS

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Campfires cause lasting impacts in the backcountry. These can be overcome if you carry a lightweight camp stove for cooking. If you have a campfire, use dead downed wood and use existing fire pits. I dislike seeing fire pits where a previous camper has tried to burn an oversized green or wet log and left the charred remains. It is best to keep your fire of a manageable size.

### 3.6 RESPECT WILDLIFE

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Winter is an especially vulnerable time for animals. Observe wildlife from a distance and don't follow or approach them. Never feed wildlife or leave food behind to be eaten. Protect wildlife and your food by storing rations and trash securely.

### 3.7 BE CONSIDERATE OF OTHER VISITORS

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People you encounter in the back country during the winter are there to appreciate their environment and enjoy the solitude. Be respectful of these other campers by sharing the trail and being courteous. On the trail yield to other users and move off the trail. In camp be aware if others are camping nearby and minimize your visual and auditory effects.



## **4 PLANNING A WINTER CAMPING TRIP**

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Roald Amundsen was a Norwegian explorer who led the Antarctic expedition to become the first men to reach the South Pole in December 1911. Explorer Roald Amundsen once said: "adventure is just bad planning." Your winter camping trip shouldn't compare to a polar expedition but poor planning often results in miserable conditions, miserable campers and damage to natural resources. Trip planning is important as it:

- helps to ensure the safety of groups and individuals.
- contributes to accomplishing trip goals safely and enjoyably.
- increases self-confidence and opportunities for learning more about nature.
- prepares for Leave No Trace practices and minimizes resource damage.

When planning a winter camping trip remember that travel through the snow will be much slower than in the summer. Reduce your mileage goal by 50% to 60%. Daylight hours are fewer in the winter, which will also limit hiking time. Even normal camping activities will take longer in cold weather.

Think about when to take your winter camping trip and consider the conditions for your time period:

- November: Moderate temperatures, possible rain, thin snow cover
- December: Short days and long nights, thin snow cover
- January: Good snow cover, long nights, extreme temperatures
- February: Good snow cover, long nights, extreme temperatures
- March: Longer days, milder temperatures, adequate snow
- April: Spotty snow cover, warm temperatures, longer days

### **4.1 PLAN AHEAD AND PREPARE**

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Elements to consider when planning a trip include:

- Identify the goals (expectations) of your trip; is this a 'jamboree' or are members of the group trying to accomplish specific goals such as reaching a specific destination.
- Be honest about the skill and ability of trip participants. Are there members of the group that are winter camping novices or out of shape and if so, how will they be mentored?
- Select appropriate destinations that match the goals, skills, and abilities and plan trip activities to match your goals, skills, and abilities.
- Plan by gaining knowledge of the specific area you plan to visit from land managers, other hikers, maps, and literature. Use trail guides and the internet to perform as much research as possible prior to the trip. A lack of local knowledge can significantly alter a trip if not researched and discovered in advance. Be aware of local factors such as trail closures, shelter closures or removals, seasonal road closures, avalanche dangers, land slides, high water crossings, flash flood warnings, bridge washouts, bridge removals, localized bad weather patterns such as lake effect snowstorms, and/or excessive snow depth.

- Choose your equipment and clothing for comfort and versatility. Ensure you have appropriate gear for the worst-case environment. Use layering of clothes to keep warm and prevent overheating.
- Know the weather forecast in advance
- Understand the terrain you will be traveling. Bring maps and photos along to help locate your journey on the terrain.
- Understand any regulations/restrictions that may apply, including parking.
- Understand and respect private land boundaries
- Anticipate the average hiking speed of group and likely food consumption
- Plan to accommodate the group size. Does the group size meet any specified land management regulations and fit your trip purpose?
- Evaluate your trip upon your return to note lessons learned and changes you will make next time.

You can prepare by:

- Educating yourself on the area you plan to visit. Learn about winter regulations, closures, and weather hazards. In upstate New York, where I live, the DEC Regulations<sup>13</sup>, specifically the DEC State Land Use Regulations, regulate where to camp on State Land. Tents may only be set up at designated sites which have yellow “Camp Here” markers discs with a black tipi, and your tent must be within 15 feet of this disc. Outside of designated sites, tents must be 150 feet from any trails or water. Lean-tos do not count as designated sites, so tents must be 150 feet from any lean-tos or trails leading to lean-tos as well. Designated sites have a marker disc, so if there is a fire ring but not a disc, the campsite is not a legal one (unless it follows the 150 foot rule). Obviously, you can’t camp at any site that has a “No Camping” disc.
- Taking a winter back country course to gain experience.
- Expecting extreme weather and gear up for it.
- In mountainous country carry an avalanche beacon, probe, and shovel.
- Planning a route appropriate for the experience level, size, and goals of your group. In the Adirondack Park one can contact the NYS DEC at (518) 897-1200 to determine trail conditions in the area you plan to visit. Adirondack Trail Information can also be found on the DEC web site<sup>14</sup>. The web pages provide general information and seasonal conditions, specific notices on closures and other situations involving trails, roads, foot bridges, etc., and links to rules & regulations, hiker and camper safety, low impact recreation, weather and more.
- Leaving your excursion plans with two people, including your expected return time. They can begin a rescue if you do not return in reasonable time and will know where to start looking for you.
- Learning to use a map and compass for navigation as trail markings may be hidden in snow and recognizing that batteries in GPS units may not work in cold temperatures.

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<sup>13</sup> <http://www.dec.ny.gov/regulations/regulations.html>

<sup>14</sup> [www.dec.ny.gov/outdoor/7865.html](http://www.dec.ny.gov/outdoor/7865.html)

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- Realizing that night falls early. You will have much less time to travel and set up camp, so plan accordingly and understand that everything takes longer in cold weather.

## 4.2 WEATHER PLANNING

NOAA's National Operational Hydrological Remote Sensing Center has an Interactive Snow Information Map<sup>15</sup> for the US. It is a great mapping tool for analyzing snow cover. The map is highly configurable. You can re-center the map anywhere in the US. One can map Hourly Snow Analysis, Driving Conditions, and Daily Snow Analysis. You can look at historical data. One can select overlays to be plotted such as Hydrologic, Political, Point or Transportation features for reference purposes.



NOAA'S INTERACTIVE SNOW INFORMATION MAP IS A USEFUL PLANNING TOOL

## 4.3 CALCULATING DAYLIGHT

The distance you can cover in a day is a function of the terrain, snow conditions, your physical condition and the number of hours of daylight available at a given time of year. This is an especially important consideration in the winter when there are so few hours of daylight. Remember that twilight will be reduced by cloud cover and local relief. Hiking with LED headlamps is possible but risky and who wants to set up camp and cook in the dark?

You can determine the number of hours of daylight by using one of these sites:

<sup>15</sup> <http://www.noahsc.noaa.gov/interactive/html/map.html>

- [SunCalc](#)<sup>16</sup> is an application that shows sun movement and sunlight phases during the given day at the given location. You can see sun positions at sunrise, specified time and sunset. The thin orange curve is the current sun trajectory, and the yellow area around is the variation of sun trajectories during the year. The closer a point is to the center, the higher is the sun above the horizon. The colors on the time slider above show sunlight coverage during the day.
- The US Naval Observatory provides [complete sun and moon data for one day](#)<sup>17</sup>.

Knowing this information not only increases your safety factor, but will also add to your enjoyment of the trip.

#### 4.4 GROUP SIZE

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Thoreau said “The man who goes alone can start today; but he who travels with another must wait till that other is ready, and it may be a long time before they get off.”<sup>18</sup> Thoreau knew the dynamics of groups, but winter camping is more fun and a lot safer in group. When choosing your group try to select members that will be compatible with one another and have similar expectations and goals. Don’t go winter camping alone but try for a small group to minimize human impact and keep the group operating efficiently.

A group size of more than eight becomes unwieldy and creates an impact on the environment. A group of four allows one to stay with an injured person and two to go for help. A small group allows for specialties to emerge. One person might set the tent while others cut fire wood, make a warm drink, or begin cooking.

#### 4.5 HOW FAR CAN I SNOWSHOE/SKI?

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Four miles an hour is considered a good, solid walking pace by a fit hiker on a dry, smooth, level trail. Two miles an hour on a trail with moderate elevation gain is a respectable hiking pace. It is commonly assumed that a fit snowshoer who is used to his or her equipment will go 25 percent slower than a hiker on bare ground under the best conditions, which is to say snow that is hard packed and fast.

Elements affecting your pace include:

- Soft and/or deep snow will slow the rate of speed and require more effort
- A heavy backpack or pulk will make traveling slower
- Breaking trail requires more effort than following a packed trail
- As the size of the group increases generally the slower the group, as a whole, will travel
- Mental attitude. Is this a goal driven group or more interested in taking pictures and chatting?

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<sup>16</sup> <http://www.suncalc.net/#/44.1126,-73.9235,13/2013.10.30/15:01>

<sup>17</sup> [http://aa.usno.navy.mil/data/docs/RS\\_OneDay.php](http://aa.usno.navy.mil/data/docs/RS_OneDay.php)

<sup>18</sup> <http://en.wikiquote.org/wiki/Walden>

- Your physical condition will be a major factor in determining how fast and far you travel, as well, as how much you enjoy the activity.

The upshot to all these variables is: Don't be disappointed if you are only hiking 1.5 to 2 miles an hour on snowshoes and plan your itinerary accordingly. Depending on the range of conditions a 6 or 7 mile tour could easily take the better part of a day. Underestimating your snowshoeing pace is wiser than overestimating it until you've been out a few times and know how accurate your estimates are.

#### 4.6 WHEN TO TURN BACK

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You're headed to the summit of a mountain, or you have barely started a long planned journey. The weather is turning bad, you are not covering ground at the pace you envisioned, trails are obscured with snow and one or more members of your group are lagging behind. Do you keep pushing or do you quit and make camp or go home?

You need to assess the situation and to know when to push forward or to turn back that sets apart the risk takers and the more patient goal conquerors. Once in a while taking a risk is worth it, but more often than not that risk can turn into a bad situation fast.

This situation assessment will involve:

- Define the scope (i.e. weather, people, trail conditions, terrain, equipment, health/condition, mental attitude ) to be included in the assessment.
- Inventory the current state and condition of people and environment included in the scope
  - Will I worsen the situation if I continue as is?
  - Are we properly outfitted for the current and future situation?
  - How much daylight is left?
  - How much food and water do I have?
- Identify the trends in conditions, the issues affecting the group and the environment, the underlying factors creating the issues and your response
- Identify the major significant issues requiring immediate attention.

This will provide a baseline against which to monitor and measure change. In dire conditions situation assessment is performed continually to provide identification of trends and changes.

Turning back after investing time and energy into a trip can be very demoralizing at the moment, but in the long run it is the best decision. Stopping or down-scaling your trip should not be looked at as a failure, but as an opportunity to learn and change for your next trip.

#### 4.7 TRIP NOTIFICATION

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A critical component of your trip plan is notifying others where you will be going and when you will return. The search and rescue volunteer association of Canada has an excellent trip notification form<sup>19</sup> you can download and print that has all the information a search team wants if

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<sup>19</sup> <http://sarvac.ca/Survival/TripPlans/tabid/182/language/en-US/Default.aspx>

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they have to come looking for you. You can adapt the forms to leave your information with family, friends, and/or in your car.



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MY OUTDOOR ACTIVITY PLANS AND EQUIPMENT / SUPPLIES		I HAD THE TEN ESSENTIALS AND SURVIVED!		CODE OF RESPONSIBILITY FOR OUTDOOR ACTIVITIES.																																																	
<p>Complete this form prior to an outdoor adventure and leave it with a responsible person. Your life may depend on it!</p> <p><b>Start:</b></p> <p>Day of Week: _____ Date: _____ Month: _____ Year: _____</p> <p><b>Intended Return:</b></p> <p>Day of Week: _____ Date: _____ Month: _____ Year: _____</p> <p><b>Purpose of Trip:</b></p> <table border="0"> <tr> <td><input type="checkbox"/> Day Hike</td> <td><input type="checkbox"/> 1/2 Day Hike</td> </tr> <tr> <td><input type="checkbox"/> Overnight Hike</td> <td><input type="checkbox"/> Climbing</td> </tr> <tr> <td><input type="checkbox"/> Fishing</td> <td><input type="checkbox"/> Hunting</td> </tr> <tr> <td><input type="checkbox"/> Skiing</td> <td><input type="checkbox"/> Snowmobiling</td> </tr> <tr> <td><input type="checkbox"/> Canoeing/Kayaking</td> <td><input type="checkbox"/> Mushroom Picking</td> </tr> <tr> <td colspan="2"><input type="checkbox"/> Other: _____</td> </tr> </table> <p><b>Route Plan A</b></p> <p>Specific Area: _____</p> <p>Intended Route in (be specific): _____</p> <p>Intended Route out (be specific): _____</p> <p>Destination: _____</p>		<input type="checkbox"/> Day Hike	<input type="checkbox"/> 1/2 Day Hike	<input type="checkbox"/> Overnight Hike	<input type="checkbox"/> Climbing	<input type="checkbox"/> Fishing	<input type="checkbox"/> Hunting	<input type="checkbox"/> Skiing	<input type="checkbox"/> Snowmobiling	<input type="checkbox"/> Canoeing/Kayaking	<input type="checkbox"/> Mushroom Picking	<input type="checkbox"/> Other: _____		<p><b>Route Plan B – Alternate</b></p> <p>Specific Area: _____</p> <p>Intended Route in (be specific): _____</p> <p>Intended Route out (be specific): _____</p> <p>Destination: _____</p> <p>Transportation to and from the starting point:</p> <p>Vehicle License No: _____</p> <p>Make/Model: _____ Colour: _____</p> <p>Owner: _____</p> <p>or dropped off at starting point by:</p> <p>Name: _____ Phone: _____</p> <p>To be picked up at end point by:</p> <p>Name: _____ Phone: _____</p> <p>Title: _____ Date: _____</p> <p>Location: _____</p> <p><b>Equipment/Supplies taken:</b></p> <table border="0"> <tr> <td><input type="checkbox"/> Backpack</td> <td><input type="checkbox"/> Water</td> <td><input type="checkbox"/> Firestarter</td> </tr> <tr> <td><input type="checkbox"/> First Aid Kit</td> <td><input type="checkbox"/> Flashlight</td> <td><input type="checkbox"/> Avalanche beacon</td> </tr> <tr> <td><input type="checkbox"/> Whistle</td> <td><input type="checkbox"/> Snowshoes</td> <td><input type="checkbox"/> Shovel</td> </tr> <tr> <td><input type="checkbox"/> Sled</td> <td><input type="checkbox"/> Extra Clothing</td> <td><input type="checkbox"/> Sun Protection</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> Tent (season)</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> Food (days per person): _____</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> Radio (frequency/channel): _____</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> Signalling Device: _____</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> Personal Locator Beacon (PLB): _____</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> Cellular Phone No: _____</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> Firearms: _____</td> </tr> <tr> <td colspan="3"><input type="checkbox"/> RV, ATV, Boat, Snowmobile (description): _____</td> </tr> </table>		<input type="checkbox"/> Backpack	<input type="checkbox"/> Water	<input type="checkbox"/> Firestarter	<input type="checkbox"/> First Aid Kit	<input type="checkbox"/> Flashlight	<input type="checkbox"/> Avalanche beacon	<input type="checkbox"/> Whistle	<input type="checkbox"/> Snowshoes	<input type="checkbox"/> Shovel	<input type="checkbox"/> Sled	<input type="checkbox"/> Extra Clothing	<input type="checkbox"/> Sun Protection	<input type="checkbox"/> Tent (season)			<input type="checkbox"/> Food (days per person): _____			<input type="checkbox"/> Radio (frequency/channel): _____			<input type="checkbox"/> Signalling Device: _____			<input type="checkbox"/> Personal Locator Beacon (PLB): _____			<input type="checkbox"/> Cellular Phone No: _____			<input type="checkbox"/> Firearms: _____			<input type="checkbox"/> RV, ATV, Boat, Snowmobile (description): _____			<p>Are you prepared and equipped to spend the night outdoors if you get lost?</p> <p>Enjoy the outdoors – Safely "It's your responsibility"</p> <p>Many people who have an outdoor misadventure quickly point out that having and using the 10 essentials allowed them to survive!</p> <ol style="list-style-type: none"> <li>1. Flashlight, spare batteries and bulb</li> <li>2. Firemaking kit – waterproof matches/lighter, firestarter/candle</li> <li>3. Signalling device – whistle or mirror to signal searchers if you become lost</li> <li>4. Extra food and water – 1 liter/person</li> <li>5. Extra clothing (rain, wind, water protection and toque)</li> <li>6. Navigational/Communication Aids (maps, compass, GPS, charts, cellular phone, hand held radio – fully charged) know how to use these items</li> <li>7. First Aid Kit and know how to use it</li> <li>8. Emergency shelter – orange tarp or large orange garbage bag. These can also be used as signalling devices</li> <li>9. Pocket knife</li> <li>10. Sun protection (glasses, sunscreen, hat)</li> </ol> <p>Each year in British Columbia there are approximately 1,000 incidents involving outdoor recreation that require the services of search and rescue. As a result of these incidents there are over 200 persons injured and over 20 deaths.</p> <p>There are 31 Ground Search and Rescue teams made from 4,200 volunteers supported by the Provincial Emergency Programs as part of the Public Safety Lifeline Volunteer Services. These dedicated volunteers are trained in Ground Search and Rescue, Swift Water Rescue, Rope Rescue, Tracking, Avalanche Response and Mountain Rescue.</p> <p>If you require assistance from one of these teams contact the police in the area.</p> <p><b>AdventureSmart</b> Get informed &amp; go outdoors!</p>	
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SARVAC TRIP PLAN FORM

### AVOID DEATH AND INJURY IN OUTDOOR RECREATION

Too often people realize too late that the outdoor activity they are involved with could lead to injury and/or death!

**Avoid This Situation – Here's How!**

**Adjust your plan when circumstances change**

- Are you prepared when the weather changes?
- What will you do if you run out of daylight?
- What will you do if your partner or other members of your group become ill or injured?

**Prepare for Emergencies**

- Will you stay warm and dry no matter what happens?
- Are your ten (10) essentials and other necessary equipment in good working order?
- Have you practiced using all your equipment?

**Have you:**

- checked the weather?
- told someone where you're going?

**Do you:**

- know what to do if you get lost?

The most common mistake  
"It could never happen to me."

### OUTDOOR TRAVEL TIPS

- Be prepared for your chosen recreation** – being fit enough to go the distance takes physical preparation. Stick to your turnaround time. Take the proper equipment, have a trip plan and use reference and guide books.
- Always carry the essentials** – if necessary, be ready to stay out overnight.
- Complete a trip plan and leave it with a friend** – the trip plan explains your destination, the route you are taking, who is in the group and your return time. If you do not return as planned, the friend you left the trip plan with can give the time to the police to initiate a search.
- Never hike alone** – hike with a group and keep together. Travel at the speed of the slowest person. If a person becomes separated by going ahead or falling behind, they are more likely to become lost.
- Do not panic** – maintain a positive mental attitude if you become lost. Being lost is not dangerous if you are prepared.
- Stay where you are** – people who carry on after they become lost usually get farther from the trail and farther from people who are looking for them. Also, going downhill often leads to natural drainage gullies which typically have very thick brush, expansive cliffs and waterfalls making travel and searching more difficult.
- Use signalling devices** – blowing a whistle, lighting a fire and staying visible will help searchers find you. Help searchers find you even if you are embarrassed or afraid. Remember that animals will not be attracted to your signals. Searchers may also use planes or helicopters – make yourself visible to them.
- Build or seek shelter** – protect yourself from the rain, wind and excessive sun. Be as comfortable as possible, but when it is daylight, make sure you are visible to searchers in helicopters or planes.
- The most common mistake** – an individual's belief that "it could never happen to me" is summed up as EGO. By being prepared, you can enjoy your trip outdoors regardless of what nature throws at you!

**Detach and take this half with you**

### DESCRIPTION OF THIS TRIP'S MEMBERS

	Person 1	Person 2	Person 3	Person 4
Last Name				
First Name				
DOB				
Height				
Weight				
Hair and Skin				
Family Doctor				
Hat Colour				
Coat Colour				
Shirt/Sweater Colour				
Pack Colour				
Pant Colour				
Footwear Type & Size				
Allergies				
Medications				
Emergency Contact				
Map				
Transmitters				
Shovel				
Probes				
Communication				
Navigation				
Survival Training				
First Aid/Certification				
Ability 3(N)				

**The following will be notified if I/we change destination:**

Name:	Address:
Home Phone:	Work Phone:

**Please notify the police if I/we do not return by:**

Date:	Time:
Signature:	Date:

**Detach and leave with a friend**

SARVAC TRIP PLAN FORM



## **5 PACKING FOR YOUR WINTER CAMPING TRIP**

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Winter camping requires greater attention to detail than camping during other seasons. Forgetting an item of clothing, a headlamp or sleeping pad may be unnoticed during the summer, but lead to extreme discomfort during the winter. Lastly, you don't want to be the one who pledged to bring dinner and left it in the refrigerator as you rushed out the door.

To ensure you pack all the essential gear for your winter camping trip try following these suggestions.

Keep your gear organized. If you keep your camping gear organized it is easy to locate items and ensure the right gear is included on the trip. A dedicated area such as a closet or room for your camping gear is ideal. Try to keep items in the same place and easy to locate. I use wire storage racks to stack large boxes which hold stuff sacks, tents and sleeping bags. I use transparent plastic tubs for smaller items such as cordage, headlamps, fire-starter, stoves and cookware. As your collection of gear grows it becomes more important to stay organized.

Keep your gear prepared. Make sure your gear is clean and ready to go. Replenish items that need to be refreshed such as toilet paper, batteries, cooking fuel, hand cleaners, etc. This is most easily done as you finish a trip and have an intimate knowledge of the status of your gear.

Use a checklist. Consult a checklist to ensure you have essential gear. If you pre-print your checklist and store it with your camping gear you are more likely to use it to pack.

Be clear on responsibility for 'shared' gear such as food, stoves, tarps, and/or saws. You can 'make do' if you forget a personal item, but it is much worse if you were responsible for an item shared by others in your group. Check and double check on who is bringing what.

Make a 'last second' list to ensure you don't forget the last minutes items, such as food from the refrigerator, hot tea for your thermos or clothes to be left in the car for your return. Invariably you will want to include items to be grabbed as you are going out the door. As you pack keep a 3x5 index card to jot down last second thoughts.

### **5.1 THE 10 ESSENTIALS**

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Before you take your winter camping trip there are essential items that should be included in your pack to ensure your comfort and survival – the famous 10 Essentials. In the 1930s, the Mountaineers, a Seattle-based hiking, climbing, and conservation organization, came up with a list of 10 essential items that no climber should be without. Many outdoor training schools make use of the 10 essentials to teach outdoor skills and good practices. Since then many 10 essential lists have been published by various groups tailored to suit particular outdoor situations. Regardless of the situation most people agree on the following items.

**1) Map** – Even if you have hiked a particular location in the spring, summer or fall, it will appear completely different in the winter. Bring a map. A map can tell you where you are, how far you have to go, time to get there, amount you have to climb, where to park your car, campsites, water sites, and an emergency route in an accident. If traveling on foot in the back country 7.5 minute USGS quads or 15 minute maps will give you the detail that you are starving for - if you know how to read it!

**2) Compass** – Carry a compass at all times. If you learn to use this tool, and its cousin the topographic map, and you are on your way to finding that never done route to the never visited part of the forest. Don't rely on a GPS unit a replacement. You shouldn't trust your navigation to anything with a battery in the backcountry – especially in cold temperatures.

**3) Flashlight Or Headlamp** – A flashlight or headlamp should be carried at all times. You may need to walk in the dark. A light source can be used to signal for help in a critical situation. Headlamps are more convenient for hands-free operation while hiking or in camp.

**4) Extra Food** – Whenever you are outside have extra food in case you are delayed by bad weather, injuries, getting lost, or getting exhausted. The mountaineers of the 1930's suggested a one-day supply of extra food. Extra food can boost morale, ward off hypothermia, and when things are bad give you much needed energy. In the winter leave the low carb food at home, that's for another time and place. Options include energy bars, hard candy or chocolate.

**5) Extra Clothes** – You need to have extra clothes to deal with a wide range of weather conditions. A down vest and/or hard shell take up little in your pack, but can provide critical warmth when the conditions get really bad or you have to spend an extra night on the mountain.

**6) Sunglasses And Sun Screen** – Ever have snow blindness and sunburn at the same time? Ultraviolet (UV) rays from the sun reflecting off the snow can cause a painful eye condition called photokeratitis or ultraviolet keratitis. This sunburn of the cornea and conjunctiva is not usually noticed until several hours after exposure. Symptoms include tearing, pain, redness, swollen eyelids, headache, a gritty feeling in the eyes, halos around lights, hazy vision, and temporary loss of vision. Prevention is as simple as wearing eye protection that blocks most of the ultraviolet radiation.

**7) First Aid Kit** – Prepackaged first aid kits designed just for hikers are a great item to have. These packages contain band-aids, bandages, basic medicines, and many other items. Of course, if you don't know how to use it, it won't be of much use. Take a wilderness first aid course to learn how to deal with injuries and sickness in the backcountry. Wilderness first aid is the specific discipline of First aid which relates to care in remote areas, where emergency medical services will be difficult to obtain and/or rapid transport is not readily available.

**8) Pocket Knife Or Multi Purpose Tool** – A knife will allow you to perform various tasks in the back country such as cutting bandages, removing splinters, punching holes in tarps, cutting rope, or making kindling.

**9) Fire Starter And Matches** – Fire is warmth and warmth is good when you are cold. Fire also serves as a good signal to others when you are lost. A basic fire starter is useful for starting a fire in emergency situations and for getting wet wood blazing. A fire starter can consist of a chemically-treated fire stick, candles, melted paraffin and newspaper, waxed cardboard, dryer lint, wood shavings, or hundreds of other materials. In addition to the fire starter carry at least two methods for starting a fire: matches, lighter and/or a flint and steel. These will be essential in starting your fire starter when conditions are cold, wet and harsh.

**10) Water And A Way To Purify It** – Without water your body will weaken and your muscles and organs just won't be able to function. Water also fends off hypothermia and altitude sickness. Iodine tablets or good stove to melt or boil water can help solve the problem.

The table below depicts the difference between three lists: the list described above, Wired Magazine's list of 10 Essential Outdoor Survival Items<sup>20</sup> and a list from Gotta Go-It Snows<sup>21</sup>.

<b>WinterCampers.com</b>	<b>Wired Magazine</b>	<b>Gotta Go – It Snows: Daypack List</b>
Map		
Compass		
Flashlight or Headlamp	Flashlight	
Extra Food	High Calorie Protein Bars	Food
Extra clothes		Extra Clothes
Sunglasses & sun screen		
1 <sup>st</sup> Aid Kit	1 <sup>st</sup> Aid Kit	
Pocket Knife or Multi-tool	Knife	Multi-purpose Tool
Fire Starter and matches	Butane Lighter & Tinder	Three Pocket Lighters
Water and a way to purify it	Water purification supplies	
	whistle	Light Weight Wood Stove
	Plastic Trash Bag	Camp Saw
	Backpacker Hammock	Tarp
	Metal cup or can	Light Weight Cooking Pot
		String

Once you have assembled your ten essentials try to keep them together in an easy to grab kit. I keep components of the ten essentials together with my toilet bag and first aid kit. It goes on every hike or winter camping adventure.

## **5.2 SPECIALIZED WINTER CAMPING GEAR**

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In addition to the 10 essentials and your normal camping gear there are pieces of gear that are difference-makers when winter camping.

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### **5.2.1 HEADLAMP**

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I consider a headlamp a crucial item for winter camping over all types of other lights; flashlights, a lantern or using a flashlight app on your cell phone. Benefits of headlamps are that they are:

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<sup>20</sup> <http://www.wired.com/wiredscience/2008/03/top-10-survival/>

<sup>21</sup> <http://www.gottagoitsnows.com/snowshoeing/004.html>

- Hands-free — the ability to use both hands is a major advantage over a flashlight, and for certain activities like cooking meals after dark, hands-free is an imperative. You can't beat the hands-free lighting convenience offered by a headlamp always pointing where you're looking.
- Beam Distance. Most of the headlamps offer a spotlight mode capable of casting an impressively long beam. This can be a big asset for finding things in the dark, such as the poorly marked trail back to your car or campsite.
- Compact and Lightweight. Headlamps are easy to fit in your pack, and the lightest weigh less than an ounce.
- Durable. Many of the higher quality lights are built tough, offering water resistance sufficient to operate in sustained rain storms and some are waterproof to one meter depth. This makes them particularly attractive for those going into the backcountry where weather tends to be unpredictable.

What sets one headlamp apart from another? Criteria you might want to consider include:

- Light output in terms of lumens or how intensely the light shines. An average headlamp will output between 20-90 lumens. The power consumed by the LED light is measured in watt (W). Both Lumen and watt will affect the type of beam the headlamp outputs versus how much battery power it will consume. For example, a 3W headlamp would output an average of 100–150 lumens, but the higher the lumens output, the more drain on the battery.
- Beam distance in terms of how far the light actually goes.
- Light bulbs. Almost all modern headlamps have LED bulbs. LEDs are basically a light bulb without a filament to burn out, and since they are very efficient at creating light without heat loss, they don't get hot. The LEDs longevity is further enhanced by its construction. An unbreakable, crystal clear, solid resin encases each LED and makes it nearly indestructible. The drawback to LEDs is their limited output for projecting light over a great distance. LEDs have an average lifespan of 100,000 hours of continuous or cumulative use, operate on low voltage DC power, and produce no UV light. Light output of LEDs are measured in lumens; energy input to a lamp is measured in watts. The efficiency of a lamp is expressed as lumens per watt.
- LED light colors. Most headlamps come with white lights because they enhance contrast and illuminate objects in a manner that looks natural. If you have a need to preserve your night vision, look for a headlamp that also has red LED lights.
- Battery life length while projecting continuous usable light. Batteries can be expensive, so you might consider rechargeable NiMH batteries or rechargeable lithium batteries, which would be better but more expensive. Headlamps designed to work with lithium batteries are a good choice for cold-weather usage, since lithium batteries outperform alkaline batteries in cold conditions.
- Weight of the total unit (most range between 3-6 oz.). The amount of weight you are willing to tolerate on your head is a personal decision. Keep in mind while winter camping you may be wearing a headlamp for extended hours as you set up camp, gather firewood at night, cook, and hang out during the long dark hours.
- Size of the entire unit including straps.

- Straps. Triple straps insure that the headlamp will not creep down your face during prolonged activity. Also, a triplex strap does not need to be overly tight to stay in place. However, a single strap unit is smaller and lighter.
- Light adjustments or modes. Most headlamps offer at least a high and low mode. Others may offer 3 or more modes, alternately called “brightness levels.” Here’s a breakdown, from the most energy-efficient mode to the least-efficient:
  - Low beam. A power saving mode for general use. Usually a wide or flood scope.
  - High. A good option for situations where you need more light to see long distances. Typically this is also provides a spot or focused beam.
  - Strobe. An emergency blinker.
- Moisture resistance can be important for winter camping situation.
- Tilt. The ability to adjust the light up or down let one position the beam exactly where you want it. This is useful for reading, cooking or illuminating tasks at hand.
- The On/Off Switch may lock to prevent the headlamp from being inadvertently switched on inside a pack. You will want a switch that is glove-friendly and easily cycles through its modes.

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### 5.2.2 WINTER CAMPING REPAIR KIT

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Gear fails more frequently in the cold; plastic buckles crack, fabric gets scorched by an ember, zippers fail due to packed snow or impatient campers, so pack a small repair kit. Items you might consider for your winter camping repair kit could include:

- A multi-tool with pliers and screw driver heads
- Wire ties
- Duct tape
- A pipe clamp for repairing tent poles or fastening two poles together
- Thin, pliable wire
- Extra parachute cord
- Steel wool. If you have a ski binding loose due to a stripped screw, putting steel wool in the same hole as a stripped screw does wonders
- Nylon straps
- A couple of sewing needles of different sizes along with thread and dental floss.

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### 5.2.3 SNOW SHOVEL

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A snow shovel is a useful tool for winter camping in the backcountry. It can be used for a variety of tasks:

- Making snow shelters. A shovel can be indispensable for making a quick emergency shelter or building a quinzee, snow cave or igloo.
- Clearing a tent site. A commonplace use of snow shovel is clearing a level space for your tent when snow camping. You can carve out a windscreen or dig a kitchen area.
- Drinking water. A shovel comes in handy for digging fresh snow to melt for drinking water.



- Avalanche rescue. If you travel or camping in avalanche areas you should carry a shovel for self-rescue.
- Shoveling out your car. Last but not least, when you return to your car after a winter camping trip a shovel is useful for ensuring you can get your car back on the highway.



USING SNOW SHOVELS TO LEVEL A TENT SITE.

Snow shovels are made of aluminum or Lexan® polycarbonate; lexan is favored for lighter weight, while aluminum is used for strength and durability.

Small shovel blades are easier to handle but less efficient at chopping and moving snow while larger blades can move more snow but may weigh more, take more space and require more strength to operate. The shovel blade should fit easily in your backpack or pulk. Some shovel blades are flat others have serrated or pointed blades that help cut through snow and ice. When digging snow pits and making smooth walls the angle of the shovel blade is a factor to consider as a flat blade will help you create a smoother pit wall.

Most backcountry shovels have telescoping or segmented shafts that can be made compact for carrying on your pack. They fit together with spring-loaded buttons that pop into holes in the connecting sections. Typically a shaft may telescope from 16 to 34 inches. Longer handles provide more leverage for digging. Be aware that any extendible shaft can get snow/water inside. When this moisture freezes the small metal spring-loaded connectors sometimes freeze up and have to be cleaned out.

Handles come as either a T-grip or D-grip. The T-grip, which is gripped between the fingers, is lightweight but can be awkward if you're wearing mittens. The D-grip is usually bulkier and slightly heavier, but it is easier to use with mittens.

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#### 5.2.4 VACUUM BOTTLE

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A vacuum bottle enables you to boil water at breakfast and it will still be hot at lunch, and at the mid-afternoon tea. Plus, you can fill it after dinner and have hot water handy in morning.

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#### 5.2.5 A WATER BOTTLE PARKA

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A store bought or home-made foam sleeve for your water bottle. The parka can keep your drink from freezing. They can keep water (or soup, or Tang, or hot chocolate.) quite hot for most of the day, and they weigh a lot less than a vacuum bottle. I think I've converted.

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#### 5.2.6 SUNGLASSES OR GOGGLES

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UV rays can cause sunburned eyes, called snow blindness. Without eye protection, snow blindness can damage the cornea for up to a week.

The winter sun sits lower in the sky, a different angle, than during the summer. Additionally, because snow is reflective, up to 85% of the sun's UV rays are reflected upward, according to the Vision Council of America.

Your sunglasses should sit closer to your face to help shield your eyes from the low-lying sun. You will want to wear close fitting sunglasses or goggles with anti-reflective, polarized lenses to block out 100% of UV radiation. If you can see your eyes through the lens then they aren't giving you protection.

To protect yourself from excess brightness and wind, use sunglasses with side blinders or blinkers. You can either buy 'glacier' glasses or DIY by mounting blinders used by target shooters on the frames of your current sunglasses.

The advantage of full goggles around your eyes and face is to also block the wind. You will be surprised how much warmer you are wearing goggles and hat and/or hood on your head. Play attention to the fit of your goggles to ensure there are no gaps around your cheek bones that will permit your breath to enter and fog the lenses.

The disadvantage of wearing full goggles or sunglasses with side blinders is fog. If your warm moist breath is directed upwards on to the back of the lenses they fog up and the fog will freeze; making it difficult to get them cleaned off. Anti-fog concoctions, commonly used for snorkel masks, only work in milder temperatures.

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#### 5.2.7 LIGHTENING YOUR LOAD

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It may be stating the obvious but the ultralight concept just isn't a option for winter camping conditions. I can't imagine anyone venturing out with an uber-light pack and expecting to have a safe and enjoyable experience. You need extra insulation and food especially if you are going to spend more than one night out.

That said there are reasons to try to lighten your load. The benefit is a lighter pack that makes outdoor travel easier, safer, and more fun. Packing light may offer the aging participant who has to deal with knee, hip and/or back injuries the ability to continue backpacking.

Packing light requires careful planning and self-discipline to assure that every item of gear and clothing is truly necessary, and that each item is as light as possible. To lighten your load start by reducing the weight of the big three: tent, sleeping bag and stove/cookware.

- Tent. Selection of a tent involves making a tradeoff among price, space and weight. Accepting a snug interior and/or paying a higher cost will yield a lighter tent. Aim for a per-person weight of less than 3 pounds. Single wall tents made waterproof/breathable fabrics such as Gore-Tex, Epic or eVent don't require a rain fly and are subsequently lighter than traditional double wall tents. Designed for alpinists they usually do a good job of shedding snow. A typical complaint on single walled tents is moisture and condensation which is best countered by keeping windows and doors open as much as possible to eliminate internal condensation at night.
- Sleeping bag. Try to acquire the lightest and highest quality sleeping bag; this usually means a down sleeping bag.
- Stove/cookware. Winter camping makes it easy to minimize the amount of cookware that you bring on a trip. Melting snow, heating soup and making one pot meals can easily be satisfied by one medium sized cooking pot.

Think about lightening your food supply by substituting freeze dried foods for heavier items.

When packing your gear examine each item and ask yourself if it is necessary or if something else can perform its function. A trick employed by the boy scouts is "The 5 Gallon Challenge"; in which they try to pack their gear in a 5 gallon bucket. Most are able to come close when allowed to have the tent and sleeping bag remain "outside" the bucket. The 5 Gallon Challenge gets one to think about every item they were taking.

After your trip, make a note of the items that can be eliminated or replaced to lighten your load. As you gain experience you will get a better feel for trade-offs in terms of weight, comfort, and functionality. Take care of the ounces and the pounds will take care of themselves.

While this discussion is focused on reducing the weight of your backpack it also applies to the load you might pull on a toboggan, sled or pulk.



## 6 PERSONAL TRANSPORTATION

I recall setting out with two companions on a spring time trip in the hopes of climbing Cat Mountain in the Adirondacks. Day one involved a hike into a lean-to near Cranberry Lake where we left our backpacks. Since there was no snow cover we left our snowshoes as well. However, as the elevation got higher so did the snow and the snowshoe-less trio had to halt our climb. We sat on some lovely rocks in the sun...near...the summit.

Although I preach “it is the journey...not the destination” when winter camping you shouldn’t judge trail conditions by what you see at the trailhead. Higher elevations and local terrain variations can quickly change trail conditions. Winter campers can use snow shoes or skies for traversing the winter landscape. Bring snowshoes or skies even if you have to strap them to the back of your pack; and don’t leave them at the lean-to.

### 6.1 SNOWSHOES OR SKIS

Skis and snowshoes both facilitate travel in deep snow conditions. You can go almost anywhere on snowshoes that you'd go on skis -- just slower. The snowshoes' shorter length helps you fit into small spaces that won't accommodate skis, but snowshoes aren't constructed to control a speedy downhill descent like skis are. Despite their similar applications, traveling by snowshoe and traveling by skis provide distinctly different experiences, and most people quickly form a preference for one mode of travel or the other.

	SNOWSHOES	BACKCOUNTRY SKIS
<b>Athleticism Required</b>	Low. Can you walk?	Medium to high; to achieve skills & exploit the terrain.
<b>Breaking trail</b>	More effort	Less effort
<b>Cost</b>	<\$250; cheaper than backcountry skis and boots and poles.	\$1,000 for a backcountry or alpine ski package; \$500 for a high-end cross-country ski package.
<b>Crossing obstacles</b>	Much easier crossing obstacles like fallen trees	Requires more dexterity and control.
<b>Down Slopes</b>	Controlled	Faster and fun
<b>Fun Factor</b>	Bushwhacking and exploring	Slide and glide!
<b>Getting up from a fall</b>	Easier	Harder
<b>Learning curve</b>	You are likely become a proficient snowshoer faster than a good skier	High learning curve before a person becomes competent
<b>Range</b>	Comparable to hiking.	Most people can travel farther on skis than snowshoes
<b>Snow Depth</b>	The proper snowshoes provide floatation in deep snow.	With deep, new snow cross-country skis can be hard to maneuver
<b>Systems</b>	Mountaineering or recreational	Alpine, backcountry or cross-country skis

<b>Terrain</b>	Snowshoes are easier to use in hilly, brushy or heavily forested areas	Skis will be faster, easier and use less energy on flatter ground, open terrain and/or packed trails.
<b>Up Slopes</b>	Using modern snowshoes with cleats, you can often take a direct route climbing up a hill	Requires "climbing skins" and/or switchback traverses
<b>Use of Poles</b>	Used for balance and for sensing the terrain.	Used for propulsion
<b>Weight</b>	Greater control when carrying a backpack of large size and weight	Large packs require extra attention to balance control

## 6.2 SNOWSHOES

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Colin Fletcher said, “Snowshoes allow you to travel (sweating hard, but sinking less than a foot at every step) across snow into which you would otherwise go on sinking forever if God had not arranged that human legs eventually converge.”<sup>22</sup>.

You get three major advantages from a snowshoe: floatation, traction and stability.

- Floatation is the ability of a snowshoe to limit how far your feet sink down into deep or soft snow. If you have “post holed” in deep snow without snowshoes, you know about floatation.
- Traction distinguishes snowshoes from other winter sport equipment. Snow and ice are slippery, and the metal claw / crampons on the bottom of snowshoes give your feet a grip.
- Stability from the extra width and length of snowshoes helps maintain balance when you encounter surface irregularities.

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<sup>22</sup> The Complete Walker IV, Colin Fletcher



Snowshoe equipment dates to the shoe ski created in Central Asia in 4000 B.C. and has morphed throughout history. American Indians used latticed wood snowshoes, as did French trappers, to traverse in the depths of winter. More than 40 years ago, snowshoes made from synthetic materials came onto the scene – predecessors of the different styles people use today.

Through the ages, snowshoes evolved to meet the environmental needs and intended use of the wearer. For the peat bogs of the Alaska and north woods, a long snowshoe like the Ojibwa and the Alaskan snowshoe were developed to spread the weight over the snow, front to rear. These long snowshoes are not good for climbing but are fantastic for travel in very deep snow, over peat bogs and frozen lakes. Other terrains led to the development of the Huron beavertail and bear paw snowshoes styles. These snowshoes are wider and not as long making them very maneuverable in hilly terrain and in

deep forest.

Snowshoes have changed dramatically in their construction and intended uses. Beginning in the 1960s, modern manufacturers replaced wood and rawhide materials with neoprene, aluminum and reinforced vinyl. Neoprene is used for the lacing system instead of untanned caribou, moose or deer hide, and aluminum has replaced wooden frames. Since current snowshoes are designed mainly for adventure and recreational purposes, they are lighter, sleeker and easier to maintain.

Today's recreational snowshoes are smaller, lighter, stronger, and more maneuverable than the traditional wood frame and rawhide models. Made of high-quality, light, durable, aluminum or carbon fiber with a durable synthetic decking they will likely last for decades of use. Quality snowshoes cost \$200-300, although you can usually find a sale- especially off-season.

Snowshoeing may be small compared to other outdoor industries, but clearly a niche has been carved. According to American Sports Data, 1.2 million people are frequent snowshoe participants and 15 million people living in the snow belt are frequent hikers. Snowshoeing participation increased by 11.4 percent from 2009 to 2010, according to Outdoor Foundation's "Outdoor Recreation Participation Topline Report 2011."<sup>23</sup> Backpacking participation also had an increase of 9.2 percent. Both categories showed significant increases compared to several other outdoor recreation activities.

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### 6.2.1 SNOWSHOE TERMINOLOGY

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Snow shoes are simple devices described in their own terminology.

**Bindings** - attach the snowshoe to your boot. The best bindings have a system which is easy to get in and out of with gloves and/or cold hands.

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<sup>23</sup> [http://www.outdoorindustry.org/images/researchfiles/OIA\\_Participation2011Topline.pdf?133](http://www.outdoorindustry.org/images/researchfiles/OIA_Participation2011Topline.pdf?133)

**Frame** - is the structural foundation of the “shoe” which defines its shape and size.

**Decking** – is the material within the frame which enables the “shoe” to “float” on the snow. It can be of either the lace or solid material variety. A common decking material is Hypalon.

**Floatation** - Staying on top of the snow.

**Crampons** - Many snowshoes come equipped with both toe and heel crampon-type claws for better traction on icy surfaces, slopes and hard packed snow. This cleat is referred to as a crampon, even though it is very different from the crampons that ice climbers use. It is a metal claw that gives the snowshoe better traction on packed snow surfaces and steep hiking trails.

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### 6.2.2 WHAT SIZE SNOWSHOE SHOULD I GET?

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The sizing of snow shoes is relative to three primary factors.

1. The total weight being supported (your weight plus the weight of your backpack). The more you weigh, the bigger the shoe must be in order to keep you afloat. Usually manufacturers provide a sizing chart to provide guidance in this matter.
2. The type of snow you’re traveling on. Light, puffy, dry powder requires a bigger snowshoe whereas smaller snowshoes are suitable for wetter snow and traveling packed trails.
3. The terrain you will be encountering. Steep, rocky, wooded terrain with twisty trails is more suitable for smaller snowshoes whereas flat open country facilitates larger, longer snowshoes.

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### 6.2.3 SNOWSHOEING TECHNIQUE

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If you can walk, then you can snowshoe - it’s that simple. The beauty of shoeing is its simplicity. You don’t need much equipment.

1. Just strap a pair of modern snowshoes onto your favorite hiking boots. You shouldn’t need special footwear as you will be exercising hard enough to maintain good circulation to your feet.
2. Wear gaiters to keep the snow out of your footwear and protect your ankles.
3. Wear a layered clothing system that you can vary according to the weather and your level of exertion.

There’s not much technique to snowshoeing, nevertheless, here are a few useful tips:

- To climb a steep slope kick the front of your snowshoe into the snow and press down on the ball of your foot engaging the crampon. Make sure that each new step is sufficiently above the last one to avoid collapse.
- To descend a steep slope keep your knees slightly bent, lean back, and keep your weight on your heel crampons to maintain control.

- To traverse a slope, kick the side of the snowshoe into the hillside, engaging the crampons. Swing your heel hard towards the uphill slope, then stomp down, securing the snowshoe edge and crampons in the slope. Trekking or ski poles are helpful for balance and support.

## 6.3 SKIS

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Skis for the backcountry are different than their counterparts for groomed track and race skiing. First of all, they are wider, and therefore, usually heavier. Metal edges are helpful for icy or crusty surfaces, but are not required.

For true backcountry exploration where deep snows, obstacles and downhill slopes are likely, skis should be slightly shorter than those for general touring. The length you choose will be based primarily on your weight. In general, slightly shorter skis are easier to maneuver, while longer skis will perform better at higher speeds.

Backcountry touring skis need to have extra width to provide flotation. This is useful for touring outside of established ski trails while you're carrying a pack. The greater width of backcountry skis also provides a stable platform on which to balance and learn striding techniques in variable snow conditions.

Sidecut refers to the long curves cut into both sides of a ski, or the difference between the waist and either end. A ski's sidecut makes carving turns easier by keeping the ski's edges in contact with the snow.

When choosing ski bindings for backcountry touring, keep three important factors in mind: durability, security and ease of repair. You'll need bindings that provide a strong, reliable connection to your skis, stand up to the abuse of wilderness skiing and can be easily repaired when you're out in the field.

The Three-Pin system consists of an extension on the front of the ski boot sole (with three holes in its underside) and a set of three metal pins rising up from the binding. The sole extension fits over the pins, and a curved bale is squeezed down over the extension to hold it in place. The sole extension on this traditional style of boot is 75mm wide, which is referred to as the Nordic Norm. This style of binding offers reliable support and can be repaired in the field.

"New Nordic Norm" or NNN is a name given to a boot-binding connection system that has all but replaced the traditional 3-pin systems. NNN systems consist of a short, metal rod mounted in the toe of the ski boot sole, which clips into a matching ski binding somewhat like a door hinge. NNN bindings feature raised ridges on the ski's surface, which fit into matching grooves in the soles of compatible ski boots.

Backcountry trips involve more turning and downhill travel than those on flat terrain, so it's best to choose boots that provide solid ankle support and torsional rigidity. Your backcountry boots must be compatible with the bindings you choose.

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### 6.3.1 CLIMBING SKINS

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Climbing skins are strips of material that attach to the undersides of backcountry and metal-edge touring skis to provide traction for climbing. They help save your energy by keeping you from backsliding on moderate terrain. They also save time by allowing you to take a direct, uphill route

instead of having to traverse across gentler terrain. They're handy to have when you're carrying a heavy pack, too, as they provide a little extra control.

The outer surface of skins has hairs or scales that grab the snow, preventing backward movement of the skis. When the skis are moved forward, these surfaces flatten out to allow some glide. Skins can cover the full length of the ski or just the middle section (so-called kicker skins). They typically attach to ski bases with adhesive, buckles, straps or a combination of these.

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### 6.3.2 TELEMAR SKIING

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Telemark skiing uses free heel telemark ski bindings that allow your feet and ankles to flex free of the skis, whether you're climbing or descending the steep terrain of the backcountry. Named for the Telemark region of Norway where it was developed, "tele skiing" is a challenging style that combines striding with a bent-knee technique for carving downhill turns. Telemark combines an element of "downhill thrill" with the go-anywhere flavor of free-heel skiing.

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## 6.4 SKI POLES AND WALKING STICKS

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Ski poles or trekking poles are optional. If you are traversing rugged terrain, carrying a heavy pack or concerned about your balance they can be helpful. If there are slopes involved take trekking poles, they can easily be lashed to the outside of the backpack during flatland strolls.

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## 6.5 TRAIL ETIQUETTE FOR SNOWSHOERS AND SKIERS

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Unless you are exploring new terrain and breaking a trail you will likely be sharing the trail with other travelers; snowshoers, skiers, snowmobilers, dogsledders, skijorers and/or dogs. Be alert to their presence and give consideration to coordinating your passage and joint use of the trail.

It is the responsibility of every person to maintain the trail in the best possible condition. When the snow is deep on the trails, hiking boots alone will punch holes with each step. This makes the trail very difficult to ski, especially after the holes freeze. If there is more than 6-8" of unpacked snow, then you should be equipped with snowshoes or skis to avoid creating postholes.





Cross-country skiing requires a smooth surface and skiers prefer to follow existing ski tracks. Stepping on ski tracks (even with snowshoes) breaks the grooves. Snowshoers or hikers should walk outside of the ski tracks, closer to the side of the trail.

Skiers should always stay in control, and be able to stop or avoid other people or objects. People ahead of you have the right of way. It is your responsibility to avoid them. If you fall onto the trail while skiing, fill in your hole.

Don't stop where you will obstruct a trail or are not visible from above. Move to the side so others may easily pass.

Whenever starting downhill or merging into a trail, look uphill and yield to others. A skier going uphill, should always yield the right of way to the downhill skier. When two skiers meet on level ground, the slower skier should yield the right of way. When a faster skier comes on a slower skier going in the same

direction, the slower skier should step aside and let the faster skier go through. If a skier yells "track", you should step aside and let them pass by. Once the word "track" is yelled, the skier should follow with the word "please." This is a universal way to be polite and acknowledge the yielding skier.

If you are skiing fast and come upon slower skiers, try yelling out "on your left" so they know where you will pass. Reduce your speed while you pass on their left - then take off again once you have passed them. Think of other skiers as yield signs. There is much to consider if you are taking your dog winter camping with you, as discussed in a subsequent chapter. However, if you have a dog ensure it remains under voice and sight control at all times or keep your dog on a leash.

If you feel the call of nature, step far off the trail and go; nobody wants to travel in yellow snow

## **7 TRANSPORTING YOUR WINTER CAMPING GEAR**

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Commonly, winter camping gear is transported in a backpack or towed on a toboggan, sled or pulk.

### **7.1 BACKPACKS**

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Internal frame packs tend to be better for winter use, but they are not a necessity. Internal frame packs have a lower center of gravity and hug your body better. When skiing or snowshoeing, the weight moves more with your body allowing for greater freedom of movement.



A LARGE CAPACITY INTERNAL FRAME PACK IS SUITABLE FOR WINTER CAMPING

To carry all the winter gear for a multi-day trip (large sleeping bag, lots of clothing layers, tents, lots of food and fuel, etc.) you need a pack with a capacity of 5,000 cubic inches or greater.

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#### **7.1.1 CHOOSING AN INTERNAL FRAME BACKPACK**

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When choosing an internal frame backpack look for these features:

- A slim profile to enable travelling off-trail.
- Straps and loops for transporting sleeping pads, ice tools, etc.
- Compression straps to squeeze and stabilize the load and for carrying poles or other items on the outside of your pack.
- Load lifter straps to pull the load off the top of your shoulders.
- A shoulder harness that doesn't inhibit arm movement or have buckles that pinch.
- A hip belt that cups your hip bones, so the pack's weight is evenly distributed over the entire belt surface and not just on the part of the belt that rests on your hip bone.
- Head clearance so you can easily look up to see where you are going.

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### 7.1.2 MEASURING TORSO AND HIPBELT LENGTH

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All pack makers design their packs with your torso in mind. Know your torso length. Lack of this knowledge often leads to the realization, after the fact, the pack doesn't fit correctly. A tall person can have a short torso thus requiring a smaller pack. Conversely, a shorter, person can have a longer torso and require a larger pack.

To determine your torso size ask a friend or family member to help you, if possible. You will need a tape measure or tailor's tape to measure along your back from the seventh vertebrae, the largest bump on the back of your neck with your head tilted forward, to the point on your lower back which is horizontal with the top of your hipbones. This measurement in inches corresponds to the following pack sizes:

15	16	17	18	19	20	21	22	23	24
← <b>Short</b> →					← <b>Tall</b> →				
				← <b>Regular</b> →					

If you find that your torso is on the border between two sizes, my experience is to go with the larger size. For example, if your torso is 18 and a small size is torso 16-18, and a medium size is 18-20, go with the medium because you'll have more room to make adjustments. Most good packs allow for that.

The hip belt should wrap around your hips, not your waist and the lumbar pad should be centered properly into your lumbar area. You want a significant amount of the pack's weight on your hips. A good way to do that is to make sure your hipbone is centered under your belt and the lumbar pad centered and pressing firmly into you lower back.

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### 7.1.3 FITTING A BACKPACK

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Once you've selected a pack with the right torso length and hip belt size, you need to get properly fitted. Your goal is to have 80% to 90% of the load weight resting on your hips. To achieve this, start by putting about 10 to 15 lbs. of weight into the pack to simulate a loaded pack. Follow the steps below in front of a mirror and/or get a friend to help if possible.

- Adjust the hip belt. First make sure all the pack's straps and hip belt are loosened. Put the pack on your back so that the hip belt is resting over your hip bones. Close the hip belt buckle and tighten it. Check the padded sections of the hip belt to make sure they wrap around your hips comfortably. Keep at least 1" of clearance on either side of the center buckle. If the hip belt is too loose or tight, try repositioning the buckle pieces on the hip belt straps. If this doesn't solve the problem, you may need a different pack (or hip belt).
- Adjust the shoulder straps. Pull down and back on the ends of the shoulder straps to tighten them. Shoulder straps should fit closely and wrap over and around your shoulder, holding the pack body against your back. They should NOT be carrying the weight. Have your helper check to see that the shoulder strap anchor points are 1" to 2" inches below the top of your shoulders.

- Adjust the load lifters. Load-lifter straps are located just below the tops of your shoulders (near your collarbones) and should angle back toward the pack body at a 45-degree angle. Gently snug the load-lifter straps to pull weight off your shoulders. (Over tightening the load lifters will cause a gap to form between your shoulders and the shoulder straps.)
- Adjust the sternum strap. Adjust the sternum strap to a comfortable height across your chest. Buckle the sternum strap and tighten until the shoulder straps are pulled in comfortably from your shoulders, allowing your arms to move freely.
- Adjust the stabilizer straps. Pull the stabilizer straps located on either side of the hip belt to snug the pack body toward the hip belt and stabilize the load.
- Final tweak. Go back to the shoulder straps and carefully take a bit of tension off of them. Now you're ready to go!

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#### 7.1.4 PACKING YOUR BACKPACK

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For an external pack it is best to have the weight low, but for an internal pack the weight should be kept to the middle since the pack is designed to fit closer to your body. Put your sleeping bag and clothing not needed during the day in the bottom.

Locate the stove, cooking items, and food in the middle. Keep fuel (especially white gas) containers away from food and cooking gear. Place fuel containers in heavy duty gallon zip-loc freezer bags and pack upright.

Next to the top goes the tent, because it will be one of the first items you need to access. Finally, on the top of the pack stuff the clothes you will need accessible during the day, like extra gloves, a windbreaker and/or insulating layer. Pack items such as water, snacks, sunscreen, sunglasses, camera, and other quick access gear items, in an easily accessible location such as next to a side zip, in the pack lid pocket, a side pocket, or on top of the pack.

Strive for a horizontal distribution of weight, so that one side of the pack isn't heavier than the other. You should keep the weight centered so that you don't lose your balance or hurt your back.

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## 7.2 TOBOGGANS, SNOW SLEDS AND PULKS

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Frankly I have mixed experiences using sleds to transport winter camping gear. In the right circumstances a sled offers advantages over backpacking. It's an easy way to move a lot of gear – up to 18,000 cubic inches and 200+ lbs – more than one can comfortably stash in a backpack. So if you are setting up a base camp, hauling supplies to a cabin or outfitting a scout troop, you might consider a sled. One can just hook into the harness and pull your winter gear rather than carry it.

In theory, a sled just sliding along behind you sounds wonderful. In practice, it works very well on smooth flats and slight down hills, especially if the load is light. It doesn't work so well up or down steeper hills. Pulling something behind you can get pretty complicated as you thread your way through tight trees, around blow downs, or crossing brooks and steep-sided gullies. On side hills, pulling a sled can be a real pain. Here in the northeast you can encounter all of those challenges within a matter of feet on any given trail.

Sleds work best in the right circumstances. This usually means adequate snow cover and a reasonably level, wide trail. In steep terrain a sled benefits from lashing the gear inside and stiffening the sleds and/or harnessing. The addition of a rigid harness system is what differentiates a sled from a pulk.

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### 7.2.1 SLEDs

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My first sled was a \$12 sliding model from the local Super-Mart that we modified with lashing, but it proved to be thin and the plastic cracked under the abusive conditions of winter camping. Carrying a broken plastic sled out of the woods is not fun. Unless you are only going in your neighbor's woods, these toy sleds are not recommended.

A more durable sled is the 5 lb, bright orange Paris Expedition Sled, which I have used as-is. The Paris Expedition Sled is made of .125 mm linear polyethylene and it has metal grommet reinforced tow holes with additional holes along the side for a towing harness and/or lashing. It tends to track straight and is a tough sled for the price. It is also a popular model for modifying into a home-made pulk. These sleds can be found at local hardware stores or ordered online.





“OVER THE COUNTER” SLEDS MAY BE USED IN SOME WINTER CAMPING SITUATIONS.

Otter Outdoors offers 8 different sizes of their sled. Originally marketed for ice fisherman (some models even come with ice shack accessories), it supposedly will not crack even at -40 degrees. The sleds are deep (10-14”) and stable. Cabalas sell two small Jet Sleds (\$25) that look like the Otter Outdoors design.

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### 7.2.2 PULKS

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A pulk (from Finnish pulkka; Scandinavian for a low-slung sled) is used to carry supplies or transport a child over snow. The addition of a rigid harness system is what differentiates a sled from a pulk. The components of a pulk include the sled, the poles and the harness / hip belt.





A PULK IS DESIGNED WITH A HARNESS SYSTEM TO ENABLE TOWING WINTER CAMPING GEAR.

#### 7.2.2.1 COMMERCIAL PULKS

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At the high end are commercially available pulks such as the ones from SkiPulk, Granite Gear, Kirafu, Snowsled, WildernessEngineering or Fjellpulken.

- SkiPulk offers a wide range of SkiPulk accessories and models. You can purchase poles, hip belts and/or harness to accessorize a Paris Expedition sled or complete SnowClipper, Weekender or Expedition pulk system.
- The Granite Gear Expedition sled weighs 17 lbs and has a capacity of 15,000 cubic inches. With a crossed fiberglass stay system, flexible nylon connecting rods, and a zero play full body harness, this sled pulls and turns easily. The lightweight hull offers a low coefficient of friction (drag) over the snow. There is a durable cover with 3 compression straps to secure gear and a full-length zipper for access. The hull has molded-in ski runners and there is a brake prevents sled from sliding backward on slopes. The harness poles are constructed in such a way as to allow for hip rotation.
- Kirafu offers three pulk models: Expedition (\$825, 15lbs/18000 cubic inches), Armadillo (\$638, 12 lbs/12000 cubic inches and Military sleds (MILSPEC versions).

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- Snowsled makes a variety of pulks for short 2 week expeditions to lengthy multi-week trips, adventure racing models and day trip versions.
- WildernessEngineering offers an 11,000 BaseCamp Pulk and a 6 page instruction booklet.
- Fjellpulken from Lillehammer, Norway offers a broad assortment of models for children, disabled, touring and expedition, rescue and dog racing.
- Northern Sled Works offers the Siglin Sled and Siglin Pulk as well as models for towing behind a snowmobile.



EXPEDITIONS RELY ON PULKS TO TRANSPORT LARGE AMOUNTS OF GEAR.

#### 7.2.2.2 BUILD YOUR OWN PULK

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If your winter camping budget doesn't warrant an expedition pulk there are internet resources for making your own pulk. Some that we like are:

- My Cheap Snow Camping Sled by Michael Krabach who starts with a sled model called the HO! by Recreation Inc.
- On ExploreNorth.com Mark Harris has a simple, cheap and quick to build design.
- Penob Bob gives instructions for modifying a Paris Expedition Sled into a pulk
- PiceaRubens offers modifications to the Penob Bob design.
- Mad River Rocket offers a pulk kit, material list and [instructions](#).
- Visit Skipulk.com and download the Pulkbook. The Pulk Book includes instructions for drilling holes and rigging fiberglass poles to a sled, attaching the poles to a hip belt, tagging on fins for tracking and stabilization, and using it in the wilderness. Pulk poles and hip belts are available for sale through the skipulk website.

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### 7.2.3 TOBOGGANS

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Some winter travelers prefer the traditional toboggan design. Toboggans are the traditional sled in North America. Toboggans are especially popular with traditionalists, “hot tenters” and base campers due to the increased capacity for gear.

Toboggans carry large loads and can fit in a set of snowshoe tracks. They are usually quite stable due to their length. Toboggans can be made from wooden or plastic materials. Wooden toboggans need to be waxed and may crack or snap if hauling a heavy load over a log. If a wooden toboggan is dragged over a rocky trail you can gouge the base or crack the planks.

One tradeoff is the width of the toboggan. The narrower the toboggan the easier it pulls. However, very narrow toboggans are more susceptible to tipping. 16 inches is a typical width with a length of 8 – 12 feet. A wider toboggan is more stable, but harder to pull and it may not fit inside your snowshoe trail.

A limitation of toboggan travel is the restriction to frozen river beds and lakes. Anything more than a ten degree incline transforms travel into a heroic struggle. Travel up slopes or through densely wooded areas is difficult.

Typically gear is packed in duffel bags, plastic buckets, plastic bins or milk cartons or lashed to the toboggan using a tarp. A method for lashing gear using a tarp involves the following steps:

- Lay a large tarp on the toboggan. It should be large enough to turn up on all sides such that the ends cover the load completely. The tarp can be used as a shelter or windbreak after you unpack at camp.
- Distribute the load equally on the toboggan so that it will track properly.
- Make sure the load is packed squarely, that nothing projects beyond the toboggan edges, and that it is not top heavy.
- Once gear is stowed on the toboggan cover it snugly with the ends of the tarp and proceed with the lashing.
- Start the lashing rope at the front of the toboggan, crossing over the top, through the side ropes, back up and over. Repeat down the side of the toboggan. Bring the lashing rope back to the front of the toboggan in the same manner and secure it with a knot.
- After your lashing is completed you can secure additional items such as axes, shovels, poles, and snowshoes to the top of the load. However, to maintain balance it is best to keep these extra items to a minimum.

Try to ensure that you make a neat, secure job of lashing the load. This will ensure that the load does not slip or move while you are on the trail.

When you get to your campsite an over-turned toboggan makes a great platform on which to place your stoves for cooking.

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TOBOGGANS ARE USED BY TRADITIONALISTS FOR MOVING WINTER CAMPING GEAR.

## **8 ON THE TRAIL**

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Now that you are geared up and moving out there are considerations for breaking trails, crossing ice, navigating to your destination and determining the amount of remaining daylight.

### **8.1 BREAKING TRAIL**

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Whether you are out skiing or snowshoeing breaking trail can be daunting and exhausting. When traveling in the backcountry, on a new trail or traveling in fresh snow someone will have to lead the way. Breaking trail is exactly as it sounds. The traveler in the lead expends extra energy pulling their snowshoe or ski out of the snow, but breaking trail helps smooth the snow underneath and compacts it for subsequent travelers. The benefit of breaking trail is being able to pick the trail and travel through fresh untracked snow.

The easiest way to break trail in deep snow is to break up the task with others of your group. Walk in a single line, with the leader breaking trail. Take turns out front, and change leaders as the leader gets tired or starts to heat up. The trail breaker can simply step out of the track and falls into the last place in the line. The leader should take consistent, medium length, even steps that are easy for others to follow. A trail breaker with long legs taking big steps is harder to follow for travelers with a shorter stride.

Mixing snowshoe and ski tracks is problematic. Since snowshoes destroy ski tracks, many well-traveled areas ask snowshoers to observe traditional backcountry courtesy and stay out of ski tracks. Ski trails are normally much narrower than a typical snowshoe trail, and less well packed because skis offer more flotation than snowshoes. If the snow is deep and soft, snowshoers may find themselves post-holing right through the ski track. In most cases the ski track offers little advantage and putting in a separate snowshoe track allows both snowshoers and skiers to have a positive experience and avoids friction with skiers who often resent having their tracks obliterated and their skiing enjoyment greatly reduced.

### **8.2 CROSSING ICE**

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There is no such thing as "safe ice." Conditions and unseen or unknown factors can render seemingly safe ice suddenly dangerous. Crossing ice should not be done without planning, consideration of risks, employing safety devices and having a rescue plan 'just in case'.

Ice conditions can be greatly affected by water currents, snow depth, and recent weather. As a general guideline, two inches of black or white ice will probably hold you up and six inches will hold up a moose. Thickness of suspect ice can usually be determined quite quickly by using an ice axe or auger to drill through. The table below provides weight bearing guidelines for various thicknesses of ice.<sup>24</sup>

<b>Thickness</b>	<b>Safety</b>
<2 inches (5cm)	Dangerous
4 inches (10 cm)	Suitable for individual weight
7 inches (18 cm)	Will bear a snowmobile

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<sup>24</sup> Environment Task Force Newsletter, Ohio State University Extension, Winter 1998, V1 #4, [http://ohioline.osu.edu/enviro/wi98/enviro\\_7.html](http://ohioline.osu.edu/enviro/wi98/enviro_7.html)



8-12 inches (20-30 cm)	Will bear an ATV or small car
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If you want to get geeky about estimating ice thickness in advance you can use the following formula:<sup>25</sup>

Z = ice thickness in inches

S = degree days accumulated below 32 F

A = a coefficient which varies as follows:

(.8) -windy lake with no snow

(.5 to .7) –average lake with snow cover

(.2 to .4) –sheltered small river with rapid flow

S is calculated as follows: Suppose ice is formed December 15 and the mean temperature for December 16 was 5F. To find degree days, subtract 5o F from 32F for a value of 27. If on December 17 the temperature is 4o F, subtract 4F from 32F for a value of 28. S would then have a value of 55 by December 17 (27F + 2 F = 55). Next take the square root of 55 (7.4). To determine ice thickness, multiple 7.4 by the appropriate coefficient A (say .8 for a windy lake with no snow), and your answer is 5.9 inches of ice. If you don't know the date of ice formation, you can estimate by the following technique:

- For lakes 3 –10 feet deep, freezing occurs very close to the date when the 3-day running mean temperature is 32F and where temperatures remained mostly below that for the rest of the winter.
- For lakes 20 –50 feet deep, the date of freeze-over occurs when the 40-day running mean temperature reaches 32F.

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### 8.2.1 TIPS FOR CROSSING ICE

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Stay off the ice if you have any doubts about safety. Walk in single file and stay spread out. Stay clear of any moving water caused by currents.

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<sup>25</sup> Outdoor Action Guide to Winter Camping, <http://www.princeton.edu/~oa/winter/wintcamp.shtml>

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TRAVEL ACROSS ICE IN SINGLE FILE WELL SPREAD APART

Carry a long pole to poke and use it to check on the ice. Held horizontally a long pole can arrest a fall through the ice.



A LONG POLE IS HELPFUL FOR PROBING SUSPECT ICE

Keep ice picks readily available by carrying them on a cord around your neck or wear a sheath knife to help you crawl back on ice if you break through.



ICE PICKS ARE USED TO HELP GAIN A GRIP ON ICE IF YOU FALL THROUGH

## 8.3 COMPASS BASICS

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Before you start trekking about the woods you should be familiar with use of a compass. Practicing use of a compass is a skill best learned before it is required in the field. Reading a compass can be an intimidating skill to many people. However, once you learn the basics and practice a little, you will find that you can read a compass with ease. Make sure you know how to use your particular compass before heading out.

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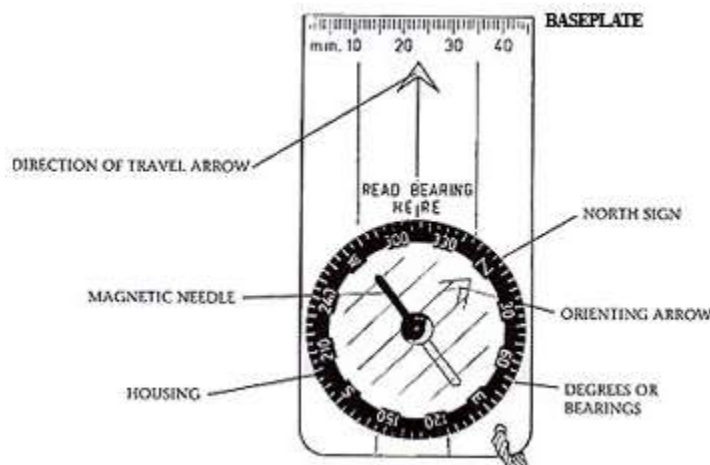
### 8.3.1 PARTS OF A COMPASS

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The first step to reading a compass is to understand its parts. These directions are based on the commonly used compass in the illustration below:

- The base plate is the surface on which the compass is mounted, usually a hard rectangular piece of plastic.
- The housing is the main part of the compass. It is a round plastic container that has the compass needle inside. It can be turned so you can select different bearings (degrees) for your direction of travel.
- The direction-of-travel arrow is marked on the base plate. When traveling, you point this arrow directly away from you and move in the direction it is pointing.
- The orienting arrow is marked in the housing. It rotates when the dial is turned.
- The magnetic needle turns freely within the housing. It has one end painted red to indicate north.

- A compass is divided into 360 degrees for precise locations using latitude and longitude. The cardinal points are marked on the outer ring of the housing. North is at 0 degrees (and 360 degrees), east is 90 degrees, south is 180 degrees, and west is 270 degrees.



PARTS OF A STANDARD COMPASS

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### 8.3.2 HOW TO READ A COMPASS

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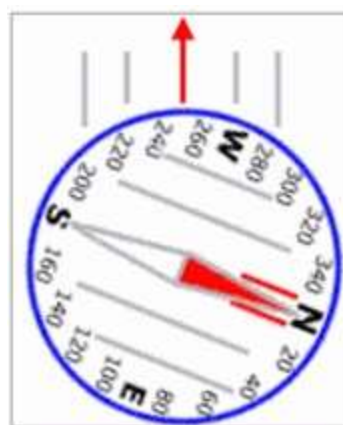
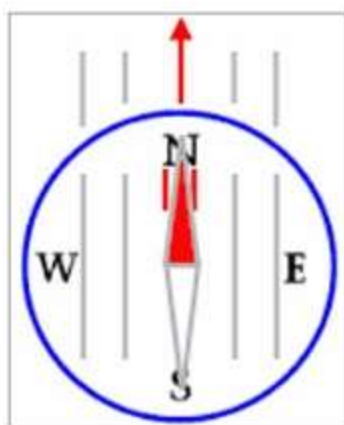
Now it is time to read your compass. Decide which direction you'd like to travel and rotate the housing until the bearing number you'd like is lined up with the "read bearing here" mark. For example, to head due north, rotate the housing until the 0 degree mark is lined up.

Hold your compass flat and still in the palm of your hand (and against your chest) so the base plate is level and the direction-of-travel arrow is pointing straight away from you. The magnetic needle should be able to move freely, without bumping the top or bottom of the housing.

Look down at the compass and see where the needle points.

Turn your entire body until the magnetic needle is centered between the red lines, as shown in the figure to the right. This is referred to as "keeping the red in the shed." Make sure to do this; it will keep you heading in the right direction. The compass in our example is pointing due north (also 0 degrees).

To determine the bearing of an object in the distance, face the object with the compass held flat in your palm as before. This time, rotate the housing until the red end of the magnetic needle is between the red lines, and "in the shed." Read the bearing number at "read bearing here." In the example shown below, you are heading 250 degrees west.



DETERMINING COMPASS BEARING

## 8.4 PACE

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You have probably heard the saying “slow and steady wins the race”. Keeping a steady pace is the best way to approach your trail. It will help you conserve your energy for steep climbs or rough stretches and keep your group operating as a unit.

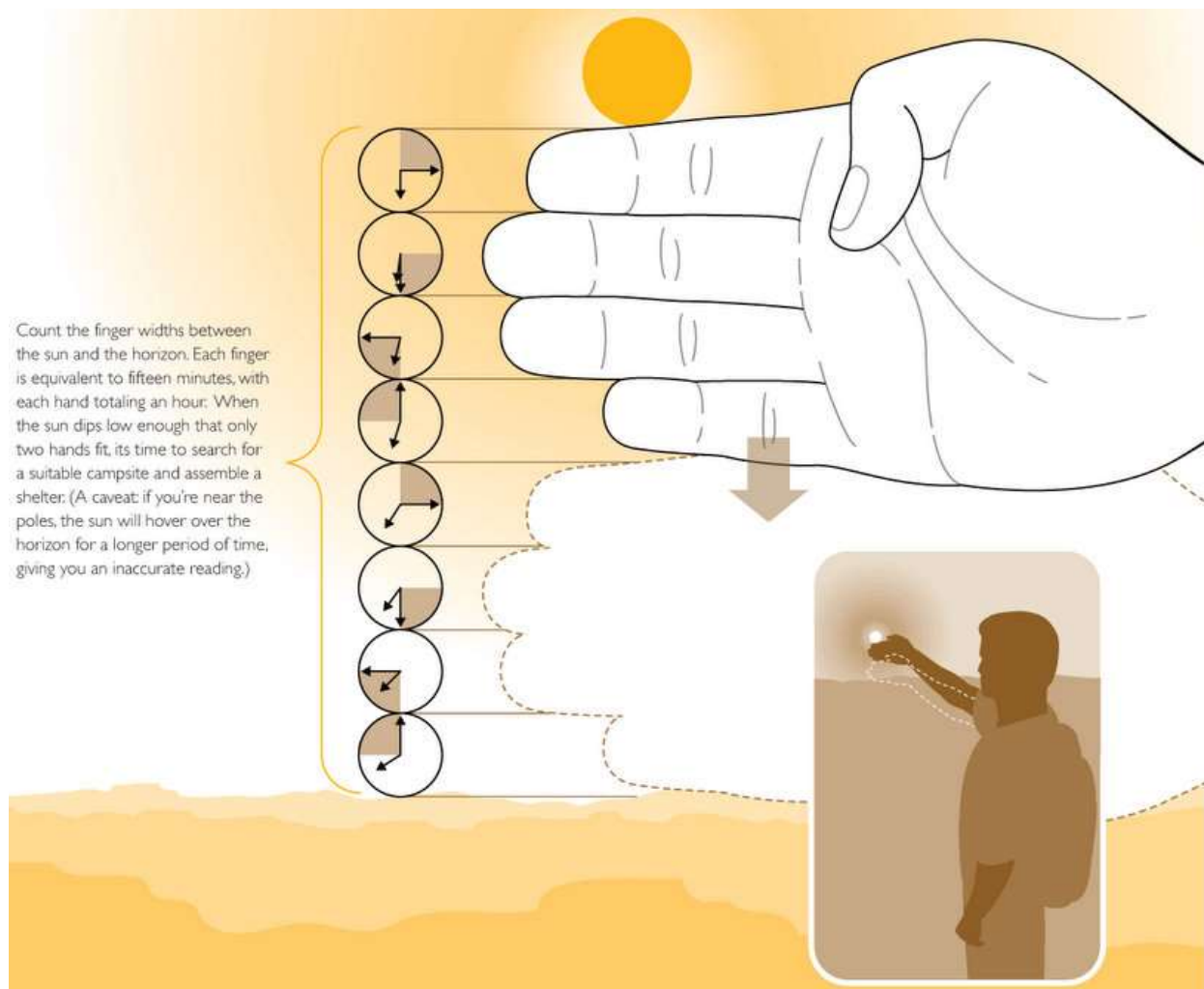
Don’t be so eager to accomplish a particular portion of a trail that you rush through and wear yourself out before you encounter a climb. Take your time, even at the moderate parts of a hike, to prevent you from getting burnt out and give yourself the opportunity to enjoy the sights and sounds found along the way. Soak up the details that would otherwise be missed if you were to race through your trip.

## 8.5 ESTIMATING REMAINING DAYLIGHT

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If you're outdoors you can easily estimate how long until the sun sets using your fingers. Extend your arm fully and count the number of finger widths between the sun and the horizon. Each finger is about 15 minutes, which means each hand width should be about an hour.





ESTIMATING REMAINING DAYLIGHT UNTIL SUNSET



## **9 WINTER CAMPING SHELTERS**

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Your winter camping site and shelter will be a major determinate to your comfort during the evening hours. On winter's long nights, the campsite is where you will spend considerable time cooking and eating meals, relaxing with companions and sleeping overnight.

The snow-covered ground provides many options for selecting a campsite as well as opportunities to be creative in constructing a comfortable location.

Take the time to find a good campsite. You will want to consider site selection factors as well as choose an appropriate type of winter shelter.

### **9.1 CAMPSITE SELECTION**

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Selecting a comfortable camp site is a useful skill for all campers, regardless of the season. Here are factors to evaluate when assessing different camping locations:

1. Does the site conform to camping regulations?
2. Is there available water or suitable snow to melt?
3. Is your campsite at least 150 feet away from a water source?
4. Is your campsite safe from hazards such as hung or dead tree branches, rock falls, snow slides or avalanches?
5. Is the campsite fairly level?
6. Is the campsite set off from hiking trails and game trails? Is the campsite private and quiet?
7. Is the site suitable for the expected weather?
  - How exposed is the site to wind? If you like the view from an exposed ridge are you confident of a calm night, because those spots tend to get strong winds.
  - Can you evaluate the site in case of a storm? Will the site remain safe in event of a heavy snowstorm?
8. If you plan on having a fire is there a pre-existing fire ring or suitable site for a fire pit. Is there suitable and available wood?
9. Is there a useful (e.g. protected, comfortable) site to cook and eat your meals?

Select a protected campsite out of the wind and off the valley floor and other low areas where cold air settles. Look for natural wind blocks like large boulders, rock outcroppings, or dense stands of trees protect against wind. Breezes blow up canyons or mountains during the day, and down at night. If you camp near a stream, cold air travels down water corridors. Don't set your tent or build a fire under trees that have snow on their branches.

### **9.2 CAMPSITE PREPARATION**

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Consider orienting your site toward the east to catch the sun's early morning rays. If you want to get an early start or capture early warmth this tactic may help in the morning.

You may want to customize your camping site. If you are sleeping in a lean-to you should consider hanging a tarp across the opening to help eliminate breezes. Similarly, if you are sleeping in the open, a snow wall or tarp can serve as a wind block.

You might consider a kitchen or group hang-out site; they're places where everyone congregates and chats about the day's activities.. In most weather conditions cooking can be done outside. I try to avoid tent cooking whenever possible. The kitchen area can vary in size depending on how much time you have and how energetic you feel.

Ideally, you can do all of the cooking without bending or kneeling and the stove is protected from the wind.



A LARGE ROCK CLEARED OF SNOW MAKES A SIMPLE KITCHEN PLATFORM.

In deep snow ideal kitchen areas are rectangular holes approximately 4 feet deep by 5-9 feet in length and 3-4 feet wide. A shelf can be made in the snow approximately one foot below the top the hole where a stove can be set and all cooking is done.

If you are tired a kitchen may consist of a small hole deep enough to stand in and to keep the stove out of the wind. The nice thing about such kitchens is their convenience.

You may also want to designate a private area as the latrine.

### 9.3 WINTER CAMPING SHELTER ALTERNATIVES

Winter camping shelter options are numerous to include:

- snow shelters such as quinzees, snow caves and igloos,
- pre-existing structures such as lean-tos,
- tents such as hot/cold tents, hammocks, four season tents, tipis, tarps and bivy sacks.



A TIPI, TARP TENT AND THREE SEASON TENT DISPLAY A RANGE OF WINTER CAMPING SHELTERS.

There are many alternatives for winter camping shelters each with their own tradeoffs.

Shelter	Description	Advantages	Disadvantages
<b>Lean-To</b>	Three sided roofed enclosure with a plank floor usually made of logs	It's already there! Spacious: room to change clothes, room for cooking, can sleep 6+. Up off the ground	Limited to specific areas, expensive to build, large open face makes it susceptible to wind. Not particularly warm. Usually situated in high-use areas. May have to share
<b>Tent</b>	Solo or multi-person tent	Readily available, wide variety	Must be carried and set up.
<b>Hammock</b>	A fabric sling suspended between two points, used for sleeping	Light weight, easy to pitch in wooded areas, no level ground necessary	Accessories needed to "winterize" otherwise a hammock can be cold, no space for sitting

<b>Hot Tenting</b>	The main features are a canvas tent with a woodstove. Usually used in a multi-day, base camp situation.	Warm. Stove provides cooking and enables drying of clothing.	Heavy. Stove & stove pipes are an additional item (and weight) to transport. Most fireboxes are limited and require constant attention. Sleds are needed to haul the extra gear. Tents are usually more involved to set up and break down.
<b>Bivy</b>	A waterproof shell over a sleeping bag providing insulation and a wind and moisture barrier	Light weight, camp anywhere, easy to set up	Can be constricting, no shelter for gear, not easy to enter/exit
<b>Tarp</b>	a sheet of flexible, water-resistant material with attachment points allowing it to be tied down or suspended	Light weight, easy to set up. Multiple configurations possible	Not wind proof or particularly warm, no ground protection
<b>Snow Cave</b>	A shelter dug into the snow to protection from wind as well as low temperatures.	Relatively warm	Construction takes time, you can get wet in the construction, requires deep snow drifts
<b>Quinzee</b>	A shelter made by hollowing out a pile of settled snow.	Easily constructed in less than ideal snow conditions	Construction takes time, you can get wet in the construction. Less sturdy than an igloo.
<b>Igloo</b>	A shelter constructed from blocks of compacted snow in the form of a dome.	Relatively warm, long lasting and durable	Construction takes time, skill or experience is needed. You can get wet in the construction.

## 9.4 LEAN TOS

It was our biggest group ever - ten winter campers! We had chosen Puffer Pond, near Indian Lake, as our overnight destination as it was an easy 2 mile snowshoe hike terminating at two closely positioned lean-tos to accommodate the group. As we got closer to Puffer Pond the younger campers raced ahead to secure the “perfect” lean-to for themselves. Their land grab backfired as wind kicked up during the evening and blew snow off the frozen pond surface into their exposed lean-to. Those positioned in the lean-to back from the water’s edge were slightly shielded by trees and doubly protected by a tarp hung across the open side of the lean-to.

Harmony was achieved when the group on ‘snob knob’ invited everyone to share a single fire after dinner under a full moon night sky. The night’s entertainment included reading the lean-to registration book; a time honored entertainment as captured in [No Place I’d Rather Be: Wit and Wisdom from Adirondack Lean-tos](#) by Stuart Mesinger. The book organized log book comments into themes: love stories, tall tales, partying, complainers, weather, critters, bugs, food, the privy,



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the campfire, the long walk, adventures, culture clashes, hunting and fishing, companions, religion and solitude..



IAN, MARK AND MATT LISTEN AS DAN DISPENSES PEARLS FROM THE LOG BOOK

There are benefits to winter camping in an lean-to. Foremost, is that you don't have to carry your shelter with you. They are spacious; although each lean-to can be different typically there is adequate room for 5. The lean-to provides a level, dry platform for changing clothes, setting up a stove, mixing food, or just plain sitting.

On the other hand, lean-to's aren't particularly warm – even if you close off the open side with a tarp. They are usually situated in high-use areas. They can house rodents. The sleeping arrangements can leave you lying wide awake between two prodigious snorers.

The Lean-to is an open faced camping shelter found throughout the Adirondack Park back-country areas and along the Appalachian Trail. They are also found in the Nordic European nation of Finland, although in Finland they are called “laavus” instead. These Finnish lean-tos serve as temporary housing for people on hiking, camping or fishing expeditions out in the wilderness. They are especially common in the Pukala national forest of Finland.

Lean-tos are built mostly by hand with chainsaws and chisels and the logs are assembled using a scribe notching technique that results in a very tight fit of joints and allows the use of the entire length of logs. The floor space usually measures 12' x 8' in size.





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DSettahr over at Adirondack Forums<sup>27</sup> posted a spreadsheet of all the lean-tos in the Adirondack and Catskill Mountains. He stated it was his “(long term) hiking goal... to spend a night in every single lean-to in the Adirondacks and the Catskills.”

Lean-To Name	Location	Park	Completed
Skeeter Lake	Aldrich Pond WF	Adirondacks	
Balsam Lake Mtn.	Balsam Lake Mtn. WF	Catskills	
Beaver Meadow	Balsam Lake Mtn. WF	Catskills	
Beaver Pond	Balsam Lake Mtn. WF	Catskills	
Belleayre Mtn.	Belleayre Mtn. Ski Area	Catskills	
Hirschland	Belleayre Mtn. Ski Area	Catskills	
McKenely Hollow	Big Indian WA	Catskills	
Rider Hollow	Big Indian WA	Catskills	
Shandaken Brook	Big Indian WA	Catskills	
Chub Pond #1	Black River WF	Adirondacks	
Chub Pond #2	Black River WF	Adirondacks	
Gull Lake	Black River WF	Adirondacks	
North Lake	Black River WF	Adirondacks	
Remsen Falls	Black River WF	Adirondacks	
Sand Lake	Black River WF	Adirondacks	
Woodhull Lake	Black River WF	Adirondacks	

The spreadsheet has two pages: one that has all the lean-tos listed in alphabetical order and one that lists them by the management unit in which they reside. Currently, there are 295 lean-tos on the list. Subsequent posters noted corrections where lean-tos no longer existed..

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### 9.4.3 SHARING LEAN-TOS

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The guidelines for sharing lean-tos state that while it is nice to share lean-tos there are no regulations requiring they be shared.

User ‘WildRiver’ stated *“There is no regulation compelling lean-to users to share the shelters with latecomers. Latecomers have no regulatory right to move into lean-tos that are currently being occupied, even if there is room. On the other hand: No one can claim exclusive occupancy of any portion of state land, whether it is a lean-to or an off-trail campsite in the middle of nowhere. Basically, the state’s land use regulations are completely mum on the topic of sharing campsites. No matter where you go in the Forest Preserve, you have no guaranteed “right” to solitude, nor do you have the “right” to intrude on someone else’s.*

*However, there is by all means a valid expectation for solitude. The word is an integral part of the legal definition of “Wilderness Area,” meaning that solitude is a feature the state is officially trying to promote and perpetuate. In fact, the Five Ponds Wilderness UMP specifically addresses people “who go into the wilderness primarily as a social excursion seeking the company of others and facilities where they might congregate” by stating: “Users” in [this] category are not really*

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<sup>27</sup> <http://www.adkforum.com/index.php>

*seeking a wilderness or the experience of it. Therefore, the accommodation of user group 5 is not a goal in the management of this unit.*

*So there is an official obligation to provide “outstanding opportunities for solitude,” and in fact this is a key part of the wilderness experience. Most people that you meet in the back country are in search of privacy to one degree or another, and it is to everyone’s mutual benefit to give each other space when choosing a campsite.”*

Formal New York State DEC regulations on use of state land address lean-tos stating:

- a) Open camps (lean-tos) may not be occupied by the same person or persons for more than three successive nights or for more than 10 nights in any one calendar year, provided others wish to use such camps.
- b) The enclosure of the fronts of open camps is prohibited, except by tying canvas or nylon tarpaulins in place or erecting snow walls. The use of wood, nails, screws or other fasteners is prohibited.
- c) The erection of tents in open camps is prohibited.

## 9.5 TENTS, TARPS BIVYS & TIPIS

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Hot or cold tenting? Each style of winter camping has its proponents.

Hot tenting is a blend of Native American and 19th century European techniques and equipment. It involves packing a wood stove along with a more substantial, usually canvas, tent, since one is spending time in the heated tent as it is not just a sleeping berth. Hot tenting usually requires bringing your gear on a sled, toboggan or pulk. Hot tenters often establish multi-day base camps. Advantages of hot tenting include lounging in comfort, the ability to dry out clothes and cook in the shelter. Disadvantages include an increased weight, set up time, the need to cut fuel for the wood stove and the risk of scorching on a hot stove. There can also be a separation from the environment as one is sequestered inside a tent rather than sitting around an open fire in the evening. Sitting around in your designated space at the mercy of other’s organizational habits can become claustrophobic depending on the number of campers sharing the hot tent.

Cold tenting usually involves sleeping in a tent or under a tarp. Much of a backpacker’s three season equipment is applicable to cold tenting. Cold tenters rarely stay in the same place more than one night. Advantages of cold tenting include a lighter load that can be easily backpacked and more mobility. Disadvantages of cold tenting include accumulation moisture in your clothes, gear and sleeping bag, a need to cook over a camping stove or open fire, and, finally, the possibility of being confined to your sleeping bag for long hours if the weather is uncooperative.

Tim Jones has a nice article<sup>28</sup> entitled “Cold Can Be Warm: Two Ways to Winter Camp” comparing cold and warm camping, otherwise known as hot tenting. From Tim’s article:

*“Cold camping means camping without a heat source, relying on a tent or tarp to shelter you from wind and falling or drifting snow, and warm clothes and a good sleeping bag to keep you*

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<sup>28</sup> <http://www.easternslopes.com/2010/01/28/warmcold-winter-backpacking/>

*comfortable. Though “cold camping” doesn’t sound all that appealing, you can be surprisingly comfortable in a “cold” camp.*

*The big advantage of cold camping is that your pack is lighter and you are more mobile. Almost any trail you’d backpack on in the summer is fair game for a winter cold camping trek. With a free-standing tent, it’s easy to travel on snowshoes or skis, reach your destination and, an hour later, be well fed and snug in your sleeping bag for the night. The only moment of potential discomfort unique to cold camping is hauling yourself out of that cozy sleeping bag in the morning. But, if you planned it right, you’ve already had something warm and comforting to eat and drink before you have to get up and get dressed for the day.*

*Warm winter camping is something of a misnomer, since it isn’t warm all the time. You spend your days and nights in the same cold as cold campers. Typically, the only “warm” in warm winter camping is in the evenings and perhaps again in the morning when you are awake and in camp to tend to some sort of heat source. That heat source might be a campfire in front of a tarp shelter, a woodstove inside a tent or even a candle lantern inside a snow cave or snow shelter – which can be surprisingly cozy. It would seem that gas-fueled catalytic heaters would be ideal inside a tent, but I’ve never found a stove/fuel combo that’s light and efficient enough to carry backpacking.*

*The advantage of warm camping is obvious – you aren’t confined to your sleeping bag when you aren’t moving. You get to dress and undress, eat and relax in a warmed space.*

*Warm camping also has its disadvantages. Warm setups are usually – but not always – heavier than cold camping. And it usually takes a lot more time to set up a tarp-and-campfire site or a woodstove-heated tent or to build a snow shelter than it does to pop up a free-standing tent. Then there’s the time and effort it takes to find wood for a campfire or stove – not always easy when the snow is deep.*

*Warm camping works better when you spend more than one night at a campsite rather than moving camp every day. A warm camp is perfect for a long weekend. Pack in and set up camp your first day, leaving plenty of time to find wood if needed. The following days you can explore out from there, knowing you can return to a snug haven.*

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### 9.5.1 FOUR SEASON TENTS

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Despite what the name implies, four-season tents are actually one-season tents: winter. Both the canopy and body feature stronger materials than three-season tents, and the body shape maximizes resistance to high winds and heavy snow loading. There is a corresponding increase in both durability and weight over summer or three season tents.

Defining features of a four season tent designed for mountaineering and winter camping are:

- All vents can be closed during storms.
- Tougher materials than three-season tents.
- Multiple guy-out points for anchoring.

Four season tent considerations include:

**Size.** When weight is an issue get a tent for the exact number of anticipated users. If you’re planning for a base camp then consider a larger tent; every extra inch counts when you’re sitting through winter’s long nights.

**Single or Double-Wall Tent.** Get a single-wall tent for long backcountry tours. Get a double-wall tent for trips where you will be in the same camp for several nights. Single wall tents are usually lighter and if vented properly, moisture usually isn't much an issue in the winter.

**1 Door vs. 2 Doors.** For winter tents the door question usually gets answered when you think about how much time you'll be on the move. In base camp, a second door can be key; some find the convenience of a second door to be well worth the extra few ounces, especially for tents that hold three or more people. A second door may eliminate uncomfortable situations and climbing over others during exits.

**Vestibule.** Vestibules provide a place to store gear and put on your boots without exposing the inside of your tent to a snowstorm. When camping on deep snow, you can dig out below the vestibule to create a plush porch and storage area. Four-season single-wall tents often do not have an integrated vestibule because the people using these tents tend to focus on saving weight.

**Venting.** The trade-off is to include just enough venting to reduce condensation while maintaining warmth, but be able to seal up the tent to keep out blowing snow during a storm.

**Footprint:** While footprints add extra water resistance and durability for long stays they are unnecessary when camping on snow.



A WINTER CAMPING TENT OFFERS VESTIBULE SPACE FOR GEAR AND COOKING.

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### 9.5.2 USING THREE SEASON TENTS FOR WINTER CAMPING

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There's no need to go out and buy an expensive winter tent if you're only going to use it once or twice each winter. It is often possible to use a three-season tent in winter conditions as long as you have good wind protection and it has steep walls to shed snow.



Considerations for assessing the suitability of your three season tent for winter camping includes:

- Wind protection. Ideally your tent isn't comprised of mesh which will be subject to wind and strong drafts.
- Steep Side Walls are desirable to shed snow loads.
- Ventilation is necessary to minimize condensation within the tent.
- A freestanding frame is desirable to avoid having to stake out your tent in deep snow conditions.
- Extra stake outs to allow tying your tent securely to adjacent trees and brush in bad weather.
- Adequate vestibules for stashing your gear and shedding clothes (and snow) before getting into the tent.

If you are smart about picking a good tent site a three season tent is completely suitable for winter camping.

## 9.6 TARPS & BIVY SACKS

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Tarps are lighter to carry than winter tents and can fulfill a variety of functions: wind break, snow moving, dining fly, ground cloth, or a roof on a partial snow shelter.

While not as warm as a tent, using a tarp as your primary shelter can be rewarding. You are offered a variety of pitching options, a tarp ventilates well, and you can position yourself to be able to see the night sky if desired.

A bivy bag is intended for a bivouac, an emergency camp, and is designed for a very short stop. It is something you use when you are caught out without full camping gear, either by choice or in an emergency. A bivy is not intended to be a comfortable rest and is often used in a location where you normally would not stop. While a bivy sack can offer a light and inexpensive shelter there are drawbacks:

1. Your gear stays outside in the weather as there is no room in the bivy sack.
2. They can be confining and restrict moving around during the night. If someone is claustrophobic they may not enjoy sleeping in a bivy.
3. Getting in and out of bivy sack during the winter can be problematic. Exiting a bivy sack in the middle of a winter night to heed nature's call can be doubly so. They are not designed to accommodate easy access.
4. Condensation from the occupant can get captured inside the bivy and can moisten the sleeping bag.



A BIVY BAG DOESN'T REQUIRE A LARGE CAMP SITE.

There are many single wall tents available in the 3 lb range, which can offer more convenience than a bivy sack. Having said that, many people use a bivy bag for protection when sleeping in a snow shelter or directly on the snow or to add comfort range to their sleeping system since a bivy sack adds 5-10 degrees.

You can make your own inexpensive bivy bag from Tyvek building wrap. Set your sleeping pad down with your winter sleeping bag on one half of the Tyvek. Fold the Tyvek over everything and trimmed it to provide a generous fit. Hopefully, the generous cut enhance ventilation. My main goal for a bivy is to keep my sleeping bag out of the snow if I am winter camping with a floorless tipi or tarp.





MATERIALS FOR A DIY BIVY BAG AND THE FINISHED PRODUCT.

In my research I heard of DIY Tyvek projects that sewed seams and glued them but the use of double-sided carpet tape seemed to make the most sense to me. It was quick and relatively easy to apply once I figured out how to remove the film.

I taped the bottom of the bivy and half-way up the side with carpet tape to approximately waist height. I turned the bivy inside out so the Tyvek advertising was on the inside. I applied two tabs of sticky backed Velcro such that I could secure the top half, if desired.

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#### 9.6.1 TIPIS

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Single or center pole tipis, called megamids or pyramids, are one of the oldest designs. Theoretically there are two parts, a pole and the tarp, but in reality, you need tent stakes and cord to stake out the bottom. If you can find an overhanging tree branch or rig a line between two tree to hang it from, you can even do away with the pole – yielding extra space.



A SMALL TIPI PROVIDES ADEQUATE SPACE FOR WINTER CAMPING.

I bought a Black Diamond Mega-mid Tipi Tent with thoughts that it could be used for emergency shelter when canoe camping, but especially for winter camping. The tipi sets up easily on snow and over uneven ground.

The four person Mega-mid is supposed to sleep 4 persons, but I am sure they never made those calculations with 6'4" campers in mind. However, it was palatial with 2 and adequately fits 3 sleeping forms quite well. The Mega-mid provides 51 square feet of floor space, one door and measures nearly 5' (57") tall. Total weight of the tent, pole, stakes and stuff sack is less than 4lbs.

As a bit of trivia, the Mega-mid was developed almost 30 years ago by Peter Metcalf when he was working with Chouinard Equipment. Peter, an avid climber and alpinist, liked doing remote climbs, and between all of the climbing gear, ropes, camping gear, etc., he was looking for a lightweight tent to ease the load and increase his speed. Nothing was available at the time, but during one trip with a safe-looking weather forecast, he ended up just taking the fly off of a double-wall tent and found out that it worked great. One trip led to another, and it eventually became the

first Chouinard Equipment tent. The original design was called the “Pyramid” for obvious reasons, but when a larger four-person version was created, it became the Mega-mid.<sup>29</sup>

On our maiden winter camping with the Mega-mid - having little experience with tipis at this point we didn't stamp out a large enough footprint. However, the tipi worked fine. The tipi form sheds snowfall easily with a soothing swooshing sound through the night as accumulated snow slides down the side.

When setting up the Mega-mid give consideration to facing the door in the lee of any prevailing wind. If you are using a center pole, don't stake the tent out too tightly until you have your center pole erected. Use a tautline or similar knot and you can always snug up the guy lines later.

You can pad the top of the pole with a glove, mitten or hat if you are concerned about high winds and you can place a flat stone or piece of firewood under the pole to keep the pole from settling into the snow overnight.

Since the Megamid doesn't have a floor we packed a space blanket to provide coverage below the sleeping pad, so I am not too sure about overall weight savings.

It is nice to be able to enter the tipi with boots on and not worry about tracking snow in. Cooking inside is an option, however, like any single wall tent condensation can be an issue if there isn't adequate ventilation.

#### 9.6.1.1 HOT TENTING WITH A TIPI

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A nice compromise between the comfort of hot tenting and the lightness and mobility of cold camping is the lightweight Kirafu Tent. It is light and easy to set up. It accommodates 4-5 campers with a wood stove and wood. If you want to be warm – it can get very warm.

The Kifaru 8 Man Ultralight Tipi weighs 12 lbs for an 8 man tent including a large packable wood stove. The tipi is made of an ultralight fabric which resembles parachute material. The tipi material itself is very light and easily stuffs into a small sack. It has one aluminum center pole and several stakes.

Set up is easy. If there is a lot of snow it is beneficial to dig or stamp out the area first for easier set up, especially if you don't have the longer tent stakes. Taking the time to clear out the snow saves a lot of time and trouble in the end.

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<sup>29</sup> <http://www.backcountry.com/explore/the-art-of-tarp-camping-with-minimalist-shelters>



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Then we stake out the tent, insert the center pole and lift the Tipi.



PARTS OF A KIRAFU TIPI

What is touted as an eight person tent will comfortably fit five tall campers with the wood stove and a supply of wood. Without the stove the tent will fit six persons.

The wood stove is stainless steel and weighs in at just over 4lbs. When folded up it is roughly the size of a laptop and comes in its own carrying case. With 20/20 hindsight it is recommended that you roll the stove pipe a few times at home first in order to loosen it up a bit and to get the hang of it. Once set up it is time to build your fire.

The firebox is 8×9×20". You will have to keep the wood small since the door only allows wood of approximately 3.5 inches in diameter. Burn time is about an hour; however, you can easily warm the inside of the tipi up into the 70s. The sides of the stove and stovepipe do become red hot so you will want to make sure that the sleeping bags, packs, bare skin, etc. stay well away.

If you sleep with the stove off, one person should rise a little early to light the stove and heat some water for breakfast. Everyone else can then get up into a warm tent.

If you wish to have a fire going all night it is important to position a light sleeper near the stove to keep waking up and throwing a few pieces of wood on every hour or so.

We have found the stove to be an adequate cooking stove. The stove is sturdy enough to hold pots of boiling water, frying pans etc.

A platform is necessary under the stove to prevent it from melting down into the snowpack below as it heats through the night.



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A VARIETY OF VIEWS OF WINTER CAMPING IN A TIPI



## 9.6.2 TENT COLOR CONSIDERATIONS

I have never given tent color much thought when purchasing a new tent. Unlike buying a pair of pants, there aren't always color options when selecting a particular tent model. However, there is a lot of thought that goes into the selection of a tent color by the manufacturer. One thing to consider if you do snow camping and spend time inside during the day is that yellow lets in a lot of light which might lead to snow blindness on a sunny day. Years ago REI did tests of colors and decided a dark orange was best for mountaineering tents- they were cheery and easy to find, but cut down on light more to help stave off snow blindness. Most people prefer:

- bright colors if they snow camp,
- navy, black, green or gray if they trail hike and like to hide from the crowds,
- black or navy for desert conditions as they provide better shade with a ventilated pitch,
- orange or yellow for emergency shelters and search and rescue,
- yellow for river trips for mood enhancement on rainy days,
- blaze orange, green or gray for hunters (depending on the type of hunting military tactical) gray or green for those in bear country ( to avoid visually attracting them)
- photographers like a bit of color in their photos.

Color	Advantages	Disadvantages
<b>Navy</b>	The NOLS color choice for blending in as it blends in well at dusk and semi-darkness, doesn't attract attention from people or animals. It dries quickly in sunlight. It makes the best shade if an ample insulating air distance (3 ft) is kept between you and the tarp. Best projection from snow blindness.	It lets less light through, dreary in dreary weather, can be hot in hot weather if fabric is close to the body.
<b>Purple, Brown, Royal</b>	It blends in well at dusk and dark, doesn't attract attention from people or animals. It dries quickly in sunlight. It makes the best shade if an ample insulating air distance (3 ft) is kept between you and the tarp. Best projection from snow blindness.	It lets less light through, dreary in dreary weather, can be hot in hot weather if fabric is close to the body.
<b>Grey</b>	Popular with many backpackers. It blends in well in many settings. It doesn't attract attention from people or animals. It lets lots of light through.	Dreary in dreary weather, lets radiant heat through in hot weather (doesn't provide dark shade), little protection from snow blindness.
<b>Bright Orange or Chartreuse</b>	A favorite of Search and Rescue and survival kits. It is cheery in dreary weather, easily spotted in emergencies or when returning to camp in stormy weather. It lets lot of light through. It provides hunting safety.	It shows dirt, may attract attention from people or animals, gives little shade, and gives little protection from snow blindness.
<b>Leaf Green</b>	The stealth camper's choice. It blends in well in many settings. It lets some light through, good compromise for all around use.	Difficult to locate in twilight conditions
<b>Gold</b>	It is cheery in dreary weather, easily spotted in emergencies or when returning to camp in stormy weather. It lets lot of light through.	



A VARIETY OF TENT COLOR OPTIONS FOR WINTER CAMPING.

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### 9.6.3 STAKING OUT

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Regular tent stakes are almost worthless for staking a tent out in snow. Using a tent, tarp or tipi in winter conditions requires staking alternatives such as snow stakes, deadman or other staking alternatives.

#### 9.6.3.1 SNOW STAKES

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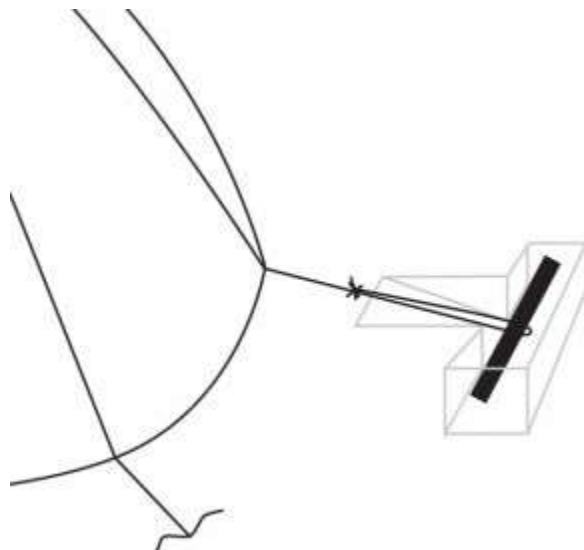
Snow stakes provide holding power in snow by increasing the length of the stake and incorporating holes and edges to adhere to the snow. A rolled lip holds the tent cord and makes a solid striking

surface. The perforations in the stake bite in and hold, once the snow is compacted and sets. When the snow stakes are inserted into the snow, the holes in the stake fill with snow, helping to anchor the stake in place. One can also use one of the lower holes to tie off stake if necessary (burying cord in snow), rather than using the traditional top hole

#### 9.6.3.2 DEADMAN

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A way to stake a tent in snow is with the use of "deadmen". Deadmen are anchors buried in the snow. These anchors can be traditional tent stakes, pieces of wood or bags filled with snow. To use a deadman attach a line to the tent guy point and tie an adjustable loop or tautline hitch in the line. Dig a small trench a few feet away from the tent and perpendicular to the direction of the line coming from the tent. Place a deadman through the loop and bury it 6"-10" deep in the trench making sure that the adjustment area at the tent end of the loop is not buried. Stomp on the deadman or pour a small amount of water on this spot to really set it. Let the snow set (sinter) for 30-60 minutes before tightening up the guy line.



DEADMAN STAKE EMPLOYED TO STAKE OUT A TENT.

An inexpensive, very packable and light weight deadman is a simple fabric parachute. These are rip stop squares (18"-24") with line attached to each corner. Just pack them full of snow and then bury them in the snow and attach a guy line to them.



FABRIC BAGS CAN BE CARRIED TO FASHION ONSITE DEADMAN ANCHORS.

If you have the wire stakes, a way to get more holding power is to take pairs of the stakes and bury them as an "X" rather than a single cross-bar "T".

When it's time to leave, untie the loop in the guy line and pull out the line. If you need to retrieve your deadman the next morning, it is usually easiest to use an axe to chop away the snow.

### 9.6.3.3 ALTERNATIVE STAKING OPTIONS

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Other staking options include using - skis, ski poles, ice ax, snow shovels, spare stuff sacks filled with snow. Or one can position your tent between several closely grouped saplings and use them as tether point.

### 9.6.3.4 TENT VESTIBULES

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If you've set up your tent on two or more feet of snow, take a shovel and dig out a vestibule area. Once it is dug out you can easily take your boots off and put them on while sitting in the doorway of your tent. This is more comfortable and it helps keep snow out of your tent.

## 9.7 SNOW SHELTERS

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Snow is a very good insulator. Snow also is a very effective windbreak – if your shelter is constructed so that the snow you use doesn't blow away in the wind. Snow shelters include quinzees, snow caves and igloos.

**Quinzee:** Quinzees are fairly quick to build but do require a fair amount of energy to construct. Build a big pile of snow, allow the snow to settle and compress and then hollow out the pile to create a cavity that is uniform and with walls at least 12 inches thick all around.

**Snow cave:** To build a snow cave find a suitable location, usually on the leeward side of a small hill or natural rise in the landscape where snow drifts tend to form. Dig into the drift creating a hollow and you have a snow cave. A snow cave can be an effective shelter option for a single person. Finding a suitable location however, is often a hit or miss proposition

Digging a quinzee or caves requires a lot of energy and usually results in a lot of sweating – not good in cold weather. Having several people on hand to take turns digging and wiping snow off of clothing is usually a good idea. Take your time and take lots of breaks to prevent overheating..

**Igloo:** An igloo is by far the best option for all around protection from the elements. It is possible to build snow blocks from just about any type of snow that is available. Using a mould to pack the snow into the right size and shape makes building a top quality igloo easier. Using a snow mold allows even a novice winter architect to construct an adequate shelter in as little as 2-4 hours. An igloo is a very sturdy shelter that can last for months and gets better with every snowfall.. A uniform shape maximizes stability and insulation and wind stopping power. Temperatures inside an igloo often hover in the 37-41F degree range with the addition of body heat and a small candle/flame.

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### 9.7.1 QUINZEES

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A quinzee (also quinhzee) is a combination of an igloo and a snow cave. Quinzees are suitable in marginal snow conditions, or when a crust is not available for igloos, or when there is not enough



deep packed snow for a snow cave. On the flip side a quinzee won't last an entire winter season as do some igloos. Usually quinzees are made for 2-3 sleepers.

Quinzees require a fair bit of work to complete and are usually used when spending more than one night in the same spot. If built properly a quinzee will be warmer to sleep in than a tent.



A QUINZEE IS AN EASY TO BUILD SNOW SHELTER

#### 9.7.1.1 HOW TO BUILD A QUINZEE

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1. To build a quinzee one shovels snow into a pile the shape and size of an igloo and then waits for the snow structure to sinter. Sintering is a process whereby snow crystals adhere to one another and form a bond making a harder structure. The sintering process may take a couple of hours to complete. If you are really organized you can bury your backpacks and then pull them out later in the tunneling process to reduce the amount of digging that has to be done. However, the items in the backpacks will be unavailable for a few hours, so make sure you have the items (e.g. stove, hot drinks, and extra clothes) that you might want during the interim.
2. Gather sticks approximately 12" in length and jab them all over your quinzee. These sticks will be the guides for the thickness of the cave walls.

3. Dig an entrance at ground level and as you tunnel inside, slant upwards to create a raised sleeping platform. Warm air rises, so this will allow the cold air to flow down and out while you're sleeping.
4. As you uncover the ends of the sticks, you will have a 12" wall at that location. This step will take the most time as only one person can excavate the inside while others outside move the snow away from the entrance (and stand around and get chilled). Expect the tunnel person to get snow-covered and/or wet when building the quinzee so make sure you have alternative clothing.
5. Try to keep your structure rounded. If you have a flat roof the quinzee will sag and eventually collapse
6. Pile up the excavated snow along the sides of your entrance to create a windbreak.
7. Smooth the ceiling as much as possible then light a candle or other heat source to glaze the interior surfaces.
8. Punch ventilation holes with a stick. Check the ventilation holes frequently and keep them clear.
9. If you have a tarp lay it down on the floor. If the weather is really nasty you can use your backpack to partially block the entrance door from drafts. Temperatures inside a snow shelter can be 32 degrees or warmer even when the outside temperature dips into negative digits.

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#### 9.7.1.2 WINTERCAMPERS.COM EXPERIENCE WITH A QUINZEE

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On a dog-sledding winter camping trip in the Boundary Waters Canoe Area Wilderness we established a base camp on Eskwagame Lake. While our guides slept out in bivouac and 4 of us slept in the tipi, Jason and Paul decided to make and sleep in a quinzee.

They constructed a quinzee using the steps previously described– except they might have made it a little on the small side. At 2am those of us in the tipi heard “I’VE GOT TO GET OUT OF HERE!” followed by an explosion of nylon and snow as Paul was overcome by claustrophobia and exited the quinzee in a rush. Jason reported sleeping comfortably, but admitted that space was tight. Paul slept the rest of the night under the stars and Jason benefitted from the extra space.

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#### 9.7.2 SNOW CAVES<sup>30</sup>

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During the winter, one can sometimes see a ptarmigan making its home for the night: In full flight, the plump white bird will suddenly dive into a soft drift, hunker down in the resulting depression, and let blowing flakes settle on its feathers to form a protective blanket.

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<sup>30</sup> Ernest Wilkinson, Mother Earth News Issue # 078 – November/December 1982. “LEARN HOW TO BUILD SAFE, SNUG SNOW CAVES AND OTHER HAVENS IN WINTER WILDERNESS, PLUS HELPFUL INFORMATION ON WINTER CAMPING. “ From <http://www.motherearthnews.com/Do-It-Yourself/1982-11-01/Snow-Caves-and-Other-Shelters.aspx>



Snow, you see, is one of nature's most practical insulators. The falling flakes, each of which may contain more than a thousand loosely clustered ice crystals, can pile up into a fluffy mass (composed of as much as 90% air) that is virtually—in form and effect—the frozen equivalent of goose down.

Many of nature's creatures, in fact, use the heat-retaining qualities of snow for protection from winter's cold. But we humans, in all of our "wisdom", generally cling to our dependence upon technology . . . even in situations such as winter mountaineering trips, where—for shelter—we most likely sit huddled within the frigid confines of thin rip stop nylon walls. Worse yet, some individuals have actually perished needlessly from "exposure" to snow and cold, when a little knowledge of the resources at hand—and an ability to use those materials—could have saved their lives.

#### 9.7.2.1 SELECTING A SITE FOR YOUR SNOW CAVE

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An ideal spot for a snow cave would be a firm bank or drift that's six feet or more deep. But not everyone who needs winter shelter, of course, will find a place where the precipitation is that substantial, and even those who do will sometimes discover—early in the season, especially—that the piled crystals are too loose and powdery to make good caving material.

Fortunately, one of the characteristics of snow is that it tends to compact itself (and harden) once it's been disturbed. So when the cover is too shallow to accommodate a cave, you can build yourself an "artificial" drift in which to burrow: Find a hill that's 10 to 20 feet high and covered with 24 inches or more of snow, and then—with a shovel, your feet, or whatever—push the snow down the incline to form a large pile at the bottom. With that done, wait 10 to 20 minutes to let the material "set", and then proceed to dig your cave.

Likewise, if you find a site where a drift is sufficiently deep but not firm, you can tromp around the area and poke the powder repeatedly with a stick or your ski poles also mounding more snow on top and stirring that up a bit—to encourage the mass to harden.

In any case, it's important to remember that if you're in an avalanche-prone area, you need to be very careful about choosing a site. Always check with rangers for snow condition reports before venturing into the wilds . . . and be aware that the lee—windless—sides of mountains are particularly dangerous, and that new snow on the ground increases the danger of a slide.

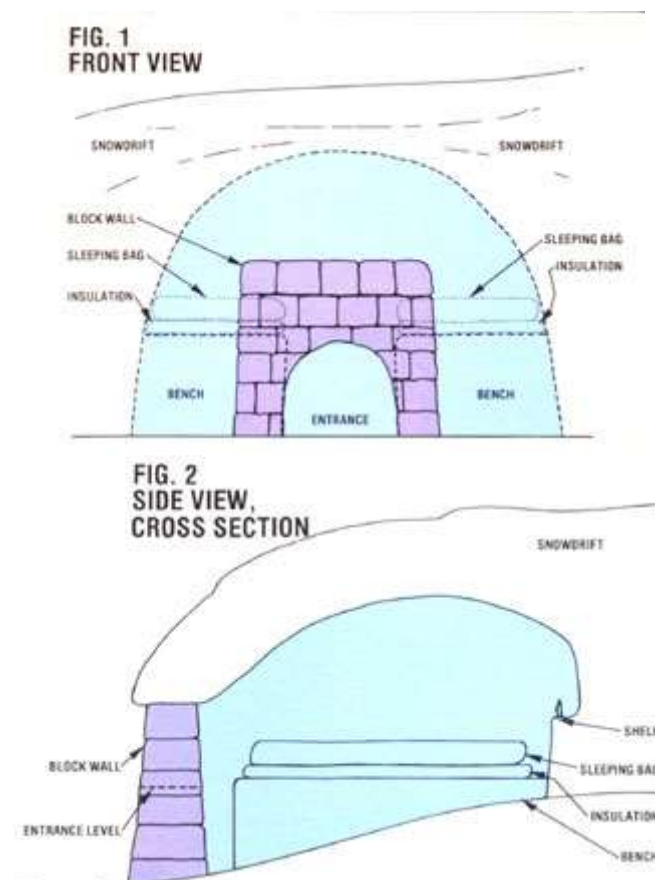
#### 9.7.2.2 CONSTRUCTION OF A SNOW CAVE

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Virtually every book I've read on the subject of snow caving recommends carving a narrow tunnel into a drift or bank, and then hollowing out a larger living area—at the interior end of the shaft—by scooping out the material and transporting it through the burrow to the outside. I've found, however, that the method is very time-consuming . . . and that a digger is likely to get a kink in the back—and snow down the neck—in the process.

Therefore, I've come up with what I believe is a much better technique: First, open a large vertical hole (about four feet on a side, working from "ground" level up) directly into a drift or pile of snow. You can use a lightweight folding shovel—a tool that I think all winter back-country enthusiasts should carry—or, in a pinch, some kind of make-do implement . . . such as a snowshoe, ski, or flat stick.

When the “doorway” is done, go on to excavate your living quarters by digging out a rounded, dome-shaped area (a flat roof will sag and collapse) that’s somewhat wider and higher than the entrance itself. The exact dimensions of your abode will, of course, be up to you . . . and will depend upon the number of people you intend to house. Given the right snow conditions, you can construct caves large enough for six or more individuals . . . but a smaller shelter—such as the two—person model shown in Figs. 1 and 2—takes less time to build, tends to be more stable, and is a more appropriate project for beginners.



VIEWS OF A SNOW CAVE

Once you’ve hollowed out the cubicle, take some of the loosened snow and pack it up to form a sleeping bench (or two or three) that’s 20 inches or more high, a bit wider than a sleeping bag, and as long as its occupant-to-be is tall. If you’re building a one-person shelter, you can dig a fairly shallow chamber and position the single platform parallel to the opening. If you’re making a two-person grotto like the one in the accompanying illustrations, you’ll need to excavate a deeper cavity and place a bed on each side of the doorway.

After you’ve finished contouring each bench to your satisfaction, lay a backpacking pad on top, and cover that with your sleeping bag. Be careful not to put any substantial weight on the bench just yet, however you’ll need to give the snow a chance to settle before you take your first nap.

Since the next major step in the cave construction is to block up the original 4’ X 4’ entry hole, it’s a good idea to move the rest of your gear inside first. (This is another advantage of my snow-

caving technique . . . you don't have to push, pull, and squeeze your equipment through a tiny, confining burrow to get it under shelter.) You may also want to carve a shelf or two in the cavern's interior surface, to hold a candle and other small items . . . and thrust a short stick partway into the wall to make a handy clothes hook.

Now—using your shovel, a snow saw, or just your hands—fashion “bricks” from the material that you scooped out of the cavity. For starters, try to make a number of cakes that are the approximate size (precision isn't required here) of a standard 8" X 8" X 16" cinder block, and then—as you build the wall—custom-tailor whatever others you need to fit specific spaces.

To fill the opening, lay the bricks in courses just as a mason might. Start with a horizontal foundation of end-to-end bricks across the entrance, and then position each block in the succeeding rows so that—whenever possible—it straddles the juncture of the two cakes below it. Remember, too, to spread a handful or so of snow “mortar” between the chunks as you work. The final product will be a sturdy wall that completely closes off the cavity, bottom to top.

At this point, take a break (gather firewood, get some camp chores done, go on a hike, whatever) and allow the wall a chance to firm up. After 20 minutes or so, you and your domicile will be ready for the last few construction steps.

Using a shovel or flat stick, cut a small entrance hole (this one should be just big enough to crawl through) in the bottom center of the snow-brick wall. Ideally, the highest part of the opening should be lower than the top surface of the sleeping benches (rising body heat will then be contained inside the cave), so dig down as close to “floor” level as you can when you cut this cavity.

### 9.7.2.3 A FEW FINAL POINTERS

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Experience is the best teacher of all and that's certainly the case when it comes to developing a proficiency at building (and camping in) snow shelters. After a few winter back-country outings, for example, you'll acquire a sensitivity to the different kinds of snow—in terms of texture, moisture content, and “pack ability”—and to the degree to which varying conditions will affect the type of shelter you should (and/or can) build. New precipitation, for instance, is often too fluffy to make good material for a large cave but might be just fine for a one-person chamber.

You'll also learn, rather quickly, that it's important to pace yourself as you work making sure that you don't perspire excessively and—as a result—become overly (and perhaps dangerously) chilled. Always dress in layers; too, so that you can adjust the amount of clothing you're wearing to suit the weather and the activity at hand. And remember: To stay dry is to stay warm.

In addition, you may find that it takes some time to accustom yourself—both physically and psychologically—to life in a snow cave. You can't expect such a shelter to be the Waldorf-Astoria, but the grotto's temperature will hold at a range of 30° to 38°F (once you've been inside for a while), and neither you nor such items as jugs of water will freeze even if the mercury outdoors dips to 30 below. Should you be caught in an emergency situation without a sleeping bag, then, a snow cave will still keep you relatively warm. If necessary, you can use a few isometric exercises (tense the muscles in your legs, hands, and feet for several seconds, then let them relax, to stimulate blood flow) off and on through the night to avoid frostbite.

Some folks find that the darkness and silence inside a snow cave can be disturbing so be prepared, when you blow out your candle that first night in your shelter (and do be sure to extinguish the

flame, so that it doesn't consume oxygen while you're sleeping), to cope with an instant attack of claustrophobia. Most people get used to the quiet and close quarters in a very short time, however.

During the day, if you leave the cave - to go for a hike or gather firewood or whatever - be sure to mark the entrance conspicuously so that you'll be able to find your home when you return. Remember, too, that snow has a way of "swallowing" camp litter trash that, come spring, will show its ugly face all too plainly. Be sure to keep all refuse and waste in one place, and to pack it out with you when you leave.

And finally, practice building snow shelters before placing yourself in a situation where you might need such a structure. A wilderness emergency—such as getting caught in a sudden blizzard—is not the ideal time to try to construct your first snow cave. And reading the information in this article and in other books is not, by itself, sufficient preparation for going on an overnight cross-country tour without a tent.

With experience, you should be able to carve out a shelter in an hour or less so take some time this winter to teach yourself the art of snow caving. Find an appropriate site close to home, and spend an enjoyable afternoon or two practicing construction techniques. Once you've polished your skills, you'll be able to explore the wonders of winter's wilderness with confidence knowing full well that a warm, comfortable home is never more than a few feet of snow away.

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### 9.7.3 IGLOOS<sup>31</sup>

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Provided temperatures remain below 32 degrees F, constructing snow shelters is relatively easy. Sheltering from the wind is the first priority, since the wind can drastically decrease the air temperature. Temperatures below 14 degrees F become increasingly unpleasant, so that it becomes necessary to construct shelters in which heat can be retained extremely well. These can range from a simple, hollowed-out heap of snow to an igloo, which can take a few hours to construct. In a long-term shelter, such as an igloo, heavy, cold air can be diverted away from the occupants by digging a cold sink to channel the air down and away from the shelter. It is important to allow for



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<sup>31</sup> "The Complete Wilderness Training Guide" written by Hugh McManners and published by Dorling Kindersley. From Chapter Three, "Living In The Wild"

adequate ventilation in all snow shelters in order to prevent suffocation.

#### INITIAL STEPS OF BUILDING AN IGLOO



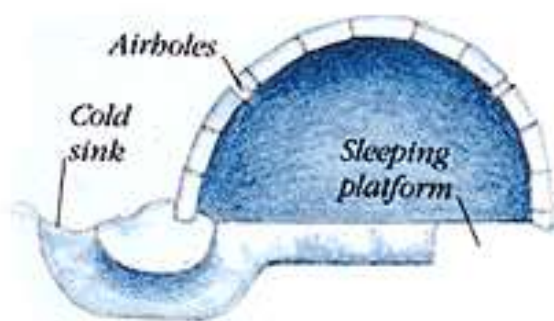
1. Cut blocks from dry, hard, hard snow, using a snow saw or large knife. Each block should be about 3 ft. (1m) long, 15 in. (40cm) high, and 8 in. (20cm) deep.

2. Form a circle with blocks around the hole created where you cut the blocks. Cut the circle in a spiral from the top of the last block to the ground ahead of the first block. This will make it easy to construct a dome.

3. Build up walls, overlapping the blocks and shaping them so that they lean inward. Cut a hole under the wall for the cold sink and entrance. Put several blocks along one wall as

a sleeping platform

4. The last block must initially be larger than the hole. Place the block on top of the igloo, then, from inside, shape and wiggle it to slot exactly into the hole.

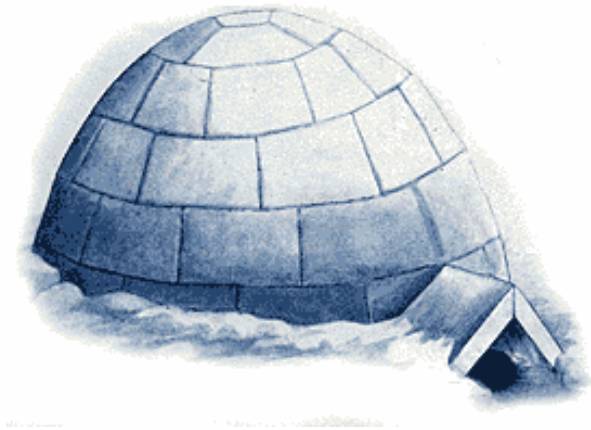


#### COMPLETING AN IGLOO

5. Hot air from your body and stove rises and is trapped inside the dome. Cold air falls into the sink and flows away to the outside. It is essential to cut ventilation holes in the walls with an ice ax.



**Finished Igloo.** With warmth inside the igloo, the surface of the walls will melt and freeze over, to form a smooth, airtight ice surface. The roof over entrance tunnel prevents snow from blowing into igloo.



It is vital to make at least one air hole in the roof to avoid suffocation. The igloo will get very warm inside with heat from your body, even if it is cold and windy outside. Without ventilation, lethal carbon dioxide will build up. Also, the use of stoves in an enclosed shelter is not recommended due to dangerous build-up of carbon monoxide.



## 10 CLOTHING FOR WINTER CAMPING

Clothes don't provide heat. The purpose of wearing clothing is to reduce heat loss and retain and maintain your warmth. Think about how you dress: small details make a big difference when the weather is harsh and your energy level is dropping. Clothes should insulate and support the body's temperature equilibrium. At the same time that our clothing should help to retain heat that the body produces, it should also transport excess moisture and heat away from the skin.

Breathability and wind resistance aren't the same thing. Breathability represents how much perspiration vapor can escape through a fabric from the inside out, whereas wind resistance measures how easily wind passes from the outside in. These are different properties, it's possible for a garment to be very air permeable but not very breathable—air could pass right through, while sweat could still bead up inside, leaving you feeling damp and cooled. The opposite is also possible, for example, jacket that blocks wind completely (zero air permeability) but will still let perspiration vapor pass through at a decent rate.

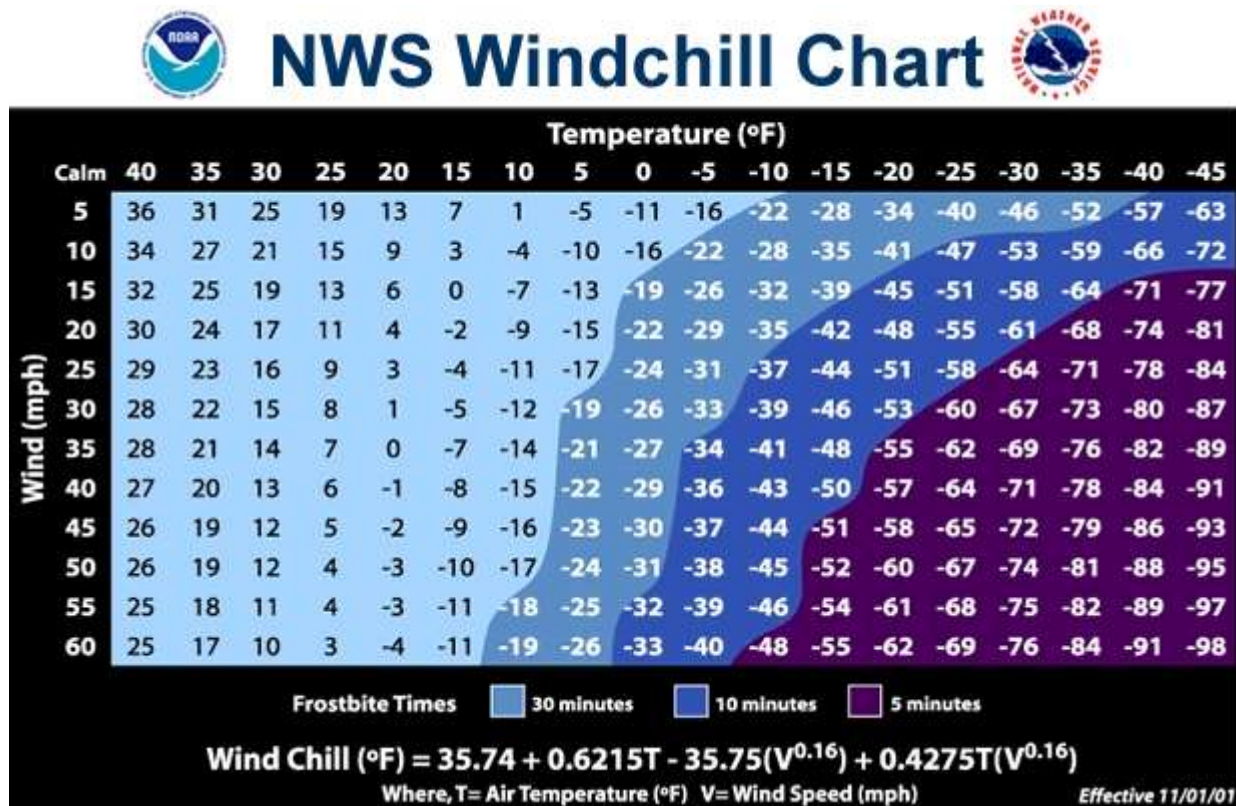
The purpose of clothing is to retain heat that the body produces. The body puts off heat all the time, for better or for worse. This is a natural process, and we lose heat in five ways.

Heat Loss	% Heat Loss	Primary Action	Prevention
Convection	50%	Air is heated when it is in contact with the skin. The warm air rises up and away from the body. Wind increases convection.	Wear windproof shells, a hood and a hat to protect your face and head. Take breaks out of the wind. Dress appropriately for high wind conditions.
Radiation	30%	Heat in the form of infrared radiation is released as waves.	Insulate with warming materials that trap air and retain heat nearest the body.
Conduction	5%	Heat is conducted by material in contact with the skin. Metals or water conduct heat rapidly.	Sit and/or sleep on insulated pads off the snow. Put insulating soles in your boots. Stay dry and avoid direct contact with metal objects.
Evaporation	5%	Body heat is transferred by perspiration on the surface of the skin and moves away from the body. Wet skin loses heat rapidly.	Keep dry. Avoid sweat by adapting clothing to your activity. Use a wicking base layer that absorbs and transports moisture from the skin.
Respiration	10%	Energy is lost when cold air is inhaled and heated in respiratory passages before reaching your lungs.	Breathing through your nose helps protect your lungs, since the air has more time to warm up before entering the lungs.

You have probably heard the phrase “cotton kills”. Cotton is an extremely absorbent fabric. It holds water – like melted snow or sweat – very well for a long period. And the problem is when you work up a sweat, cotton traps it close to your body. Add a little wind and evaporative cooling will happen. It can chill you very quickly to the point you are uncomfortable or potentially hypothermic. Wool or synthetic materials are much better suited to cold weather conditions.

## 10.1 UNDERSTANDING WIND CHILL

In 2001, the U.S. government started using a more precise way to measure wind chill by testing how quickly people’s skin froze. Twelve volunteers were placed in a chilled wind tunnel. Equipment was stuck to their faces to measure the heat flow from their cheeks, forehead, nose and chin while they walked three miles per hour on a treadmill. One of the things they learned was how quickly frostbite develops on exposed skin. The information collected from the volunteers helped scientists come up with the complicated formula involving wind speed and air temperature to compute wind chill. For example, if the temperature is zero degrees Fahrenheit and the wind is blowing at 15 miles per hour, the wind chill is calculated at 19 degrees below zero. At that wind chill temperature, exposed skin can freeze in 30 minutes.



COMPUTING WINDCHILL USING THE NATIONAL WEATHER SERVICE TABLE

Wind-chill temperature is only defined for temperatures at or below 50 degrees F and wind speeds above 3 mph. Bright sunshine may increase the wind chill temperature by 10 to 18 degrees F. The new Wind Chill Table index:

- Calculates wind speed at an average height of five feet (typical height of an adult human face) based on readings from the national standard height of 33 feet (typical height of an anemometer)
- Is based on a human face model
- Incorporates modern heat transfer theory (heat loss from the body to its surroundings, during cold and breezy/windy days)
- Lowers the calm wind threshold to 3 mph
- Uses a consistent standard for skin tissue resistance
- Assumes no impact from the sun (i.e., clear night sky)

For those wishing a more precise calculation than that provided by the table the NOAA website provides a Wind Chill Calculator where you can enter your exact temperature and wind speed to determine the precise wind chill factor.

## 10.2 REGIONAL WINTER CONDITIONS

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How to dress to stay dry and warm is very dependent on your location. Regional variations should be taken into consideration.

Location	Winter Conditions
<b>East Coast – Vermont, New York, New Hampshire, Maine</b>	Everything from lake-effect snow, cold air from the north, and the occasional warm fronts. Be prepared for very cold days, as well as days when it goes from snow to sleet to rain.
<b>Midwest – Michigan, Wisconsin</b>	Cold and windy.
<b>Intercontinental – Utah</b>	Lots of snow. The typical dry snow requires cold temperatures, but be prepared for some warmer periods with heavier snow
<b>Rockies – Colorado, Wyoming, Montana, Idaho</b>	Expect dry, colder temperatures that typically stick around whether it is snowing or sunny. Insulation may be more important than breathability in a jacket or pants
<b>Sierras – California, Nevada</b>	Wet, heavy snow and constantly changing temperatures.
<b>Pacific Northwest – Oregon, Washington, B.C.</b>	Rain which often equates to snow in the mountains. Staying dry is the name of the game. Temperatures can become warm, so combine water proof shells with synthetic or wool layers for greatest moisture wicking power.

## 10.3 LAYERING

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An efficient way of dressing in a cold climate is to use layers. This provides a versatile and flexible system that not only protects against cold, wind and wetness, but is also easy to ventilate or modify if you get too hot. The layering principle divides clothing into wicking, insulation and wind/water repelling layers.

- Layer 1. A base layer, worn closest to the body, which transports moisture away from the skin. It is imperative to wick moisture away from the skin, since water conducts heat 25 times more efficiently than air. A base layer in synthetic fibers or wool is superior to cotton, which absorbs moisture and dries poorly. Synthetic fabrics are usually lighter than wool for comparable warmth and are significantly less expensive than wool. Wool feels warmer and less clammy on the skin when damp but takes longer to dry than a synthetic fabric. Synthetic fabrics wick moisture faster which contributes to a faster drying time but also to chilling in windy conditions. Wool is significantly better at resisting buildup of body odors than most synthetics.
- Layer 2. A mid-layer adds extra insulation, and thus retains body heat. In cold weather or if activity level is low, a thicker layer is needed. The purpose of the second layer is to trap insulating air. The more air in the clothes, the better the insulation.
- Layer 3. A wind and water repellent shell that protects against external cooling and retains the warmth created between the inner layers. Modern shell garments release some moisture through their material. During high activity levels, the garments should allow ventilation at the neck, the cuff or at other special openings to increase the release of warm, moist air.
- A fourth layer can be worn during break times or when making camp. Windproof, high loft down or synthetic filled garments are easy to put on over the shell layer.

The layering principle does not apply only to the body in general, but also to the feet, hands and head.

Don't go overboard with layers. You do not want to be hot and you don't want to sweat. Usually the biggest problem isn't staying warm while snowshoeing, it is keeping cool.

## 10.4 MANAGING SWEAT

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If your base layer gets wet with sweat, it takes a lot of body heat to warm that moisture, evaporate it away, and keep you comfortable. As sweat or moisture evaporates, it cools. If the moisture is against the skin, it will cool the skin and make you cold.

While it may be impossible to avoid sweating altogether there are steps you can take to reduce the amount you sweat and handle any moisture. Be aware of your sweat. Pay attention to your body as you begin to exert yourself and recognize when you begin to sweat. I can usually sense the sweat pores opening up. That's the moment to take some, or all, of the following steps.

1. Adjust your layers. You need surprisingly few layers to stay warm when working hard in the cold, and should shed layers as soon as you sense your body sweating. When taking off for a hike during the winter one always has decisions to make. Do you start off wearing extra clothes knowing that in 10 minutes you will have to stop and shed layers? Or do you start off with fewer clothes knowing that, once hiking, you will warm up comfortably. In either case extra clothing will end up in your pack for the majority of the hike. Most waterproof-breathable materials, as well as windproof fleece, are not actually that breathable in high exertion activities. They quickly begin to trap sweat faster than they allow it to pass through, which can prompt the next step.





JIM, SKIP AND MATT ARRANGE LAYERS PRIOR TO A HIKE UP KANE MOUNTAIN.

2. Ventilate. Unzip the pit zips on your jacket if it has them. Open the front zipper as much as possible. If your pants have side-zips open them as well. I like wearing a vest while snowshoeing. It keeps my core warm, but ventilates moisture from my arms and arm pits; opening the front of the vest vents even further. Remove any neck coverings and switch to 'ear covering mode' on your hat, if possible.
3. Slow down. Move slow enough to reduce your sweat by matching your pace to your breathing. You should be able to carry on a normal conversation without being short of breath, if not you are moving too fast. To slow down further or when on strenuous terrain take one step for each breath (i.e. inhale, exhale) for a slow but steady pace that you should be able to maintain while staying at a comfortable level of warmth.



## 10.5 CLOTHING MATERIALS

The chart below describes advantages and disadvantages of popular clothing materials for the three main layers.

Base Materials	Advantages	Disadvantages
<b>Polyester</b>	water repellent and dries quickly, abrasion resistant, non-allergenic	can get smelly & retains body odor
<b>Polypropylene</b>	water repellent, abrasion resistant, non-allergenic, warm when wet	can get smelly and retains body odor
<b>Merino Wool</b>	warm when wet, odor-resistant, natural fiber, accommodates a wide range of temperatures	lesser quality can be itchy to sensitive skin, heavy when wet, not quick drying, more expensive
<b>Silk</b>	comfortable, light, natural fiber, wicks moisture reasonably well	not very durable, not as warm as wool or synthetics
<b>Spandex</b>	non-allergenic, form fitting	can be hot
Mid-layer Materials	Advantages	Disadvantages
<b>Fleece</b>	inexpensive, insulates when wet, dries quickly, non-allergenic, comes in a variety of weights, available in windproof varieties	bulky to pack, heavy when wet
<b>Wool</b>	warm when wet, odor-resistant, natural fiber, accommodates a wide range of temperatures	heavy when wet, not quick drying
<b>Down</b>	excellent warmth-to-weight ratio, lasts a lifetime, natural	expensive, poor insulation when wet, takes forever to dry, special cleaning process required, some people are allergic to down
<b>Synthetic / Poly</b>	non-allergenic, packs light & compact	will lose loft & insulation over time, short lifespan
Shell Materials	Advantages	Disadvantages
<b>Nylon</b>	durable, light, compact, affordable, non-allergenic, can be made windproof & water-resistant	flammable
<b>Gore-Tex</b>	waterproof & breathable, light-weight, multiple uses, durable	expensive, requires maintenance

Winter camping requires covering up from head to toe. Subsequent sections discuss clothing options for staying comfortable.

## 10.6 HEAD

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There is widespread misconception regarding heat loss through one's head. You have probably heard one or more of these myths:



- If your feet are cold, cover your head.
- You can lose up to 75% of your body heat through your head alone.

Although 13-16% of the blood volume is in the head at any given time it is a very exposed structure. The problem is that the head is only about 10% of the body surface area. Thus, the head would have to lose about 40 times as much heat per square inch or centimeter compared to the rest of the body to make the above estimate of heat loss true.

[Wilderness Medicine](#)<sup>32</sup> took volunteers, wired them to monitor their core temperatures. They discovered humans lose heat through any exposed part of the body and the amount of heat humans lose depends on the amount of exposed surface area. The rate of heat loss is relatively the same for any exposed part of the body not simply the head. You do not lose heat significantly faster through the scalp than any other portion of the body with the same surface area. The idea that we lose heat faster throughout scalp because of the constant blood supply to the brain is simply a myth.

Wilderness Medicine reports the cerebral blood flow is constant; blood flow to the brain does not change as the demand for oxygen is constant. As a result, when you look at total heat loss, the head accounts for about 7% of the heat lost. The cerebral blood flow does, however, vary based on cardiac output – the harder your heart beats, the greater the blood flow to the brain. When you begin to exercise you increase the blood flow to the brain and increase the percentage of heat loss through the head to about 50% of total body heat loss. But as a person continues to exercise, the muscles demand more oxygen which increases blood flow. To ensure thermoregulation and maintain normal core temperature (exercises increases body heat), the skin vasodilates which increases blood flow to the skin to cool the blood. The net result is a decrease in the total blood flow to the brain and a decrease in percentage of total body heat lost through the head to about 10%. Once sweating begins, the percent lost through the scalp returns to 7%.

Research at the Army Research in Environmental Medicine labs showed that there was a temporary increase in heat loss through the scalp that returned to the baseline of 7% as the subjects continued to exercise.

[CNN published a set of 10 health myths](#)<sup>33</sup> including heat loss through one's head: "You Lose 75 Percent of Your Body Heat Through Your Head". CNN reports the truth is: "This adage was probably based on an infant's head size, which is a much greater percentage of the total body than an adult head". That's why it's important to make sure an infant's head remains covered in cold

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<sup>32</sup> <http://wildernessmedicineneewsletter.wordpress.com/2007/02/14/heat-loss-through-the-head-and-hypothermia/>

<sup>33</sup> <http://www.cnn.com/2010/HEALTH/08/31/rs.12.health.myths/index.html>

weather. (This also explains those ubiquitous newborn caps at the hospital.) But for an adult, the figure is more like 10 percent. And keep in mind that heat escapes from any exposed area (feet, arms, hands), so putting on a hat is no more important than slipping on gloves.

It is still a good idea to put on a hat if your feet are cold. But what is BUSTED is that there is nothing peculiar or unique about the head. The idea that we lose heat faster throughout scalp, because of the constant blood supply to the brain, is simply a myth.

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### 10.6.1 LAYERING FOR YOUR HEAD

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The practice of layering is commonly used to keep our torso warm and extended to our feet and hands with over-boots and choppers over mittens. But the head is one extremity that often gets ignored. In severe cold it is useful to combine hats, neck gaiters, scarves and hoods to keep your head and neck warm.

There are several styles of head coverings. Options include a toque-beanie-watch cap, neck gaiter or buff, down hats, balaclavas, face masks, an insulated cap with ear flaps and scarves.

On all these hats, I personally avoid any kind of windblock or waterproof-breathable membranes which limit their breathability and versatility. I prefer to layer extra head coverings as needed, but maintain breathability.

You can stuff damp glove liners into the top of a more spacious hat, and your body heat will dry them out.

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### 10.6.2 TOGUE, BEANIE OR WATCH CAP

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A toque-beanie-watch cap made from fleece or wool hats is good choices. Watch caps or similar close-fitting designs make putting your hood up an easy task. A variation of the toque is a Sherpa or snowboarder's hat which has flaps that extend down to the cheeks.

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### 10.6.3 NECK GAITER

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The fleece neck gaiter or buff option uses soft, double-layered brushed acrylic fleece to trap air to keep neck warm. It can be made into a hat shape that can open further for venting if needed. Fleece dries quickly; insulates even when wet and can provide valuable warmth.

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### 10.6.4 DOWN OR SYNTHETIC PUFFY HAT

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I never used a puffy hat but for hanging around the campsite or sleeping, some people swear by them. A popular option is the Black Rock down hat. The Black Rock Hat is made with ultralight ripstop fabric, 900 fill goose down, and lined with soft wicking dryline so it molds to your head and stays comfortably in place. The hat is very light – .9 ounces. This is an 1-½ ounces less than the lightest weight fleece hat. It balls up to just a bit larger than a golf ball, so it takes up almost no space. The hat could be just a little longer, as it did tends to ride up a little with movement. Be advised, when you are active you put out a lot of heat and a puffy hat

will suffer the same problem as a puffy jackets: moisture build up, with the long term effect that sweat and salts all compromise the loft. Still these hats are light and warm.

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#### 10.6.5 BALACLAVA

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A balaclava looks like an executioner's hood and provides full coverage for your head. These leave either your face exposed (which is good for ventilation) or have just an eye slit (which is warmer, but can collect moisture from your breath). Either way, make sure you buy one that's long enough so the bottom edge will meet your jacket collar to ward off drafts. You can layer a balaclava with a fleece or wool hat or a hood for extra warmth.

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#### 10.6.6 FACE MASK

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Usually made of neoprene or fleece, this provides crucial protection for your face, which - as it spends all day breaking trail through the wind - is vulnerable to frostbite.

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#### 10.6.7 HEADBAND

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A headband covers your ears, your forehead and the nape of your neck, and leaves the crown of your head open to the air. Headbands can be worn under helmets or even coupled with another hat.

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#### 10.6.8 A CAP WITH EAR FLAPS

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These hats are usually fleece lined with a baseball cap style brim and long ear flaps. Since I routinely wear glasses the brim is useful not only for shade but also to help keep snow and moisture off my glasses. It has to be a serious wind blast to make me employ the hook and loop closure.

I have a Columbia Kazoo Hat. I usually wear the ear flaps loose as the hat fits securely. The long



ear flaps keep my ears and neck warm even in a strong wind. The feature I like the most is the ability to temperature control. Unlike a beanie or watch cap the hat can be adjusted to provide more ventilation. As things warm up the ear flaps can be fastened across the back of the hat and gradually raised towards the top of the hat exposing my neck and head as it morphs into a baseball cap. The hat easily packs in a coat pocket, and it is surprisingly light weight for being so warm.



I got my hat at the local sporting goods store but a web search revealed a variety of sources with cost ranging from \$12-15. A variation is a trapper's or bomber hats as worn by Marge from the movie Fargo, The bomber hat is warm – perhaps too warm to wear during aerobic activity.

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#### 10.6.9 SILK BANDANA

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I read this tip in an article by Cliff Jacobson. He routinely brings a large silk scarf on his northern canoe expeditions. I found a large silk bandana to be a versatile item to take winter camping. A silk bandana is not as absorbent as a cotton bandana, but it is a lot stronger, dries faster, rinses out easier and it does not absorb stains the same way. It scrunches up into a smaller package and silk is 1/3rd the weight. It is superior to cotton for retaining warmth and keeping you dry. It feels smoother against the skin, and is generally more breathable.

I have used it primarily as a neck warmer when I am sleeping. When coaching Boy Scouts I encourage them to never bury their head in a sleeping bag during the night, but the light covering of a silk bandana can be used as a face covering. The bandana can be fashioned into a hat, a hood, an emergency sling, an ear warmer, a first phase water filter or any number of items. On a dog sledding trip in single digit temperatures I used it as a face mask to prevent frost bite on my cheeks.

## 10.7 HANDS

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Gloves provide a covering for individual fingers, but wearers do not derive much benefit from natural body heat. While gloves have separate coverings for four fingers and the thumb, mittens have one covering for all of the fingers and one for the all important opposable thumb. Mittens thus provide a pocket of warmth over the four fingers, but wearers often suffer from a lack of dexterity.

If keeping all fingers warm during winter activities is a priority, then mittens are usually considered preferable to gloves. When it's too cold for gloves; generally around 10-15 degrees Fahrenheit for most people, a good pair of mittens is crucial to enjoying any wintertime activity. If hand mobility is a priority, then gloves provide much more articulation than mittens.

Mittens are generally warmer than gloves (given the same material) because gloves have a higher surface area than mittens (due to the fact they have individual fingers). This means that the heat from your body dissipates into the air more quickly and it feels colder.

Double-layer woodsman's mittens (known as choppers and mittens) have been a winter staple for generations. They're tough enough for chopping wood, hunting, ice fishing and outdoor chores, and great for sledding and cold-weather hikes.

Traditionally the outer shell or chopper is made of strong, supple leather that resists wind, wear and water. The mitten insert provides insulation and warmth. The mitten inserts should fit inside the choppers and give a loose fit when your hands are inside. A tight fit cuts off the circulation of warm blood and can lead to frostbite and other cold injuries.

Shown below are three variations of choppers and mittens. On the left is shown a traditional style consisting of a rugged leather chopper with a hand knitted mitten insert. On the right are lighter weight deer hide choppers with a loose fleece mitten insert.



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LEATHER CHOPPERS AND MITTENS ARE A WARM CHOICE FOR WINTER CAMPING.

Finally, the choppers below are made of a waterproof Gore-Text shell with wrist closures and dense fleece mitten inserts. These choppers are longer with cuffs that extend to mid-arm.



MODERN CHOPPERS ARE MADE OF CORDURA AND FLEECE MATERIALS

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An advantage of choppers and mittens is the ability to substitute various mitten inserts as mittens get damp due to sweat or to increase hand warmth. For extended outings carry at least two full sets of wool mittens. In a pinch you can also substitute extra wool socks for wool mitten inserts.



THICK FLEECE MITTEN INSERTS CAN BE CARRIED AS SPARES

One can also use a hybrid system with light glove liners inside of choppers. This enables the choppers to be removed when increased dexterity is required, yet keeping your hands covered.



LIGHT GLOVE INSERTS CAN BE COUPLED WITH CHOPPERS.

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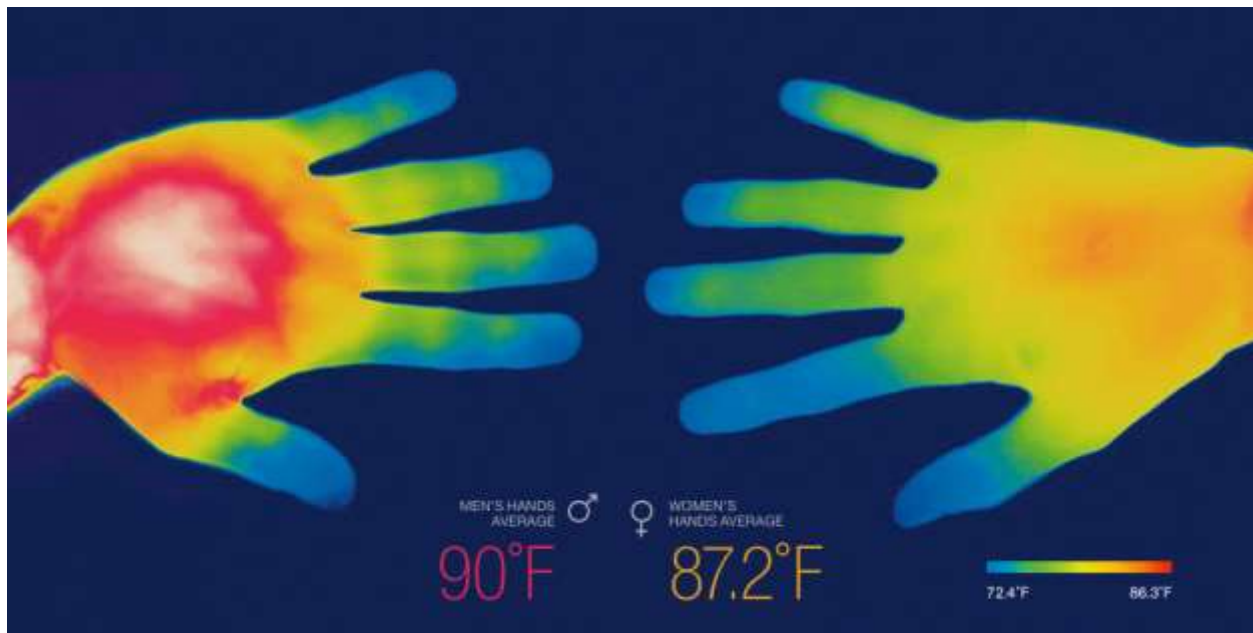
### 10.7.1 DEALING WITH COLD HANDS

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In extreme cold conditions, situations that require you to operate without adequate hand coverings or poor circulation then you are faced with the task of re-warming your hands. The following tips may be useful:

- Make sure your core is warm. Increase your level of exercise and/or add additional insulating layers to keep your core warm and prevent the diversion of blood from extremities, like your hands, to your core.
- Windmill your arms to create a centrifugal force to drive blood from your core to your hands.
- Thwack your inactive hands lightly against your leg to jolt your nerves and rekindle sensation. Then open and close your hand rapidly, flicking your fingers until you feel the tingling of blood rushing back into the capillaries.
- Repeatedly exhale hard into your closed hand or put your hands on your neck or belly or jam them into your armpits.
- Put hand warmers to the inside of wristbands or your sleeves covering your forearms. They'll heat blood inbound to your hands, which in turn will warm your fingers.

Although women's core body temperature can run 0.4°F higher than men's, women's hands run 2.8°F colder—87.2°F on average, compared with 90°F for men.<sup>34</sup>



A THERMAL PHOTO SHOWS A WOMAN'S HAND (RIGHT) COOLER THAN A MAN'S HAND (LEFT).

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<sup>34</sup> The Lancet, Vol. 351 No. 9114 p 1492, May 1998.

<http://download.thelancet.com/pdfs/journals/lancet/PIIS0140673605788759.pdf>

The gender differences in such cold responses are still not completely understood, but hormone levels and muscle mass could play a role. Women are also up to five times as likely to have Raynaud's, a disorder in which cold temperatures can make blood vessels temporarily collapse.

## 10.8 JACKETS

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Remember the sweat that your base layer is supposed to wick? That aerobic moisture is moving away from your body, and it needs to escape. If the outer shell isn't extremely breathable, it will trap that moisture. It can even freeze. You need a soft shell to really get rid of all that aerobic moisture you generate.

What's a soft shell? It's a style of fabric that's softer than a traditional rain shell. This fabric is woven in a way that will block wind but breathe. It's treated to be water-resistant so it repels water from snow. Some promise protection in a light rain. And as the name suggests, it's soft enough to move with your body, and it's comfortable. It's the successor to wind-block fleece.

Wind-block fleece is 250 percent warmer than traditional fleece. It has excellent breathability but isn't designed to be waterproof. The soft shells have the water resistance.

Should you wear a hard-shell or soft-shell jacket? Backpacker Magazine's Gear Chick Kris Hostetter recently posted an answer to the Hard-shell versus Soft-shell Jacket question.

"It's not technically the temperature that determines what type of shell is best (warmth is provided by what you wear underneath your shell), but several different factors: precipitation; your level of exertion and breathability requirements; and your weight and pack-ability requirement."

She writes *"Here's the deal: When do I pack a hard-shell? On any day trip where rain is a possibility. On any multiday backpacking trip—period. When weight is a big concern, I'll always opt for the rock solid weather protection of a hard-shell—which is always lighter and more packable than a soft-shell. Hard-shells are made using a tightly woven face fabric that's either laminated to a waterproof/breathable membrane—such as Gore-Tex or eVent—or sprayed with a waterproof/breathable microporous coating. For way more details on the differences between these two types of hard-shells, check out this article from our Oct. 2009 issue.*

*When do I wear a soft-shell? When you're skiing, snowshoeing, or doing anything outside in the winter. All soft-shells have a DWR (durable waterproof coating) that repels light precipitation, like snow or drizzle, and for winter sports, when hard-shells can get so crinkly and loud, it's nice to wear a quiet soft-shell. I'll also go for a soft-shell when I'm biking or running. Or on a daytrip when weight and pack space are not big concerns. Soft-shells are made using stretch woven face fabrics. Most soft-shells are not waterproof (see below)—they block the wind and provide way better breathability than hard-shells. And because the fabric is soft and stretchy, they often fit really well and have a totally styling' look for around town."*

Backcountry.com's soft shell jacket buyer's guide that provides information on the different options a buyer should consider before purchasing a soft shell. Soft shells are great for the edge seasons of winter camping. They can be considered heavy when compared to a down or synthetic jacket if you are just seeking warmth.



### 10.8.1 SOFTSHELL JACKET GUIDE

Soft-shells emerged when people wanted something to bridge the gap between waterproof hard-shells and highly breathable fleeces. The soft-shell sought to be the best of both worlds. These jackets range from heavyweight and waterproof to ultralight and ultra-breathable, so chances are you can find the right one for to help you stay dry and comfortable in a wide range of weather conditions and outdoor activities. Soft-shells are more breathable than a hard-shell; more wind- and water-resistant than a fleece and can make for a lighter system as you may not need additional insulation.

While many stretch-woven soft-shells hold off a good amount of moisture, they can only be considered water resistant. Soft-shells with membranes offer waterproof protection that rivals top-shelf hard-shells. However, the pores in these membranes are slightly larger than those in waterproof shells, so they breathe better. Basically, they're waterproof in about any condition except for a full-on monsoon. Soft-shells with membranes are waterproof. Stretch-woven soft-shells are water resistant.

It's hard to distinguish between stretch-woven and membrane soft-shells, but this may be the most-important factor for choosing. Membrane-equipped soft-shells offer greater weather protection at the expense of breath-ability; stretch-woven fabrics breathe better for aerobic activities, but don't protect as well. So how do you tell them apart? The easiest way is by looking at the fabric.

Type	Summary	Materials	Advantages	Disadvantages
<b>Stretch Woven Softshells</b>	These jackets shed wind and water thanks to the tightness of the fabric's weave. Most stretch-woven jackets keep you dry in pretty brutal snow or moderate rain, but eventually moisture will win out and you'll start to get a bit wet. However, if you're working hard, your body heat drives out the moisture, so you probably won't get totally soaked as long as you're moving.	Schoeller, Nylon or polyester, Polartec Power Shield, Apex Aerobic & Apex ClimateBlock (The North Face), M2, & M3 (Marmot), TufStretch (Mountain Hardwear)	Highest breath-ability for aerobic activities.  Generally very lightweight.  Good weather resistance with excellent wicking.  Can be used as a mid layer under your hard-shell.	Not completely waterproof.  Sometimes not completely windproof.  Not as lightweight as comparable fleece.
<b>Membrane Softshells</b>	Just like hard-shells, these jackets feature a waterproof breathable membrane for weather protection. The difference is that membrane soft-shells use a slightly looser weave for increased breathability. Keep in mind that "looser" is measured in this case on a microscopic	Gore-Tex Soft Shell, Gore-Tex WindStopper, Ventia (Outdoor Research), Conduit (Mountain Hardwear),	More waterproof than stretch-woven soft-shells.  More breathable than hard-shell jackets.	Not as breathable as stretch-woven soft-shells.  Generally heavier than stretch-woven soft-shells.



	level. These jackets will hold off hours of horrendous downpour. It has to be a full-on monsoon to soak through a soft-shell with a membrane	Omni-Tech (Columbia), Polartec Windbloc or Marmot M1	Versatility to take on nearly any condition.	Not quite as waterproof as a full-on hard-shell.
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Get a stretch woven softshell jacket if...

- You do a lot of highly aerobic activities like trail running or back country touring.
- Get out on very cold days with lots of fluffy snow but minimal slush or rain.
- Want to use your soft-shell in place of a fleece to layer under a waterproof shell.

Get a membrane softshell if...

- You are more concerned with weather protection than breathability or aerobic comfort.
- You get out on relatively warm days where slushy snow and rain are likely.
- Tend to spend blocks of time sitting still (such as on a ski lift or belaying an ice climb).

## 10.9 COVERING YOUR LEGS

Snowshoeing or skiing into a winter camping location usually doesn't require special leg coverings. Don't worry about being too cold on your snowshoe/ski into camp; if you are moving, you will generate a lot of heat. Quick drying / water resistant synthetic or light wool pants will likely be adequate for this highly aerobic activity. In special conditions or once in camp, however, the layering principle takes over.

### 10.9.1 WICKING LAYER

If it's cold and/or if there's a wind chill advisory or once I am settling into camp I wear wicking underwear layer under my pants for more warmth. This is usually a simple wicking base layer to move perspiration rapidly away from the skin and up to where it can evaporate without causing the skin to cool. REI offers this comparison of long underwear fabrics.<sup>35</sup>

	Synthetics	Wool	Silk (Treated)
<b>Leading brands</b>	Capilene; Ex Officio; Marmot; Mountain Hardwear; REI Polartec Power Dry; The North Face; Under Armour.	Ibex; Icebreaker; Patagonia, SmartWool.	REI.
<b>Moisture wicking</b>	<b>Excellent</b> - Nonabsorbent fibers transport moisture away from skin, spreading it	<b>Excellent</b> - Wool fibers absorb moisture (as much as 36% of its weight), then	<b>Good</b> - Transports moisture away from skin more slowly than synthetics.

<sup>35</sup> <http://www.rei.com/learn/expert-advice/underwear.html>

	over the garment's outer surface to speed evaporation.	gradually release it through evaporation.	
<b>Drying time</b>	<b>Excellent</b> - Dries faster than any fabric on this list.	<b>Good</b> - Slower to dry than synthetics, but often feels dry on skin.	<b>Fair to good</b> - Silk absorbs some moisture and is thus fairly slow to dry.
<b>Temperature regulation</b>	<b>Fair to good</b> - If breezes arise before it dries, a wearer could get chilled. In hot, humid conditions, faster-drying synthetic layers are usually best.	<b>Very good</b> - Surprisingly comfortable on warm days; excellent for cool days. Offers more warmth than a synthetic garment of the same thickness.	<b>Very good (in low temperatures)</b> - As nice as silk feels, people typically find it too warm for vigorous warm-weather activity. Good insulator when it's cool or cold out.
<b>Odor resistance</b>	<b>Poor to fair</b> - When worn for extended periods, synthetic fabrics collect bacteria causing odors. Best if laundered after every use.	<b>Excellent</b> - Wool is naturally antibacterial, usually for the life of the garment. Can be worn on consecutive days with minimal odor buildup.	<b>Fair</b> - Best if laundered after every use.
<b>Stretch</b>	<b>Very good</b> - Above-average elasticity. Retains shape after being stressed.	<b>Very good</b> - Above-average elasticity. Retains shape after being stressed.	<b>Good</b> - Moderate elasticity. Usually retains shape after being stressed.
<b>Price</b>	<b>Good</b> - Moderately priced.	<b>Expensive</b> - Natural fibers can be costly.	<b>Fair</b> - Borderline expensive.
<b>Suggested uses</b>	-All activities, all conditions. -Best in this group for rainy conditions and for heat and high humidity. -Snug fit best for cold weather..	-Most activities, most conditions. If paddling or in rainy conditions, faster-drying synthetics are a better option. -Best in this group for cool conditions.	-Moderate cool-weather activities and snow sports. -When stationary (spectator sports) or post-activity lounging indoors.

### 10.9.2 INSULATING LAYER

For really cold conditions (or extreme lethargy in camp) add an insulating layer of fleece or pile. Fleece has insulating qualities similar to wool, but is more hydrophobic, (less water absorbent), which means they hold less water and dry more quickly. Fleece doesn't have the same warmth-to-weight ratio as a good down or synthetic layer, and it's not very compressible. Fleece is available in different weights or thicknesses, with different amounts of loft and insulation. Fleece sweatpants are inexpensive and commonly available. While good as a middle warmth layer fleece is not very wind or water resistant and is a poor choice for an outer layer.

### 10.9.3 PANTS

Your pants may be constructed of wool, a synthetic soft-shell, insulated or waterproof, depending on your activities, the weather, the snow conditions and personal preference.

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### 10.9.3.1 WOOL PANTS

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Wool gets its insulating quality from the three-dimensional elastic, wavy crimp in the fibers that traps air between them. The weave of some wool clothing can be as much as 60-80% air which is excellent for heat retention.

Technically, it can be argued that wool does not wick moisture. The end result, however—fibers moving perspiration away from skin and dispersing it through evaporation—is the same. Rather than straining perspiration moisture and vapor through the tiny gaps in a nonabsorbent synthetic knit, wool's inner core (cortex) absorbs moisture—between 27% and 36% of its weight.

Wool is highly breathable, dries fast, is slow to retain odors and is flame resistant – important if you are working around a campfire. Wool is durable and quite abrasion resistant. Wool can be woven in very tight weaves that are quite wind resistant.

Wool pants can be purchased inexpensively. Many Swedish, Swiss, German, military pants are available for inexpensive costs. Look online at surplus outlets like Sportsman's Guide, Cheaper Than Dirt, for military surplus wool pants. Kick a crampon through the tough matte of wool above the ankle cuff and, oh well, the pants didn't set you back all that much.

Wool can be heavy when wet and releases moisture slowly. Coarse woven wool can be itchy against the skin and some people are allergic to it.

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### 10.9.3.2 SOFTSHELL PANTS

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Softshell pants are made of high-performance synthetic wind and water resistant, stretch woven fabric treated with DWR to help keep you warm and dry, even in wet snow conditions. Softshell pants are extremely breathable and the DWR is enough to deal with snow. Not all softshell pants are made from stretch-woven fabric (e.g. Scholler Dryskin) but for simplicity we will use stretch-woven and soft shell interchangeably. Stretch-wovens possess a unique type of water resistance that is inherent in the fabric structure and is not dependent on a chemical treatment that can wear or wash out. The surface of the fabric is woven in such a way that the hydrophobic face structure has a significant relief rather than being completely flat like a typical rain shell. Stretch woven fabric has a lot of give, so you can wear a trimmer fit and not have to sacrifice range of motion.

If you wear softshell pants over a baselayer they provide stellar cold weather protection for backcountry skiing, snowshoeing, where you encounter windy, wet, and cold conditions.

Adjusting side zippers to vent, draw cords in the leg opening, internal boot gaiters, reverse-zip storage pockets, suspender loops, and internal stretch panels at the knees are just a few features commonly found in soft shell pants.

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### 10.9.4 INSULATED OVERPANTS

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Once in camp or sitting around at night you may want more insulation, again with a wind barrier. A concern is ease of use. Having a pair of insulated pants that I can pull on in camp seems much easier than having to first remove my pants to add or subtract an underlayer. Insulated over pants are usually made from down or Primaloft insulation and can be used as a replacement for the heavy and bulky fleece garments used as an insulating layer. Overpants may be bulky but they compress well and are suitable when you are striving for extra warmth, minimal weight, and space in your pack is at a premium.

While overpants are easy to don or remove they are not intended for aerobic activities like cutting wood, setting up shelters, or hiking around.

Insulated overpants don't have to be complicated or expensive. We had a pair of insulated overpants made using a sweat pants pattern to make the pants. The pants have a draw cord waist. The legs have Velcro leg openings up to the knee to permit slipping them on over boots. Since the pants are intended for warmth and lounging around the fire at night we will be most likely wearing them over other layers, so the fit is relaxed.

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### 10.9.5 WATERPROOF PANTS

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Having waterproof or hardshell pants is important when you're dealing with wet snow conditions and/or are building a snow shelter. The primary purpose of the waterproof pants is to provide protection from wind and moisture. Ideally it should repel water from snow, sleet or rain and block the wind, while also letting perspiration evaporate.

Most hardshell pants are made waterproof and breathable to some extent by using tightly woven fabrics teamed with a coating or laminate and taped seams. This keeps moisture on the outside but allows perspiration to escape, with the goal of keeping you dry and comfortable.

The truth is that all outerwear designed for active winter sports has various degrees of water resistance, but will eventually leak given enough water, time and pressure. Manufacturers define "waterproof" according to different standards, and testing is not standardized. The trick is to balance protection from moisture on the outside with the ability to let water vapor (warm perspiration) escape from the inside.

Waterproof ratings are determined by placing a 1" x 1" square tube over the fabric and determining how high (in millimeters) a column of water you can suspend over it before it starts to leak.

<b>Waterproof Rating (mm)</b>	<b>Resistance provided</b>	<b>What it can withstand</b>
<a href="#"><u>0-5,000 mm</u></a>	No resistance to some resistance to moisture	Light rain, dry snow, no pressure
<a href="#"><u>6,000-10,000 mm</u></a>	Rainproof and waterproof under light pressure	Light rain, average snow, light pressure
<a href="#"><u>11,000-15,000 mm</u></a>	Rainproof and waterproof except under high pressure	Moderate rain, average snow, light pressure
<a href="#"><u>16,000-20,000 mm</u></a>	Rainproof and waterproof under high pressure	Heavy rain, wet snow, some pressure
<a href="#"><u>20,000 mm+</u></a>	Rainproof and waterproof under very high pressure	Heavy rain, wet snow, high pressure

For winter camping in wet snow conditions or for use in building a snow shelter, clothing rated between 5,000 mm and 10,000 mm is a good choice.

A field that was once dominated by Gore-Tex now has a number of products and choices. Most are extremely waterproof but outstanding gains in breathability in the past few years have redefined the market in high exertion outerwear.

## 10.10 MAINTENANCE OF DWR CLOTHING

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Virtually all rainwear have their exteriors treated with a durable water repellent (DWR) finish. It is rainwear's first line of defense against precipitation. DWRs work by increasing the surface tension created when water contacts a surface by suspending water droplets on the outer fringe of the fabric. An optimized DWR keeps moisture in a rounder droplet shape. The rounder the droplet, the easier it rolls off the fabric.

A waterproof/breathable membrane will stop water from penetrating a rain jacket's interior, but a DWR prevents precipitation from saturating the jacket's exterior. Without a DWR, a rain jacket's exterior becomes waterlogged and heavy; the damp fabric tends to sag and cling to your skin. Over time DWRs diminish in performance due to dirt, body oils, abrasion and repeated launderings. Indicators that it is time to wash your garment and reapply a DWR coating include:

- You have been taking part in high output activities where body oils and sweat might have accumulated inside the jacket or pants. These oils lead to contamination of the membrane and you will probably notice a decrease in breathability or increase of condensation inside your jacket or pants.
- You notice the water is not beading on the face fabric like it did when your jacket or pants were brand new. This is a sign that the DWR coating needs to be recharged.
- You have washed and dried your jacket a few times now without reapplying a fresh coat of DWR. It's probably time to apply this coating as it will bring back the beading effect.
- You notice some "wetting out" in high wear areas of the garment such as the sleeves, cuffs or jacket shoulders from backpack straps, or the front thigh area of your pants.
- You notice dirt and stains on the outside of your gear. Dirt and contamination like sunscreen allow water molecules to saturate or "wet out" the face fabrics and can also lead to increased build-up of condensation inside your gear.

Revive your garment by a washing and a few minutes of tumbling in a clothes dryer set on low or medium heat. The heat will restore DWR water repellency. For more serious treatments a DWR can be reapplied using a spray-on or wash-in DWR revival product from companies such as Granger's, Nikwax, McNett or Penguin.

## 10.11 FEET

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In addition to providing adequate traction the next most important consideration is to keep your feet warm. To avoid cold feet you want to ensure proper circulation, control moisture, and provide insulation.

When your body gets cold the circulation of blood to your arms, legs and feet will be reduced in order to maintain both the heat level and the blood flow in your head and vital organs.

If your boots are too tight they will restrict circulation in your feet, which leads to cold feet regardless of the insulation. Your boots should hold your foot securely, but have a large toe box to



permit your feet to flex and move enhancing circulation. There are several cues that your boots are too tight:

- Your toes rub against the front of the toe box
- You don't have enough room to wiggle your toes
- One part of your foot feels cold, but the rest doesn't
- Your foot or toes feel pinched or cramped
- You have no room to accommodate sock liners or extra socks

If you have high arches and your shoes otherwise fit well, taking the time to loosen the laces all the way down to the toe and then re-lace your shoes to leave more room in the instep.

Many problems with cold feet are related to moisture control. A foot secretes about 2 oz of water every day and during vigorous activities this quantity is multiplied. To avoid cold feet, it is imperative that moisture is quickly wicked away from the foot. Footwear made with excessively impermeable materials conspire to prevent the foot's perspiration from evaporating. The foot first gets damp, and then cold.

Your feet will sweat during the day and left unattended at night the moisture in your boots will freeze at night creating stiff, cold, uncomfortable boots to put on in the morning. An alternative is to wear boots with liners that you remove. If you are hot tenting you can dry the liners out over the wood stove. Otherwise keep in your sleeping bag at night to keep them from freezing and maybe dry them out a bit. For a short camping trip the amount of moisture transferred into your sleeping bag will be minimal.

For insulation you can add additional socks, boot liners and insoles. Wool socks are extremely warm, especially when paired with a good light liner sock. You can remove the factory insoles from the boots and replace them with insulated insoles which should be warmer than the stock models.

As a last resort, use chemical foot warmers to keep your feet warm. If you're feeling desperate you can always stuff hand warmers beneath your arches, just below your ankle or over your toes.

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### 10.11.1 SOCKS

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It may not seem intuitive, but wearing two pair of socks is an effective method for wicking moisture away from your feet to keep your feet warm and prevent blisters. Not two hiking socks, but rather a synthetic or wool liner and a thick synthetic or wool outer sock.

Wearing a liner sock is a great trick to prevent blisters on the trail. Liner socks are very thin socks, and generally are made of wool, silk, or synthetic materials to wick away moisture.

Your thick hiking socks provide cushion and insulation. The main thing you need to remember is that they should be synthetic or wool, so they wick moisture away from your feet.

On multi-day trips where you want your foot insulation to remain effective so that you don't need to bring extra dry clothing or if you are unable to dry your footgear out, you might want to consider vapor barrier socks. Vapor barrier socks are not breathable. They are normally worn over wicking socks to prevent perspiration from soaking your primary socks and boots. The vapor barrier improves the effectiveness of the insulating layers by isolating the moisture coming from the skin.

The liner sock gets wet from your perspiration, but when done properly the insulating sock and boot liner remain bone-dry even after several days of use. Once you have reached camp remove the vapor barrier sock and dry out your inner liner while your wool socks and boots remain dry and don't freeze overnight.

Vapor barrier socks work best in very cold temperatures, starting at about 10 degrees Fahrenheit or less; much warmer than that and you'll sweat too much, which gets uncomfortable. You can purchase vapor barrier socks made of silnylon, cuben or PU-coated nylon or experiment with using plastic bags from bread loaves or heavy duty plastic bags. Try placing a boot insole inside one or two plastic bread loaf bags and then duct tape over the top of the instep. This will allow several days use of a bread sack without your toes going through the bag.

Keep in mind your liners will get really damp but never soaking wet because when your skin reaches a certain humidity level sweating stops. If you change liners during the day also keep in mind your feet will flash cool. Use the tops of the liner socks you just removed to dry out your feet and the inside of your vapor barrier socks. Many people report a reduction in blisters or hot spots since using this system as there is no friction.

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### 10.11.2GAITERS

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Gaiters are important for protecting your feet and lower legs, keeping snow from slipping in-between your pants and the top of your boots while snowshoeing or skiing and keeping your boots and socks dry. Gaiters for snowshoeing are usually longer than hiking gaiters and typically extending up near the knees. Winter gaiters typically run from the bottom of your foot to mid-calf and are made with sturdy weather-resistant materials. Winter gaiters are usually made with waterproof and breathable fabric uppers and an abrasion-resistant lower to protect your ankles. Because the user may want to make adjustments while wearing gloves or mittens they usually have easily manipulated snaps and/or Velcro to secure them on top of your leg and boots.



In addition to the fabrication and design, most gaiters are also equipped with: a strap that fits over the instep of your boot or a lace hook that holds the gaiter in place; a top closure that cinches or clips tight to seal the upper half of the gaiter; and some sort of entry system. Often the entry system is a closure like Velcro, but can also be a zipper. Typically, winter gaiters have a front entry, where the closure system runs down the length of your shin, which makes it easy to get in and out of

the gaiters. They also have a larger circumference to fit over insulated pants and mountaineering boots.

When you shop for gaiters make sure your snow gaiters have a means of securing them at the top such that you can keep the gaiters cinched around your leg. The last thing you want is your gaiters sliding down your calves!

Look for gaiters with cords or straps that are replaceable. You want your gear to be useful for many years. If there is a strap or cord that runs below your boot it will eventually wear out. Get gaiters where you can easily replace those straps or cords.

Pmags<sup>36</sup> provided a tip for securing gaiters; if you have problems with the hook of your gaiter sliding around you can attach a key chain ring to your laces and easily hook your gaiters onto the key chain ring.



A KEY CHAIN RING PROVIDES AN ANCHOR FOR HOOKING YOUR GAITERS.

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### 10.11.3SNOWSHOEING BOOTS

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How to tell if you've got authentic snowshoeing boots? Look for a little lip on the heel. This extension keeps the rear binding from slipping down over your heel. It performs a similar function if you wear a traction device such as ice cleats. Do your boots have one?

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<sup>36</sup> <http://www.pmags.com/quick-tip-key-chain-ring-for-gaiters>

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THESE SHOES SHOW SNOW SHOE HEEL LIPS.

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#### 10.11.4NEW ENGLAND OVERSHOES (NEOS) FOR WINTER CAMPING

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NEOS OVERBOOTS OPTIONS FOR WINTER CAMPING

New England Over Shoes (NEOS) have several models of light weight 500 Denier Cordura nylon overshoes with a snow shoe compatible heel and a Vibram sole. They make both insulated and un-insulated versions. The overshoes add 20F to everyday footwear and the insulated models add 40F. NEOS are 100% waterproof which means that they don't breathe very well. They have a Velcro closure secured by a strap and a quick release buckle. They are very adaptable – you can wear them over a variety of footwear: boots, sneakers, felt liners, down booties or even Crocs.

They are easy to put on as they open up to huge proportions. Due to the ease of getting on and off they make excellent camp footwear. There is nothing easier to get on and off for a quick trip out of the tent late at night.

Suitable models are the Voyager (11"), Adventurer (15") and Trekker (20"). I have both the NEOS Voyager's (un-insulated, 2lbs, 11" high) and NEOS Trekker models. I have used them like mukluks, snowshoeing with felt liners inside. Once I wore the Trekkers over my hiking shoes for a series of stream crossings during a late spring hike in which the snow wasn't deep enough to require snowshoes.

These overshoes are great for snowshoeing. The molded ridges on the heels keep your feet secure in the bindings. However, in deep snow the 11" height of the Voyager permits snow to leak in over the top. The taller Trekker model doesn't allow snow to enter, but they get humid as the waterproof gaiter extends to upper calf level. I haven't tried adjusting the height of the Trekkers



while en route, but theoretically the tops can be rolled down and re-cinched. The Trekkers are easy to pack as they roll up into a small bundle.

The boots are light, warm and comfortable....as the man says “Did I mention they are light?”

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#### 10.11.5MUKLUKS

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Mukluks are soft boots made from leather or canvas designed for specifically for cold weather. Mukluks are characterized by two primary features: flexibility and breathability. In a mukluk your feet flex, move and roll and result in more warmth giving blood. The breathability of mukluks precludes moisture from building up inside the boot. Conversely, the boots are not waterproof and should be protected from slush and water.

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#### 10.11.6DOWN BOOTIES

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Once in camp it is a treat to put on dry socks and warm footwear. Keeping your feet warm plays an important role in maintaining a comfortable temperature. Down booties are super lightweight above the ankle booties made with a nylon outer shell fabric and a adjustable draw closure. They are usually made of 650 - 800 fill goose down or Primaloft insulation and are light (~6 ounces) and compressible so you can easily carry them in your pack. Sizes are a loose range so they may be slightly loose or slightly snug on your foot. Down booties are usually worn over socks and may be worn inside of overboots.

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#### 10.12 CHANGING CLOTHES

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While hiking and setting up camp you'll be working and keeping warm. Sometime afterwards the activity level drops and you'll need to put on dry, warmer clothing before you chill. The wetter you are and the colder it is the more important it is to change your clothes – all of them.

A typical winter camping scenario involves snowshoeing into your prospective campsite and working up a sweat on the way. Once the campsite has been determined the changing begins with a dry base liner and an insulating layer. Ensure your feet stay warm by putting on thicker dry socks. If you have the opportunity to air out and dry your wet clothes begin the process.

Only once you are warm and dry should you start assembling your shelter, getting fire wood, or cooking a meal. Don't wait and get cold before you decide to change your clothes.



## **11 FOOD AND FLUIDS**

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Your body needs fuel (both food and fluids) to be active and stay warm. You will need more fuel during winter camping.

### **11.1 FOOD**

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The average American consumes 2,700 calories a day. Carry a winter backpack, towing a sled and trying to stay warm may require in excess of 4,000 calories a day. This translates into roughly 2.5 lbs of food per person. Roughly 50% of your food should be carbohydrates, 20% should be protein and 30% should be fats.

Avoid taking fresh food in the winter (fresh fruit, vegetables, eggs). These all contain water and weigh a lot (and you have enough to carry). The exception to this is cheese, butter, or meats (needed for their high fat content). Take mostly dry foods (cereal, pasta, rice, wheat, oatmeal,) baked goods (brownies, cookies), or freeze dried foods (expensive but very lightweight and quick to cook which can save on stove fuel).

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#### **11.1.1 BREAKFAST**

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You probably want to get up and fueled up to avoid getting cold. If you saved your hot water from the previous evening in a thermos then you are set for making a hot caffeinated beverage and hot cereal. If you planned ahead and are really careful this can be accomplished as breakfast in bed.

The easiest thing to cook quickly in the morning is water. Breakfast suggestions include: instant oatmeal or Granola with hot milk. If possible supplement your breakfast with extra powdered milk to add protein, margarine for fats and a slight amount of sugar. The sugars will get you started and the proteins and fats will keep you going through the morning.

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#### **11.1.2 LUNCH**

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You can break out a stove and cook up a hot meal or carry a personal lunch. Another approach is to snack through the day. You can munch on cheese, summer sausage, power bars, cookies and brownies.

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#### **11.1.3 DINNER**

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It is often good to start dinner with a hot drink – soup, tea, hot chocolate or hot Jell-O, for warmth while waiting for the main meal.

If you are cooking over a fire there are few meals simpler than a cylindrical meat (e.g. hot dog, sausage, and bratwurst) shoved on a stick and cooked over flames. With or without condiments, warming your hands while held in a slice of bread and no clean up.

An alternative is a one pot meal or avoid the mess by freezer bag cooking a meal such as Mashed Potatoes in a Bag. Ingredients include canned chicken breast, stove top stuffing, instant mash potatoes and gravy mix. Place the stuffing and potatoes in separate Ziploc bags and note amount of water needed with a marker on the outside. Boil water necessary and add to mash potatoes. Massage bag to mix thoroughly. Place chicken in boiling water that will be used for stuffing. Add

this water to stuffing bag and massage to mix. The cooking water can be used for drinks and the pot remains clean.

At the end of the meal water should be melted/heated up for personal water bottles at night.

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#### 11.1.4 DEHYDRATING FOOD

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Dehydrating food removes water from food, making it lighter and longer-lasting without removing its taste. You can dehydrate the leftovers from many home cooked meal to provide a tasty meal outdoors.

The advantages of dehydrating your own food are many:

- savings on cost from pre-packaged trail meals
- the ability to suit your own taste
- you can make fruits and vegetables part of your winter camping menu without fear of freezing, damage or spoilage
- you can size meals to fit your appetite
- you can keep a stash of freeze dried food in your freezer available for the spur of the moment winter camping trip.

##### 11.1.4.1 PRIOR TO DEHYDRATING

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Select the best fruit and vegetables as dehydrated foods are only as good as the fresh fruit or vegetables. When selecting fruits and vegetables for dehydration, choose ones that are ripe, unbruised and at peak-eating quality. Prepare foods to be dehydrated as you want them to be served. Apples, for example, may be sliced, cut into rings, or pureed for fruit leather.

Keep pieces uniform in size and thickness for even drying. Thin cut slices will dry more quickly than thicker pieces.

Make sure your food is clean before dehydrating.

To prevent browning: try steaming or coating light-colored fruits and vegetables with acids such as lemon juice or ascorbic acid (FruitFresh) before drying. Steaming or blanching also is recommended for vegetables to inactivate enzymes that cause vegetables to mature, or toughen during drying.

##### 11.1.4.2 DURING DRYING

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Foods can be dried in a conventional oven, a commercial dehydrator, or in the sun. Drying times vary with the method and foods chosen. Maintain 130F to 140F with circulating air: Remove enough moisture as quickly as possible to prevent spoilage. A drying temperature of 130 degrees F to 140 degrees F allows moisture to be removed quickly without adversely affecting food's texture, color, flavor and nutritive value. If the initial temperature is lower, or air circulation is insufficient, foods may undergo undesirable microbiological changes before drying adequately. If the temperature is higher or if the humidity is too low, nutrients can be lost or moisture may be removed too quickly from the product's outer surface. This causes the outer surface to harden and prevents moisture in the inner tissues from escaping.

When testing for sufficient dryness, cool the food before testing. Know when your food is dry: Some foods are more pliable when cool than warm. Foods should be pliable and leathery, or hard and brittle when sufficiently dried. Some vegetables actually shatter if hit with a hammer. At this stage, they should contain about 10 percent moisture.

#### **11.1.4.3STORING YOUR DEHYDRATED FOOD**

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Store your dehydrated food in a cool, dark, dry place. Food quality is affected by heat. The storage temperature helps determine the length of storage; the higher the temperature, the shorter the storage time. Use your food within six to 12 months for best quality. Check your dried foods frequently during storage to see if they are still dry. Foods that are packaged seemingly "bone dry" can spoil if moisture is reabsorbed during storage.

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#### **11.1.5 SNACKS**

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My favorite easy to eat snack is trail mix or good old raisins and peanuts (GORP). Skip the prepackaged stuff and make your own. My favorite recipe for gorp includes peanuts, Reese's Pieces, raisins/dried fruit and Honey Nut Cheerios. Vary the mixture to suit your taste. – try smarties, banana chips, corn nuts, pumpkin seeds, chocolate covered coffee beans, gold fish crackers, and/or dried peas.

No 'high grading' or choosing select items from the mixture and if you are sharing the food with others don't reach in the bag for each share - no one wants to share your germs. Either pour GORP from the bag into the waiting hand or make a temporary container from a plastic bag or a hat and pour a portion onto it.



WINTER CAMPERS TAKE A LUNCH BREAK IN THE SNOW.

This picture shows all the ingredients for a good lunch break during a winter expedition.

- **Hydration.** You lose more moisture than you may realize exerting on a winter trek so drink up. Notice the Nalgene water bottle parkas to keep the water from freezing en route.
- **Easy to eat snack.**
- **Hard candy.** For quick energy, suck on a hard candy. Grab a couple extra for a boost later in the afternoon.
- **An insulated pad to park your butt.** Some people keep a small piece of closed cell insulation readily available just for this purpose.
- **Sunshine.** It always makes the day nicer.



## 11.2 FLUIDS

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Winter travel is strenuous exercise and you will likely sweat despite the low temperatures.

Normal levels of thirst usually come about with a 2-4% reduction in body water<sup>37</sup>. As long as you don't have kidney problems, this is generally tolerable, and acts as a perfectly sound guide to let you know when you need fluids.

Heavy exertion in cold, dry air uses up to 2-4 quarts/liters of water per day. Pack plenty of water and stay hydrated by drinking often. If you wait till you are thirsty you are already dehydrated, and dehydration can accelerate fatigue, hypothermia and frostbite. The effects of dehydration include fatigue, thirst, irritability, general discomfort, headache, weakness, dizziness, vomiting, nausea, chills, cramping, dry mouth, lips and/or throat, irregular heart rate, clammy skin or dry skin crusted with dried sweat and a decrease in performance.



DON'T GET DEHYDRATED (OR YOUR TONGUE FROZEN TO AN ICEFALL).

Dry winter air can dehydrate you without you noticing until it is too late. A good rule of thumb for checking hydration is the color of your urine. Urine will be light colored or clear if you are properly hydrated. Or you can pinch the skin on the back of your hand, lower arm, or abdomen between two fingers. If you are properly hydrated your skin should snap back into place. Dehydration becomes a problem when you exceed an 5-8% reduction in body water. By this stage, however, you would be experiencing dizziness and fatigue—far more severe than a slightly dry mouth.

To re-hydrate takes time. On average the body can absorb one cup of water every 15 minutes with the excess expelled. There are a number of factors that can affect this absorption rate; how fast the water is transferred from your stomach to your small intestine, the water temperature, genetics,

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<sup>37</sup> Water: An Essential But Overlooked Nutrient, Susan M Kleiner PhD. Journal of the Academy of Nutrition and Dietetics. <sup>37</sup>



etc., but this provides a good basis of estimate. Drinking moderate amounts on consistent schedule is preferred. A common schedule is 50 minutes of moving followed with 10 minutes of break and if you drink on every break you stay pretty much hydrated enough.

Water filters will freeze up and be destroyed by the winter temperatures. Purification tablets work much more slowly in cold temperatures. If you are using iodine tablets you may need to put in one extra and leave it for at least 45 minutes.

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### 11.2.1 CARRYING WATER

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I carry water in a wide mouth Nalgene bottle inside an insulated bottle holder inside my pack. The insulated water bottle holders are widely available and cost between \$15-20. Or store your water bottle inside your extra mittens or socks. They will keep the water from freezing as long as the temperature is not too far below zero.

Water mixed with something such as Gatorade or lemonade will freeze at a lower temperature than plain water. By placing your water bottles upside down you at least assure that if the water does begin to freeze the ice will be at the bottom of the bottle and thus not hinder you from drinking the remaining water. Hydration packs don't seem to work well in the winter as the tubes easily freeze.

On longer treks I bring two water bottles or a water bottle and/or a thermos. In the morning you will be filling up your water bottles with boiling water. Your non-insulated water bottle will cool down quickly and by the time you are ready for your first gulp, it will be cooled and you can hydrate. Your thermos can carry hot soup or tea and will stay hot until the afternoon.

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### 11.2.2 PURIFYING WATER

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It is easier, quicker and more efficient to purify water taken from a stream, pond or similar water source than melting ice and snow. However, these sources may have bacteriological or other contaminants. It is impossible to tell by sight if water is contaminated.

Not everything that's present in an undeveloped water source is necessarily harmful, and only some things pose an immediate threat to your health. Mountain Safety Research published a short article identifying the common contaminants found in backcountry water sources. Most contaminants can be placed into these categories:

- **Microorganisms**—Simply put: tiny bugs or germs. Microbes are the primary focus of treatment devices because of their immediate and potentially serious risk to your health. The pathogenic ones include bacteria (e.g., E-coli, Salmonella), protozoa (e.g., Giardia, Crypto), and viruses (e.g., Hepatitis A, Norwalk).
- **Sediment/Turbidity**—Dirt, silt, mud, glacial flour. Sediment gives water its dirty appearance and is unpleasant to ingest. But it usually isn't harmful in small amounts.
- **Tannins & Humics**—This natural organic matter leaches into wilderness water as plants decay, staining it a tea color. They're not harmful in small quantities, but they do impart odors and a bitter taste to the water.
- **Organic & Inorganic Chemicals**—Includes natural organic matter, but also pesticides, herbicides, and inorganic chemicals resulting from both industrial activity and natural erosion. Health risks usually arise from long-term, repeated exposure.

- Ordinary Salts—The result of eroding natural deposits or seawater contamination, salts simply make water taste bad; though very high concentrations can dehydrate you. When exploring coastal and desert regions, avoid drinking sea and brackish waters.
- Metals—Metals, like lead and mercury, can result from industrial contamination or natural erosion. They vary in potential health risk, but you can check with the ranger station for any local precautions before venturing out.

In the context of backcountry water treatment, water is usually considered safe to drink when it is free of pathogens—the disease-causing microorganisms. This is because they’re considered the “immediate threats.” In other words, swallowing even a few of these pathogens can make you sick with flu-like symptoms, or worse.

In contrast, non-biological contaminants, while not appetizing, typically take a much greater amount, usually from repeated, long-term exposure to build up in your system and cause you harm. But in general, backcountry zones are relatively low-risk for these types of contaminants and the trace amounts you’d ingest on a typical trip likely aren’t enough to agonize over.

That said, it’s important to assess your own risk level, and include drinking-water collection as part of your trip planning process.

To purify water effectively boil it or treat it with ultraviolet light. To purify by boiling bring the water to a rolling boil for 1 minute; at altitudes greater than 6,562 feet, boil water for 3 minutes. Treatment by ultraviolet light requires effective pre-filtering due to its dependence on low water turbidity. Follow the directions of your specific device to achieve the correct power delivery and correct contact times to achieve maximum pathogen reduction. A risk is that ultraviolet lights rely on batteries which lose energy much faster in cold weather, even when not in use.

Less effective methods are to use a filtration pump system or chemical treatment. Keep in mind that the water in filters can freeze, preventing them from working and cracking the filter, rendering it inoperable. Chemical treatments (iodination or chlorination) are not recommended because they become ineffective at low temperatures.

If you are concerned the water may have a taste because you dipped it from a pond or it contains residual pine needles consider flavoring it with a drink mix. Lemonade, tea, coffee, hot chocolate, Tang, Jell-O all can be added to hot water to make a great hot drink.

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### 11.2.3 MELTING SNOW

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If you're camping in winter then melting snow and / or ice may be your only feasible source of drinking water. Unfortunately just bashing a load of snow and ice in a pan and sticking it on a stove is a slow process. It may take as much as 8-10 cups of powder to create a cup of liquid. Gather dense snow if possible as it has higher water content than powder.

Bring a large trash bag which you can use to haul and store clean snow collected away you’re your busy (and dirty) camp areas.

To speed up the process start with an inch or so of water in the bottom of the pan then add snow to it. If you heat an empty metal pot it will scorch the dust and debris in the snow, making the water taste burnt, and likely ruin your pot.

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Use a large pot. Heating one big pot is more efficient than heating two smaller ones. Keep the lid on the pot for maximum efficiency.

Keep the process rolling by always leaving a reserve of water in the pan as you add fresh snow and ice.

If you are using a camp stove to melt snow try to cook out of the wind. A small breeze can reduce stove efficiency dramatically. Use a stove platform to prevent your stove from sinking as it heats nearby snow: Place stove legs on a wooden logs, aluminum-wrapped foam or a even a shovel blade if you're in a pinch.

Carry extra fuel. Be aware the extra time needed for cooking and/or melting snow for water may require you to carry more stove fuel than for summer trips. If you're using a white gas stove, you'll need at least eight ounces of white gas per person per day—though you may need more in subfreezing temps, if you have an inefficient stove, if it's extra windy, or you're cooking extravagant meals.

You may want to pour the resultant melt water through a coffee filter to separate the bits of dirt and leaves from your drinking water.

## 12 COOKING

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Why Cook? There are several reasons.

- Hydration. Winter camping it is hard to find clean drinking water. Boiling water before drinking it kills parasites and water borne pathogens. Cooking your food offers a mechanism for incorporating fluids in your diet.
- Comfort. Cooking your food provides heat for you and your body. Anyone that goes winter camping will tell you a warm drink and/or hot soup is nice to have on a cold day.
- Nutrients. Some food, such as vegetables, are hard to digest. We only have about 20' of intestine. Heat will begin the process of breaking down cell walls and indigestible cellulose in the food before we ever start chewing by the it.
- Entertainment. There is an enjoyment in successfully preparing meals and receiving the compliments of your companions.

Meals can be prepared by cooking on a stove or over a fire.

### 12.1 STOVES

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If your stove doesn't work during the summer, you can still get water to drink. If the stove is inoperable in the winter, you can't melt the snow that provides drinking water. Dehydration leads to hypothermia. Things can get ugly in a hurry.

[Zerstoves.net has a great article entitled "How to Choose a Backpacking Stove"](#). The article addresses factors such as fuel types used, fuel availability, weight and fuel efficiency, speed of cooking, cooking needs, starting and long term costs, cold weather performance, ease of use, safety and health concerns, personal preference, environmental/eco concerns, and ability to build stove at home or on the trail.

A comprehensive list of stoves is covered including:

- Petroleum Stoves (White Gas, Kerosene)
- Liquefied Gas Stoves (Butane, Isobutene, Propane)
- Alcohol Stoves (Alky, Meth, Spirit)
- Chemical Solid Fuel Stoves (Hexy, Hexamine, Esbit, Triox, Fuel Tab)
- Wood Stoves
- Candle Stoves
- Solar Stoves
- Flame-less Stoves (MRE Heater)
- Electric Stoves and Immersion Coils (Heating Coils, Heating Elements, Beverage Heater, Heating Rod, Coffee/Drink Heater)
- Calcium Carbide Stoves and Lanterns (Acetylene Stove/Lamp)

A discussion of fuel types, fuel availability, and table providing a fuel comparison and weight/efficiency ratings follow. It is a long article (>8,500 words) and worth reading if you are considering stove options for winter camping.

[Views from the Top](#)<sup>38</sup> ran an interesting survey asking participants what type of stove they used for winter camping. Not surprisingly, the overwhelming majority of the 62 participants declared for a liquid fuel/white gas stove. They are reliable in cold weather.



WHITE GAS STOVES DOMINATE IN WINTER COOKING CONDITIONS.

It is interesting the number of participants that cited success with canister stoves. From April through November I use a MSR Superfly stove that adapts to any Lindal valve type canister.

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### 12.1.1 CANISTER STOVES

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Canister stoves see a decline in performance in cold weather. During burning the fuel inside the canister evaporates causing the canister to cool. Moisture in the air will condense or freeze on the outside of the canister further chilling the gas inside the canister. The temperature inside the canister can drop to where the liquid fuel inside the canister won't evaporate appropriately.



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<sup>38</sup> <http://www.vftt.org/forums/showthread.php?20434-Winter-Stove-Favorites>



A CANISTER STOVE CAN FREEZE OVER IN COLD CONDITIONS.

#### 12.1.1.1 WHEN TO USE A CANISTER STOVE

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Before discussing ways to combat cold weather's effect on a canister stove let's define what we mean by cold. In sub-zero temperatures, while the first 2/3 of the propane/butane blend canister will deliver as expected, the canister may need to be warmed to keep the flame going. At temperatures above 15, isobutene offers a more consistent delivery of fuel, without the need to keep the canister warm during the final 1/3 of its canister life. Above 40 degrees F and the issue is a moot one. In conditions less than 15F use a white gas stove.

#### 12.1.1.2 TYPE OF FUEL CANISTERS

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The type of fuel canister is important as they are not all the same. Most canister stoves have some combination of n-Butane, isobutene, and propane. Here are the relative percentages for popular canisters:

- Brunton Bruntane (80% Isobutane, 20% Propane)
- Coleman Peak 1 (70% n-Butane, 30% Propane)
- Coleman PowerMax (65% n-Butane, 35% Propane)
- Jetboil JetPower (80% Isobutane, 20% Propane)
- MSR IsoPro (80% Isobutane, 20% Propane)
- Optimus Energy Gas (50% Butane, 25% Isobutane, 25% Propane)
- Olicamp Rocket Fuel (75% Isobutane, 25% Propane)
- Primus Power Gas (50% n-Butane, 25% Isobutane, 25% Propane)
- Snow Peak Giga Power (85% Isobutane, 15% Propane)

Why is this mixture information important? Without the fuel in the canister being vaporized, there is no pressure to feed fuel into the jet. These fuel components all vaporize at different temperatures.

- n-Butane vaporizes at 31 degrees F
- Isobutane vaporizes at 11 degrees F
- Propane vaporizes at -43 degrees F

When you use your stove at or below 31 degrees is the n-butane will cease to vaporize and all the propane and/or isobutane will vaporize instead and that will burn first, leaving just cold liquid n-butane in the cartridge. Likewise, if you use your stove at or below 11 degrees, the propane will be the first to go leaving only isobutane and butane in a liquid form with no more pressure. Generally, you want less n-butane and more propane for cold temperatures. The choice of canister for below freezing performance becomes one with a high proportion of propane and little or no n-butane. In this case the MSR IsoPro or Snow Peak would be your best choice with the MSR having a slight advantage in temperatures above 11F.

#### 12.1.1.3 INCREASING CANISTER EFFICIENCY

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Typically you can use a canister stove down to about 15F. To extend the effective range you can sleep with the canister or stow it within a down bootie, pre-warm the canister, using an insulated pad and windscreen during burning to keep the canister warm. The convenience of the canister stove certainly makes me want to try extending my use of it a few more degrees.

Setting a canister in a pool of water, it can be as little as an inch, it keeps frost from condensing on the canister and chilling the gas inside.

If your stove has a preheat stage, meaning the fuel line loops through the flame to vaporize the fuel before it goes through the jet, you can invert the canister so the stove functions as a liquid feed. Light the stove with the canister upright. Then turn the canister over and stabilize it. This is beneficial because the propane (which will vaporize in all but the worst conditions on earth) will stay above the liquid butane and isobutane, pushing it down through the fuel line into the stove. You don't want to turn the stove on very much, as it will behave very differently with the canister upside down. Basically with the valve just cracked you will get a full roar, and you don't have as much flame adjustment as you do with the canister upright. When you shut it off it will burn for a few seconds until all of the gas is out of the fuel line.

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#### 12.1.1.4HOW HOT IS TOO HOT?

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How can you tell how hot you can safely allow your canister to get? All gas canisters must be able to take at least 122 F without any damage at all in order to pass European and American Standards, but it is best to keep the canister below 'hand temperature', which is about 86 F. Warm is OK, 'hot' is not. Typically, your hand can touch something below 113 F without it getting an 'ouch' response.

Put your hand on the canister. If it feels cold let it warm up a little bit. If it feels cool to mildly warm that is good, but keep an eye on it. If it starts to feel hot or above a comfortable hand temperature take action to limit the thermal feedback such as adding a shield. If the canister feels too hot to touch comfortably take action fast and shut the stove down at once.

If you hear the stove is starting to roar a bit, check the canister temperature. The roar suggests that the internal pressure is getting too high.

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#### 12.1.2 LIQUID GAS STOVES

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Liquid gas stoves are characterized by a fuel bottle with an integrated pump that connects remotely to a freestanding stove body via a fuel line. Liquid gas systems are unaffected by winter weather, mainly because the pump allows you to create your own pressure and compensate for lower temperatures. Liquid gas stoves typically run on white gas. White gas burns exceptionally hot and generates more BTUs than a canister stove and offers a range of cooking temperatures.

Operating a liquid fuel stove requires more attention than a pre-pressurized canister stove. After assembling the pump, fuel bottle, and stove, you must pump and prime the stove before cooking. To create adequate pressure, pump the fuel bottle until you can feel firm resistance (usually around 15-20 pumps). Priming is just another word for pre-heating the stove, and is required to convert

the liquid fuel to a gas for efficient performance. The fuel line typically includes a section that runs across the burner where the liquid fuel is heated and converted into a gas.

To prime the stove, open the fuel adjuster and allow about a half-tablespoon of fuel to enter the priming cup and burner then turn the fuel off. Ignite the fuel in the cup, and when the flame begins to reduce, slowly open the fuel adjuster until you get a blue flame. Then adjust the flame to the desired amount of heat output. Because the fuel bottle connects remotely to the stove, you can surround the stove with a windscreen to improve performance. Always consult and adhere to specific manufacturer instructions regarding your specific stove. Many liquid gas stoves include a simple maintenance kit and cleaning instructions that allow you to ensure maximum performance on every outing.

Be sure to leave an air space when you fill the fuel bottle, as gas will expand as the temperature rises, and the excess pressure could potentially create a hazard.

Multi-fuel stoves can run on a variety of liquid fuels such as white gas, kerosene, diesel, unleaded gasoline, and/or aviation fuel. Multi-fuel stoves are the preferred choice for international trips and areas where a canister or white gas is hard to come by.

Before running your stove on a fuel other than white gas, make sure the stove is properly jetted for the fuel you plan on using. Many models require you to first install the appropriate fuel adaptor and jet before using certain fuels. While multi-fuel systems provide a range of fuel options, not all fuels provide an equal level of performance.

Kerosene is widely available, but burns with a noticeable odor that may affect your food and it doesn't burn quite as hot as other fuels, resulting in longer cook times.

Unleaded gasoline performs similar to white gas, however, some gas additives (such as oxygenated gas which is common in the US during winter months) can cause stove components to corrode and clog.

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### 12.1.3 ALTERNATIVE STOVE SYSTEMS

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Alcohol stoves are extremely light and cheap, and fuel is widely available. While you can purchase an alcohol stove, many people build their own out of used soda cans. DIY tutorials are widely available on the Internet. The stoves run on denatured alcohol or a gas line anti-freeze., Alcohol will quickly evaporate if spilled. The drawbacks of an alcohol stove are longer cook times (7-10 minutes to boil water) and the inability to raise or lower the heat output, making it difficult to do much cooking beyond boiling water.

Wood-burning stoves use organic materials burning in a purchased or DIY stove. They are dependent on locating appropriately sized dry wood. There is no extra fuel weight to carry but recognize that a wood-burning stove will not perform as well a canister or liquid gas system and your cooking pots will receive soot from the fire.

Solid fuel stoves burn tablets made of a flammable chemical compound that was originally developed by the military as a portable fuel source. In addition to a solid fuel tablet, the only thing required is a platform or stand that will suspend the pot above the tablet. You can't adjust the heat output nor should you expect the performance of a gas stove. The tablets will also leave a residue on pots and pans.

In general, an alternative stove system is a good choice as a backup system or if you're on a tight budget, you like to make things yourself, and you are willing to sacrifice performance for weight savings.

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#### 12.1.4 WINDSCREENS

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Use a windscreen and keep a lid on whatever you are cooking. A windscreen should deflect the wind from both the stove and the cooking pot. It should not totally enclose the stove: there must be room for air to get in and allow for excess heat dissipation. You can lay your pack or a sleeping pad on its side as a wind block or use aluminum foil.

The windscreen should reach a bit above the top of the stove and up the side of the pot. If you are using a large pot, as is normal, there should be a slight clearance between the pot and the windscreen. Don't enclose the canister and flame together. If you make the gap between the windshield and the pot too small and have a minimal gap between the ends of the windscreen, you will be bottling up very hot air. This might or might not cause combustion problems, but will almost certainly transfer a lot of heat into the fuel tank or cartridge if it is inside the windshield, which could then get too hot.



A WINDSCREEN INCREASES PERFORMANCE OF ANY STOVE.

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#### 12.1.5 HOW MUCH FUEL?

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The amount of fuel used is dependent on your stove, fuel type, air temperature, wind, whether you are using a windscreen, even the efficiency of the wind screen to say nothing of the types of meals and cooking time.

For planning purposes it is best to plan on at least 20 minutes of fuel for heating water for morning drinks and breakfast and at least 40 minutes of fuel for dinner. That adds up to 1 hour of fuel a day. To be on the safe side add an extra hour or two for making a special lunch, hot soups, a cold snap, or conditions that delay your trip.

### 12.2 FIRE

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The use of fires in the wilderness is controversial. A central principle of LNT is to minimize the impact of campfires. However, in the camping in the winter when it can be dark before 5pm a fire can provide a focal point, a source of heat for melting snow for water or cooking, and heat for drying and/or warming clothing.

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#### 12.2.1 BUILDING A FIRE IN THE WINTER

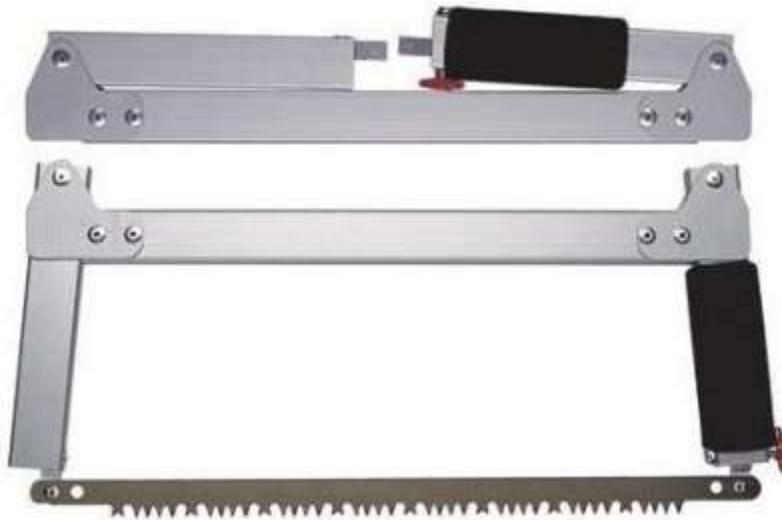
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The wood warms you three times: gathering it, cutting it, and burning it. A lightweight saw and/or an ax, along with the knowledge of how to use them, are crucial ingredients for building a fire. Typically one would cut firewood with a saw and use an ax for splitting larger diameter firewood.

A safe way to handle firewood is to gather manageable lengths and haul them back to camp where you have good footing and cutting/chopping blocks available for processing your wood.

A saw in the 15-21" range is adequate to get full efficient cutting strokes on larger poles with the trade off being additional weight and bulk. Saw blades do break, so make sure to bring an extra blade and/or have more than one saw available for your group.



A TYPICAL FOLDING SAW IS THE SAWVIVOR, A 15" FOLDING SAW THAT WEIGHS 9.6 OZ AND CAN CUT 6" LOGS.

An ax is useful for splitting larger diameter wood. When wood is wet or frozen on the outside, splitting the wood will reveal the dry inner portions that will burn and help dry the other wood.

Using an ax should not be done lightly. Nothing ruins a good camping trip more than lopping a finger or limb off while in the back country. Even if you are used to using an axe on solid ground in warmer seasons using an axe in winter poses extra risks; the snow does not provide a solid base or a safe backstop for the axe. Using an axe while on snowshoes takes additional care. Wearing gloves reduces sensitivity and possibly dexterity while wielding an axe making it easy for the axe to slip out of your hand.

A long handled axe is preferred over a hatchet for splitting wood. The length of the handle and size of the ax head is based on height and personal preference; I like a 28 inch handle and a 2¼ pound head.

When trimming branches make sure you swing the ax away from you and be aware of where the follow through is going. Plan each swing and guard against awkward swings that might deflect off a limb.

When splitting wood never hold a block end up with one hand and bring the axe down with the other. If the block does not stand up on its own, use a holding stick in one hand, supporting the block upright with the stick, so that your hand is well away from the block. Then you can safely

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bring the axe down on the block. Once the axe head is seated securely in the block use a length of wood as a mallet to hammer the axe head through the block and safely split the block.



A SAFE SETUP FOR SPLITTING WOOD: PAUL KEEPS THE HATCHET HEAD SECURE IN THE BLOCK, MARK HAMMERS THE HATCHET HEAD WITH A WOODEN BLOCK AND JASON CLEARS AWAY SPLIT BLOCKS.

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### 12.2.2 PLATFORM

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A fire for winter camping needs to be built on a platform, started with tinder and kindling and built into an appropriate style for the task at hand (heating, cooking, entertainment). If the snowpack is only a few feet thick, dig down to the ground otherwise plan on making a platform. Stamp the snow and make it flat where you intend to build this fire pit. This will give it a nice depression which will help with blocking the wind. Make sure that you get it nice and tight. The size depends on how big you want it. Now put down some logs on top of the fire pit this will now be your fire platform and you will build your fire on top of the logs.

Whether you are trying to promote Leave No Trace techniques and establishing a protection layer between the fire and the ground or shielding the fire from dampness or trying to keep it up out of the snow and direct its heat; a platform is all important.

The picture below depicts a good platform. It was built in an existing fire pit. It has a solid base of logs; getting it up out of the snow and a couple of reflective walls to channel the heat back to the fire and towards the lean-to. No wonder these winter campers are so happy, anticipating the pleasant evening to come!



A GOOD PLATFORM BUILT IN AN EXISTING FIRE PIT.

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### 12.2.3 FIRE STARTERS

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Always carry a lighter, matches, or sparking device or ideally more than one.



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#### 12.2.4 TINDER

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Tinder is the material that catches the spark from the fire starter. Tinder might include commercial products such as Wetfire, Esbit tablets or trioxane, candles or homemade aids such as my personal favorite cotton balls smeared with Vaseline or wood shaving cupcakes. Natural tinder might include shredded bark or wood shavings. White birch bark from fallen trees is a reliable starter.

You can make your own tinder from wood shavings, sawdust and paraffin wax. Pack the shavings into a muffin tin or empty cardboard egg carton. You can do this with or without muffin wrappers; if you want to re-use the muffin tins, use wrappers. Warm the paraffin up slowly –you are just trying to get it to melt, not boil. It is best to avoid a domestic conflict and use an old pot as getting all the residual paraffin out can be problematic. Or shield your pot with aluminum foil.



FIRE TINDER MADE FROM WOOD SHAVINGS AND PARAFFIN

When the last of the paraffin is melted pour it into the muffin tins. If the pot is very full dip the paraffin out using a disposable cup so you don't end up with wax being poured everywhere. You can vary the size by controlling the amount of wax poured into the muffin tin.



THE FINISHED FIRE TINDER CUPCAKES.

After the wax has cooled and congealed you can pop the wax and shaving cups out of the muffin tin and store them for future use. These tinder cups are long burning and burn hot.

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### 12.2.5 KINDLING AND WOOD

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Gather only dead wood from downed trees and branches to feed your fire. Kindling wood should be 4D: dead, dry, dinky and distant from your campsite. The kindling should be no thicker than your thumb and snap easily with two hands. Don't short change this step, you need two armfuls.

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### 12.2.6 FIRE STYLES

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The purpose of a fire – reflected heat, quick or long cooking or merely aesthetics - dictates the appropriate style.

#### 12.2.6.1 TEPEE FIRE

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For a no-hassle fire, use the classic tepee method: In the middle of your foundation, sandwich a handful of loose tinder between two layers of kindling. Prop small and medium sticks, no bigger than your wrist, upright around the kindling, their tops meeting like the poles of a tepee. Leave a larger opening on the windward side to ensure enough air for the fire, and light the tinder. A teepee fire is suitable for quick cooking or as an entertainment fire.

#### 12.2.6.2 REFLECTOR FIRE

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A reflector fire has a flat surface behind it to direct the heat back out past the fire. This surface is erected behind the fire and pointed, for example, at the face of a tent, lean-to or other shelter. This back reflector can be made out of a few large slabs of bark, several logs laid against supports and stacked upon each other to form the surface.

Lay a few logs on top of one another against the sloping back. Form a platform at the base of the slope. By lighting a fire in the middle most of the heat will be reflected back to the front of the fire, making cooking easy. Be sure that you build it so the 'grate' or fireplace faces the wind.

A good reflector close to the fire will help reflect the heat back towards you. In addition it helps to draw the smoke upwards instead of getting in your eyes. You can use this to your advantage by also reflecting heat into your shelter.

Don't make a fire up against a large boulder or tree stump. Build the fire away from the rock/stump and place a reflector on the opposite side. As this object reflects the heat onto your back, the reflector warms you to the front.

If there are no 'natural reflectors' simply build several reflectors of your own and place one behind you, then one on the other side of the fire.

#### 12.2.6.3 LOG CABIN FIRE

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A log cabin fire is made by stacking layers in alternating directions; be sure not to stack the wood too close to prohibit air movement. A log cabin fire is suitable for cooking food as it provides uniform heat.



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#### 12.2.6.4 TOP DOWN FIRE

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The conventional approach is to light your tinder, put some fine kindling on that and some heavier kindling on top of that. Hopefully, it catches enough that you can begin to add bigger pieces until you have a respectable fire. Frequently you watch as the whole affair collapses into a smoldering mess.

The top down technique can be counter-intuitive. The secret to a successful top-down fire is making the pieces for each layer a little smaller than the one below. The fire grows progressively, gaining intensity, down through the layers to the biggest logs on the bottom. It's a wonderful thing to watch.

- First, put down three or four full sized pieces of firewood on the bottom as the fire platform. These will be the large, dry, split firewood.
- Second is a layer of smaller, split pieces across the main logs.
- Place third layer of still smaller pieces across the second layer.
- Cover this with a layer of coarse kindling that are only about an inch across.
- Then top off the pile with tinder mixed with the fine dry kindling.

The top-down technique takes a little longer in preparation, but the reward is less of a chance that the fire will collapse and smother itself; less smoke, less fussing with the fire after it is lit and a long burn time without having to reload.

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#### 12.2.7 MAINTENANCE AND FEEDING

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Fires by committee are notoriously problematic; everyone has a different thermostat and style. I read a blog post<sup>39</sup> about joking about Obsessive Campfire Adjustment Syndrome – describing someone who will not stop messing with the fire. Criteria include:

- Do you ever stare at a burning pile of logs and find yourself unable to stop futzing with it?
- Do you look at a campfire and immediately see one or more ways you could improve it?
- Are you sitting closest to the fire so you can adjust the infrastructure according to your next whim?
- Are you unable to just sit and enjoy a campfire for what it is, a source of light and heat in the dark, cold night?
- Do you think you, not the wind, can control the direction that campfire smoke blows?
- Have you ever put a huge log on the fire, then gone to bed five minutes later, leaving someone else with the responsibility of making sure the fire goes out?

One approach is to appoint a “The FireMaster” and request the FireMaster for more or less heat. The FireMaster can pre-heat and dry pieces of wood by laying them discretely alongside the fire before placing them in the fire to burn. If you keep at it you can dry out most wood enough to burn.

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<sup>39</sup> <http://semi-rad.com/2014/04/do-you-have-obsessive-campfire-adjustment-syndrome/>



MAINTAINING A FIRE REQUIRES A PLAN.

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### 12.2.8 COOKING WITH A FIRE

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Cooking over a campfire is one of those pleasures difficult to explain to others that have never done it. You see, touch, smell and taste your food in a much more direct fashion. There are several approaches to cooking on a fire.

Approach	Description	Pros	Cons
<b>On a stick</b>	Impale your food on a sharp stick and cook over fire	Simple, easy clean up, easy to regulate cooking temperature by moving stick	Only suitable for a few food items. Too often green sticks are sacrificed.
<b>On a grill</b>	Food items placed on grill over fire	Similar to grilling on BBQ. Wide variety of foods can be grilled	Can be tricky getting consistent heat. A grill is required.
<b>Foil on coals</b>	Wrap food in foil and place on coals	Lightweight, can cook wide variety of food, easy to clean up	Hard to tell when food is done. Removing food from fire can be tricky. Foil must be packed out
<b>Pot</b>	Food is heated in a pot placed or suspended over the fire	Uses existing cookware. Similar to cooking with stove. Wide variety of meals can be stewed.	Temperature regulation can be tricky. Cookware gets covered with soot.
<b>Dutch Oven</b>	All metal oven is surrounded by coals	Can be used for frying, roasting, baking, braising, and stewing for large groups	Heavy cookware must be transported

Tips for cooking on a campfire include:

- Small fires are easier to cook on. Wait until the fire burns down to embers
- Avoid a cooking on a direct flame as it will burn the outside of the food without properly heating the inside
- Increase heat by grouping embers. Decrease heat by spreading the embers out or by covering them lightly with ashes.
- While softwoods are good for starting a fire, hardwoods are better for making coals for cooking
- Use the side of the fire to pre-heat food or keep it warm while you make more food or begin eating.

### 12.3 POTS & PANS AND UTENSILS

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Your cook kit will consist of some of the items: listed below:

- Something to cook in: one or more cooking pots, a pan, lid(s), an oven (reflector, stovetop, or Dutch)
- A knife, spoon, fork, spork, a ladle, strainer, coffee pot/press
- Plate, bowl, and mug or cup
- Washing up gear: detergent soap, dish cloth, towel, pot-scrubber
- A container to keep your cook kit together:

Your cook kit may be influenced by a number of factors:

- Is space or weight the limiting constraint?
- What's planned for supper / lunch / breakfast? Do you live to eat or only eat to live? Are you satisfied with simple heat and eat? If so, one pot meals may strike just the right balance between convenience and reward.
- How will you cook? Will you use an open fire or camp stove?
- Do you plan to bake, and if so, how? Skillet, a stove-top oven, reflector oven or Dutch oven?
- How large a pot is large enough? How big is your group? Pasta and soups may need bigger pots.

Minimum cooking equipment for a group of four usually includes two nesting pots with covers; one for melting water and a 2<sup>nd</sup> for cooking a one pot meal. Depending upon the meal being prepared a pot cozies may prove useful. If you don't have a fabric pot cozy a spare garment will work in pinch.

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#### 12.3.1 VACUUM BOTTLE

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A vacuum bottle enables you to boil water at breakfast and it will still be hot at lunch and during afternoon tea. Plus, you can fill it after dinner and have hot water handy in morning.

## **13 SLEEPING WARM**

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It was cold. I had a 0 degree sleeping bag but felt chilled. I pulled my down jacket into the sleeping bag and laid it over me for extra insulation. There were seven of us packed into a lean-to so tight that one person couldn't move without affecting others. With insulating bodies on either side of me and the down jacket supplementing my sleeping bag I slept warm for the remainder of the night despite plummeting temperatures that made everyone begin snoring. I can't claim that I didn't join the chorus at some point.

Staying warm at night while you are winter camping is crucial to a successful trip. Having a "winter-grade" sleeping bag, or using two sleeping bags, is an easy and obvious first step. However, there are many other actions one can employ to ensure a good night's sleep.

This chapter covers the components of a winter camping sleeping system, preparation steps before sleeping, using external heat sources, dressing for sleep, personal variations, adjustments during the night and how to handle the morning after.

### **13.1 COMPONENTS OF A SLEEPING SYSTEM**

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A sleeping system to keep one warm overnight includes several components: a sleeping pad(s), a sleeping bag, sleeping bag liner and possibly a bivy bag or overbag.

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#### **13.1.1 SLEEPING PADS**

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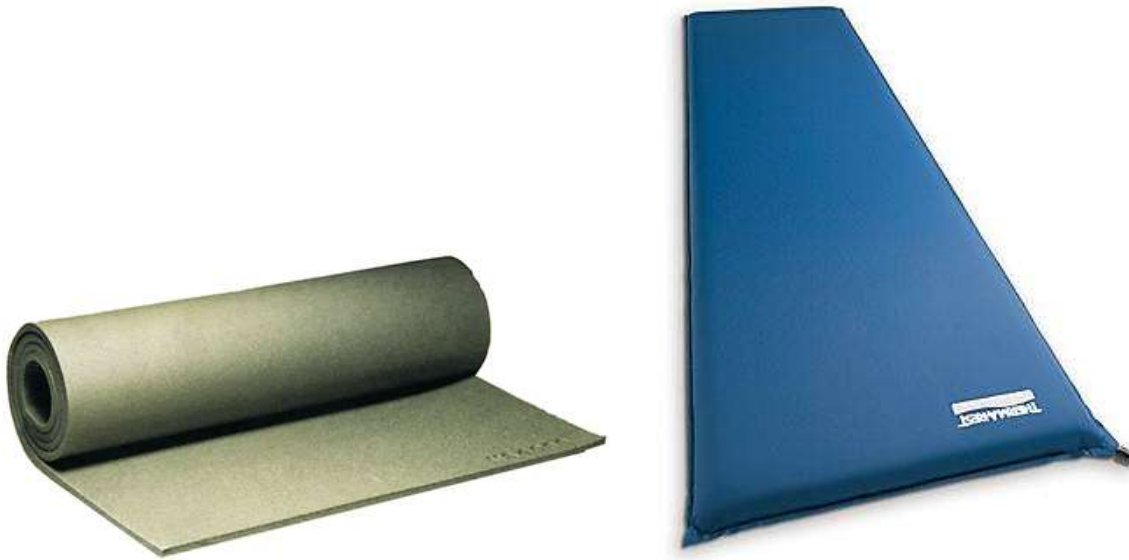
A good sleeping pad is a crucial element to staying warm at night. What is under you is more important in keeping you warm than what is on top of you. Unless you have the right amount of insulation below you the ground will absorb most of the radiant heat vented by your sleeping bag and you'll feel cold at night. You can prevent this by using an insulated sleeping pad. This compensates for the fact that you are lying on your sleeping bag, compressing the fill, eliminating most of its loft and heat retention capabilities.

Pads are rated by R-value, the measurement of insulation, ranging between 1.0 and 8.0. The higher the R-value, the better it insulates. A closed-cell foam pad is a thin, dense foam made of closed-air cells that block water and stop air circulation. Self-inflating pads are a combination of open- and closed-cell foam. Open-cell foam pads have open-air cells that absorb air and create more cushioning. Inflatable pads provide superior comfort but you can get cold spots where hips or shoulders compress the pad. Closed cell pad provide superior insulation but don't provide much cushion.

Another alternative is to use a down filled sleeping pad such as Exped's Downmat 9 which has an R-value of about seven. A Downmat more than equals two regular pads-a self-inflating and a closed-cell pairing-in insulation. While I've never used a down-filled pad, I am told they are very comfortable. Weight-wise a Downmat 9 weighs two pounds, while the two Therm-a-Rest pads will end up at three pounds six ounces.

Typically I use a combination of a closed-cell pad and an inflatable Therm-a-Rest pad. The closed cell pad has a R-value of about 2.6 and the Therm-a-Rest has an R-value of about 3 for a total of 5.6.

I recently discovered the combination of using an inflatable pad on the bottom and a closed cell pad on top for winter camping. It seems a bit counter-intuitive to use the inflatable on the bottom but it provides a cushion and floats the closed cell pad off of the cold snow. This counter-intuitive stacking of the two is worth trying if you are going to be spending a lot of time sleeping in the snow.



COMPONENTS OF A SLEEPING PAD STACK.

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#### 13.1.1.1 SLEEPING PAD ADJUSTMENTS

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Many campers over-inflate their sleeping pads making it too hard and increasing the likelihood of sliding off the pad. To properly inflate your pad try this process: Inflate the pad fully, then lie on the pad and lean on the pad pressing down with your elbow. Let out enough air so that your elbow makes contact with the ground, then close valve.

If your pad is too slippery you can give it some texture by washing the surface of your pad with soap and water and let it dry thoroughly. Then use silicone caulking or SeamGrip to make a pattern of dots along the surface of the pad. Most of your pattern should reside on the main torso / hip area. After drying for 24 hours your slip-free pad is ready to use.

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#### 13.1.2 SLEEPING BAG

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If you want to be comfortable winter camping you need more than a summer or three season bag. When the temperatures dip down to zero you need a mummy bag. Mummy bags taper from head to foot, creating a smaller-volume bag that makes it easier to maintain body heat. Additionally mummy bags have a hood you can draw around your head for extra warmth.

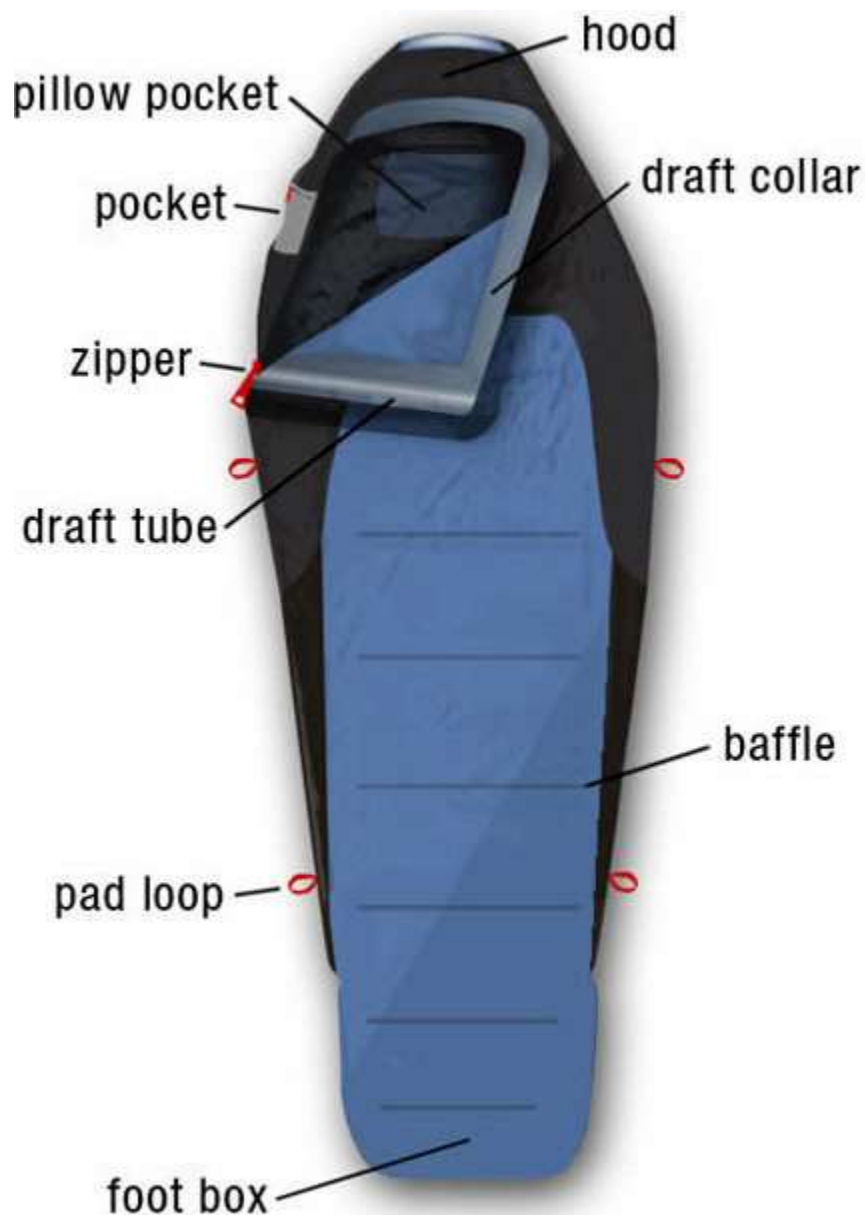
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##### 13.1.2.1 SLEEPING BAG TERMINOLOGY

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Even a simple piece of gear like a sleeping bag can have a confusing number of parts, features, and terms. Here are the basic parts of a typical mummy bag.<sup>40</sup>



**Baffles:** The internal pockets of insulation that prevent the insulation, from shifting, clumping, and developing cold spots. Sewn (or stitch) through and box are examples of baffle techniques.

**Layers:** Construction method using two offset layers of synthetic insulation. The top layer is sewn to the shell and the bottom layer to the lining.

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<sup>40</sup> <http://www.trailspace.com/articles/sleeping-bag-parts.html>

**Shingles:** Construction method using overlapping sheets or pieces of insulation stitched to the bag's shell and lining. Typically used with synthetic insulation.

**Shell:** The exterior shell keeps the insulation close to your body, and provides a little insulation on its own. Some shells are made of water-resistant materials and some with waterproof-breathable membranes.

**Lining:** Usually made of a softer material than the external shell, the interior lining is designed to feel soft and wick moisture away.

**Hood:** An insulated hood prevents heat loss from your head, and keeps warm air from escaping the rest of the bag.

**Pillow Pocket:** Give you space to stuff extra clothes or a camp pillow.

**Hood, Chest, or Stash Pockets:** A small pocket in the hood for your watch or MP3 player.

**Draft Collar:** An insulated collar, tightened by a cinch cord near your neck and shoulders, intended to prevent heat from escaping and cold air from entering.

**Draft Tube:** A thick tube of insulation along the zipper that prevents air exchange.

**Zippers:** Come in different lengths. A full-length zipper can help regulate your temperature if you start to sweat while a half-length zipper may save some weight. Zippers should be anti-snag. Many bags give you a choice between a left- or right-side zipper. A right- and a left-zippered bag with compatible zippers may be zipped together.

**Zipper Pulls:** Winter bags often feature long cords on the zippers, for easier use with gloves. Some bags have glow-in-the-dark zipper pulls for easier nocturnal exits.

**Pad Loops:** Connect your sleeping bag to your sleeping pad, holding the pad in place and preventing the bag from sliding off the pad.

**Foot Box:** The space at the foot of the bag. Some bags offer venting from the foot box. In winter, extra space in the foot box can be used to store hot water bottles, extra clothing, and boots or boot liners.

**Hang Loops:** Permit the bag to be hung to dry to maintain its loft.

#### 13.1.2.2 TEMPERATURE RANGE

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Consider the temperature range you require. You should consider whether you sleep warm or cold and take that into consideration when buying your bag. The temperature rating really means you it will keep you alive at that temperature--it does not mean you will be warm; so add 10-15 degrees F to achieve a level of comfort. Thus, a 0 degree-rated sleeping bag should keep you relatively warm into the teens, provided you're on an insulated sleeping pad, wearing a base layer and hat. The excess insulation may weigh more, but you will appreciate the extra insurance.

Temperature ratings cited by sleeping bag manufacturers can vary widely and may be estimated from the fill, features, and sizing. Your best defense is to select bags from proven, quality manufacturers whose temperature ratings have been validated by the community at large. Different brands and different designs run warm or cold talk so talk to friends and research the internet. Feather Friends and Western Mountaineering make well regarded down sleeping bags.

### 13.1.2.3 SLEEPING BAG INSULATION

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Your sleeping bag choice requires a decision between down and synthetic insulation. Down insulation weighs less, lasts longer, compresses smaller, and costs more. Down bags with a fill power rating of 800 or higher are significantly lighter and more compressible than bags with lower fill power ratings such as 650. They are also much more expensive. Down is more durable than synthetic insulation when compressed frequently. High fill power down bags can retain their resiliency and loft for 15-20 years while synthetic fills break down with five or six years of use. My first quality down bag lasted 30 years with moderate use. Synthetic sleeping bags dry quicker, provide better insulation when wet, and cost less.

### 13.1.2.4 SIZING YOUR SLEEPING BAG

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Make sure your sleeping bag is the right size for you. If there's too much girth and extra space your body will lose heat trying to warm that empty space. However, you might want extra length to your sleeping bag to sleep with boots, water bottles, cameras, clothes, etc. to keep them from freezing. Consider using a bag specifically sized for men or women as girth specifications change between models.

If you don't have a really warm winter bag, consider an insulated over-bag that you can use with your three-season one to boost the temperature rating or bring two sleeping bags.

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### 13.1.3 SLEEPING BAG LINER

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A sleeping bag liner serves as an insulating layer inside a sleeping bag, it provides a layer of protection between your body and any water bottles or clothes you include in your sleeping bag at night and they keep your sleeping bag clean from dirt and body oils. A sleeping bag liner might consist of a fleece blanket, silk mummy bag or a vapor barrier bag. My experience is that blankets tend to get tangled so look for something shaped like your sleeping bag.

I routinely use a silk sleeping bag liner inside all my sleeping bags for both comfort and warmth.

- A sleeping bag liner adds warmth. It can add several degrees of warmth to your bag depending on the fabric, which allows one to buy a lighter bag but still get the temperature rating of a heavier bag.
- For individuals with old sleeping bags with compressed insulation that has lost warmth, a liner allows a boost to the warmth and delay the purchase of a new bag.
- A liner can act as a draft barrier keeping users warmer and can fill up the excess room in a mummy or rectangular bag, boosting warmth.
- A liner keeps a sleeping bag clean and minimizes the need for laundering. Washing a liner after a trip is way easier (and cheaper) than going to a Laundromat and washing a whole sleeping bag in a large commercial machine. Washing a sleeping bag is the fastest way to ruin it. Most manufacturers recommend using a liner and just spot-cleaning the sleeping bag.
- A liner adds comfort. A liner made of Silk or CoolMax is more comfortable against the skin than the linings of many bags.
- Many liners will help wick away moisture, keeping users drier to help them sleep more comfortably. And a liner helps avoid the initial shock of climbing into a cold sleeping bag.

I have used a Design Salt silk sleeping bag liner for many years. I have used this liner in a variety of weather conditions with temperatures ranging from -teens to mid-70s. The silk liner is lightweight – it only weighs 4.7 ounces. The liner adds 9.5 degrees of warmth to my sleeping system. It is breathable, wicks moisture away from skin and is soft and comfortable to the skin. Finally it is the ideal size. I am 6'4" and found the sizing of liner to be ideal. The 95" long bag features a drawstring hood, a 35" wide opening tapering to a comfortable 22" boxed foot end.

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#### 13.1.3.1 VAPOR BARRIER

A vapor barrier is a special class of sleeping bag liner. A vapor barrier is made of a waterproof, non-breathable coated material and the concept is to keep a sleeping bag dry on multi-day trips by preventing body perspiration from getting trapped in the insulation of the sleeping bag. In ideal dry conditions the heat generated by the body drives the moisture through the insulation. However, in extreme cold this moisture might become trapped in the insulation and freeze. By using a vapor barrier the moisture is contained and can be removed by turning the vapor barrier inside out and shaking off the flakes as the moisture freezes. Used properly, a vapor barrier liner can allow you to sleep comfortably in temperatures 10 or 15 degrees lower than you could without a liner; used improperly, a vapor barrier liner leaves you sleeping covered in your own sweat.

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#### 13.1.4 BIVY BAGS AND OVERBAGS

Bivy sack is short for "bivouac sack." Bivy bags originated as lightweight emergency weather protection for sleeping bags. Bivy sacks have evolved into bivy shelters which may include mesh panels attached to the head opening, plus small suspension systems (poles, hoops or stiffened wires) that lift the bivy off a camper's face.

A basic bivy keeps a sleeping bag clean and dry. A bivy can hold a sleeping pad in place and may increase warming capacity by up to 10 degrees. It is the increased protection and warmth that is worth consideration depending upon the type of winter camping shelter (e.g. snow shelters or floorless tents) employed.

An overbag is a generously sized liner or sleeping bag cover that fits over your sleeping bag to provide extra warm and protection. Overbags operate similar to bivy bags but lack a hood. One approach is to borrow a summer-weight bag and use that as an overbag.

A major factor in choosing a bivy or overbag is breathability. Condensation from moisture escaping your body through your sleeping bag will reduce the performance of your sleeping bag.

The disadvantage of using bivy/overbags is that they provide another layer to exit / enter during the night and additional weight to pack.

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### 13.2 PREPARATION BEFORE SLEEP

Before turning in to sleep you can increase your comfort level by simple preparation of your sleeping system and your body.

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#### 13.2.1 PREPARING YOUR SLEEPING SYSTEM

As soon as you set up your site you should set up your sleeping system. If you are using a self-inflated air mattress let it self-inflate and then add puffs of air right before bedtime. You don't have to worry about moisture buildup even in winter; freezing of moisture in the pad isn't an issue unless you are doing this daily for months at a time.

Fluff your sleeping bag up very well. This will allow more time for the sleeping bag to regain its loft. Also, you should give your sleeping bag a good fluff just before getting in it. This also helps the bag retain loft throughout the night.

Put tomorrow's clothes under your sleeping bag. If you put tomorrow's clothes between your sleeping pad and your sleeping bag, your clothes will be warm when you go to put them on the next day. The additional layer between you and the ground will also help you keep warm.

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### 13.2.2 PREPARING YOUR BODY

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During the winter it's important to be adequately hydrated. Your body demands more water in the winter as your lungs lose moisture humidifying and warming the dry, cold winter air. The average person may require 2-4 liters/quarts per day during winter exertions before sleeping. In order to burn fuel efficiently you must keep your body hydrated.

Avoid caffeine, alcohol and nicotine. Caffeine is a diuretic which causes water loss increasing dehydration. Although alcohol has some caloric value, it is a detriment in cold weather. Physiologically, alcohol creates peripheral vessel dilation which results in the rapid loss of body heat. Nicotine is a strong vasoconstrictor that decreases circulation to your extremities and promotes frostbite.

Eat a hot, hearty meal for dinner. Your body will use this fuel to keep you warm throughout the night. If the weather is really bad and you don't feel like cooking a big meal, then cook the meal that is easiest and fastest to make. When cold-weather camping, carry a freeze dried meal to provide a quick, easy hot meal.

Eating a high calorie, high fat content snack before bedtime will give your body more fuel to help keep you warm. Proteins, such as cheese, nuts, or grains, are better than simple sugars. Proteins release their energy more slowly than sugars, keeping you warmer through the night.

Do calisthenics to get your circulation moving and your metabolism going. Take a brief hike around camp, or do jumping jacks or pushups to increase your metabolism and get warm before getting into the sleeping bag.

Go to the bathroom before bed and save yourself a middle of the night trip in the cold.

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## 13.3 EXTERNAL HEAT SOURCES

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An external heat source such as a hot water bottle, sleeping companions, warm rocks or chemical packs, will bolster your own body heat. Fill a leak-proof water bottle with hot water. Wrap it in a spare fleece layer or sock, place it in your sleeping bag and sleep with it. You can even pre-warm your sleeping bag with the hot water bottle before you slide into it to.

Depending on your tent mate you can snuggle next to one another to share warmth. By keeping sleeping bags close together in the tent you can take advantage of your partner's heat.



Take heated rocks from around the campfire and place them inside your cooking pot for a safe heat source inside your tent.

Chemical heating packs work great for hands and feet. Layer them between socks or gloves – never put them directly next to your skin. Chemical heat packs usually last several hours.

What to do if you are in your bag and wearing everything you have, but you're still cold? If you have an external heat source (e.g. hot water bottle or chemical heating pack) put them between your legs against your femoral artery. This warms your blood directly and quickly increases body temperature.

#### 13.4 DRESSING FOR SLEEP

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Change into clean, dry, loose fitting clothes prior to climbing into your sleeping bag. Wear wool, silk or polypropylene long underwear tops and bottoms. A hat, balaclava or hood will help keep your head warm. Accessories such as socks, light gloves/mittens, and a scarf around your neck will also help retain body heat.

Perspiration in the clothes you wore during the day will chill you at night. As your body warmth evaporates this moisture it gets trapped in the insulation of the sleeping bag, reducing its effectiveness.

Make sure your feet are as dry as possible before going to bed. Wear dry sleeping socks or booties or you can “dry” wash your feet with a good foot powder that contains aluminum chlorohydrate, to dry the skin and reduce perspiration.

If you wear too much to bed you can risk compressing your sleeping bag insulation and you risk getting overheated. You want to avoid sweating during the night. If you feel constricted in your bag, you have got too many layers on.

Keep a jacket or vest handy to utilize for adjustments during the night.

#### 13.5 PERSONAL VARIATIONS

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Some people have ‘must be warm’ spots on their bodies. For some people it is their head or feet. Mine is the small of my back. If my lower back is warm, I feel warm and can tolerate other parts being chilled. Bring an insulating layer (down jacket or fleece) into your sleeping bag to place around your cold sensitive areas. If your feet are cold, wrapping them in a fleece jacket may do the trick for you.

#### 13.6 ADJUSTMENTS DURING THE NIGHT

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Don't bring wet clothes or boots into your sleeping bag as moisture will travel from wet clothes to sleeping bag. If you must bring leather boots into your sleeping to prevent them from freezing consider putting them in a stuff sack and placed into the foot of the sleeping bag. You can also put the boots in a sack and place them under your legs between your sleeping bag and the pad underneath.

Make certain to sleep with your face outside of your sleeping bag. Your breath contains a great deal of moisture that can cause dampness to collect in the bag as you sleep.

Avoid overheating at night. Being too warm produces perspiration, so vent your bag if needed or take off your hat.

If you are cold add more insulation by using your jacket as an additional layer and seal the area around your neck by cinching your mummy bag or use extra clothing to seal off the opening around your neck. I have found putting a down jacket loosely over me to be more comfortable than wearing the jacket and it prevents sweaty arm pits.

Keep a snack available for the middle of the night, so if you do wake up cold you can replenish lost calories and warm back up again. Semi-sweet chocolate bars or trail mix work fine. One of my early winter camping experiences was during college when my high school biology teacher and I went camping in the Catskill Mountains in late November. It snowed and the temperature dropped during the night. Typical of almost every winter camping experience I had, we had gone to sleep early in the evening. However, this evening I woke up shivering and cold. I was certain it must be the dead of night and I was hopeful that day break wouldn't be too far off. I shone a light on my watch, revealing it was only 9:22pm! I feared it was going to be a long, long, cold night. Fortunately I had brought some chocolate and raisins. After a quick snack I pulled my extra clothes into the sleeping bag filling the space around my shoulders. I then managed to sleep through the night.

If you have tried all these measures and are still very cold, don't be afraid to wake someone!

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#### 13.6.1 USING A PEE BOTTLE

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Pee if you feel the urge. Getting out of your warm sleeping bag to put on boots and venturing half clothed into the snow to pee is annoying. To avoid exposing yourself to the elements use a pee bottle. If you sleep in a bivy sack a pee bottle may be a mandatory accessory.

Avoid these problems by using a pee bottle such as an old, wide mouth, BPA Nalgene bottle with a secure cap. Mark it with visual and tactile cues; a sharpie to label the bottle and cap and duct tape or wrap to help you distinguish it in the dark.

Needless to say, when using a pee bottle inside your tent or sleeping bag, accuracy and a consistent approach are key. Keep the bottle where it won't freeze before you get a chance to empty it in the morning. Did I mention it should have a secure cap?

"Anatomically correct" funnels are sold for women to use at their discretion and reportedly with a little practice funnels make pee bottle useful to all. For example, a GoGirl is a female urination device that allows females to pee while standing up (or kneeling). It's discreet, it's hygienic and it is reusable: just store it in the plastic bag, and clean it later with soap and water. According to instructions, just adjust your clothing and hold the GoGirl gently against your body to form a seal. Aim and urinate. A moment or two of pre-heating inside your jacket or sleeping could be advisable on a cold winter night. After your trip clean the bottle with bleach, rinse well and let it air dry, preferably in sunlight.



GO GIRL PROVIDES AN OPTION FOR STAYING IN THE TENT AT NIGHT.

### 13.7 THE MORNING AFTER

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When you awake prolong your time in the sleeping bag as long as possible. Try to prepare a hot drink, eat your breakfast, get dressed and pack up to the extent possible while staying warm in your sleeping bag.

Roll the moisture out of your bag each morning when you get up as your fluffy sleeping bag is full of warm very moist air exuded from your body all night long. Without rolling out your sleeping bag that moisture will begin to condense on the insulation inside the bag and reduce its effectiveness for the next night. Immediately squish all that warm moist air out of the bag as soon as you exit; compress it, let it expand, and compress it again. If weather permits set it out to dry.

Pack your inflatable sleeping pad by folding the mattress several times and sitting on it to get most of the air out, then start at the end and roll toward the valve, using your knee as pressure to keep it rolling tightly. Or alternatively fold mattress in half lengthwise, then fold again. Now sit on mattress and open the valve. When all the air is out, close the valve and roll up your mattress.

Packing nylon tents and stuff sacks can really cause your hands to get cold. Wear your gloves and mittens as much as possible to prevent frostbit.

## **14 WINTER CAMPING SANITATION**

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Let's face it – it is tough to contemplate washing up when winter camping, but that doesn't mean that sanitation should be ignored. As a winter campers you will have a different definition of 'clean' than you will at home. Winter camping 'clean' means dry, free from debris and hygienic.

### **14.1 PERSONAL SANITATION**

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For some people, camping is a good excuse to get dirty, but if you are out for an extended time, wash. As the backwoods trapper says "Wash down as far as possible, then wash up as far as possible; finally wash 'ole' possible." The obvious solution is to clean up using hot water and soap, but preparing hot water becomes a hassle out there. It's easier to mix a teaspoon of bleach in water.

You can use a multi-purpose soap, hand sanitizer, antiseptic wipe or try a pre-packaged wipe; these are usually hypoallergenic, have an antibacterial formula and contain aloe vera to minimize skin irritation. Of course, the pre-packaged wipes may freeze in your pack, so you will need to take them out and thaw them prior to use.

In some situations, you may be able to take a snow bath. Take a handful of snow and wash your body where sweat and moisture accumulate, such as under the arms and between the legs, and then wipe yourself dry.

Especially take care of your feet. If possible, wash your feet daily and put on clean, dry socks. Clean and dry your feet and wear dry socks in camp or to sleep in overnight.

Don't forget to floss and brush your teeth. Dental floss is light to carry and useful for other purposes.

### **14.2 CLEANING YOUR CLOTHES**

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Dirty clothes may smell and have an offensive appearance, but the real reason to keep your clothes clean is the possibility of chafing and reduced performance of the fabric. Dirty clothes can reduce breathability or loft of your clothes. Since insulation is effective when heat is trapped by dead air spaces, keep your insulating layers clean and fluffy. Dirt, grime, and perspiration can mat down those air spaces and reduce the warmth of a garment.

Change and/or clean your underwear at least twice a week. If you are unable to wash your underwear, take it off, shake it and let it air out for an hour or two.

Dry your socks and shake them out to extract any dirt.

### **14.3 PREVENT THE TRANSMISSION OF GERMS**

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Winter campers are more likely to become sick from improper hand sanitation than from contracting *Guardia* from untreated water. Up to 40 per cent of stomach issues are directly related to not washing one's hands before preparing meals. Most germs are transmitted by hand to face contact, especially the mouth and eyes. Prevent the transmission of germs by taking actions to prevent or reduce intestinal illness. Especially keep your hands clean and keep your hands out of your mouth and away from your eyes.

Don't touch shared food. Pour snacks and trail mix into your hand as opposed to reaching in a bag to grab a handful. Or better yet pack your trail mix in a plastic bottle and pour it into your mouth without touching it. Use food utensils when portioning out dinner rations.

#### 14.4 WINTER CAMPING POO: PACK IT OUT

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What to do, with your winter poo? Eventually the snow will melt and in spring, the poo, once hidden from view, becomes exposed and soon contaminates nearby waterways – and that's taboo. In winter, it's best to pack it out, otherwise, you're leaving behind frozen waste for the next visitors.

Since it is winter your poo will freeze, so you won't have to worry about odor. Because waste is frozen in the winter, packing it out is not as distasteful as you may think. If you are caught short, a snowball makes good substitute for or supplement to toilet paper. Bury the snowball.

Many popular, high-use areas require you to pack out your waste. And some hikers pack out their poo even when they don't have to, in the interest of trying to make as little impact on the environment as possible.

As for peeing, pee away from water sources, trails and campsites and cover any spots of yellow snow.

Having the proper supplies — mainly a reliable, sanitary receptacle and hand sanitizer— is essential. You have several options, from fancy store-bought bags to homemade, rudimentary containers.



PACK OUT YOUR WASTE IN THE WINTER – ALL OF IT.

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##### 14.4.1 WAG BAG

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WAG (Waste Alleviation and Gelling) Bag has become the overall term for any pack-it-out bag system. Wag Bags contain an inner bag and an outer for storage. It generally involves one bag with which you glove your hand and grab your business and another sturdier, sealable bag in which you deposit and seal the dump.

Cleanwaste the company that coined the actual term “WAG Bag,” has renamed their product the GO Anywhere waste kit. It includes a biodegradable waste pickup bag loaded with Poo Powder, a “transport bag,” toilet paper and hand sanitizer. The Poo Powder works by gelling more liquid waste, breaking down solids and controlling odor. ReStop and Biffy Bags are other manufacturers of waste bag kits, powders, and supplies.

#### 14.4.1.1 HOMEMADE WAG BAG

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You easily can create your own Wag Bag using an interior/pickup bag, pre-packed with kitty litter



if you wish, which functions similar to Poo Powder, and a larger, sturdy outer bag — think freezer-weight Ziploc. Heavy-duty trash compactor bags work as a Wag Bag trash bag. If bags don't seem sturdy enough, some people use a coffee can as their outer container. Tupperware with a snug-fitting lid that you're certain you no longer need in the kitchen would work, too.

Rangers at Mt. Shasta offer a user-friendly homemade kit to hikers which includes an 11 x 17 sheet of paper with a bull's-eye printed on it for pickup. Just place the

bull's-eye on your poo pile and you'll have plenty of paper to wrap around it, avoiding all hand contact. The kit also includes a one-gallon Ziploc bag and a sack with kitty litter. There are disposal receptacles at the trail head, and hikers can pick up kits there or at area outdoor shops.

A cheap alternative is using colored re-closable bag (e.g. Ziploc) for just solid wastes. These bags can be purchased by the carton from a shipping supply company such as Uline. These can contain your waste (or feminine hygiene products) out of sight. Hey its winter and your poo will freeze so you won't have to worry about odor.

Users who make their own Wag Bags should note that homemade versions can't be tossed into landfills, as can EPA-approved commercial ones, like GO Anywhere, Biffy Bags, and ReStop.

#### 14.4.1.2 “WAGGING” TIPS

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Best practices for using a wag bag come with, well, practice. Generally, when nature calls, you grab your bag kit, toilet paper, bag for used toilet paper, and hand sanitizer and head off to find a secluded area where people are unlikely to view your bare bottom. Squat and do your business.

You then take your trusty wag kit, slip the inner bag over your hand and grab your poo pile. Be careful not to spill the poo powder or kitty litter inside (so picking up your pile with the top part of the bag is best).

Then, fully enclose the poo and make sure the powder or litter has covered it. Powders, like Poo Powder above, or kitty litter are used to solidify waste and control odors. Then, seal that bag inside the thicker, outer bag or stash inside your container of choice. Place your used toilet paper in the bag. Clean your hands with hand sanitizer. Wag complete.

#### 14.4.1.3 POOP TUBE

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A poop tube is often a climber's preference, but winter campers can certainly use one, too. Use a length of PVC pipe (around 4 inches in diameter), a cap for one end, and a threaded fitting and plug for the other. (For cleaning, it's helpful to be able to remove both ends.) What length you cut is dependent on the length of your trip and, frankly, how much you poop. Six to 10 inches is standard, though 12 to 25 inches is recommended for longer trips. Either secure it to your pack with pack straps, or use duct tape and cord to make a handle and clip it to your pack for easy access. Pack standard coffee filters, place those on the ground, and aim. Or poop into brown paper bags. Then wrap up the business, send it down the tube, and seal it up.

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#### 14.4.2 DISPOSAL

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Whether you pack it out in a bag, a tube, or plastic container waste should be properly disposed of after your trip, often that means into a toilet. Some of the commercially available bags are EPA-approved for landfills, but check rules first.

##### 14.4.2.1 PACK-OUT MUSTS

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Some waste items you always pack out, no matter where you are, what the season is or how small an item it is. Those items include tampons, pads, feminine hygiene products and diapers.

## **15 WILDERNESS 1ST AID**

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Wilderness Medicine has a nine step plan for, god forbid, handling medical emergencies in the wilderness by covering a plan or checklist for their nine step Patient Assessment System. I participated in Wilderness 1st Aid classes and mock emergencies I where I ‘hurt’ victims by rushing to judgments and offering improper assistance. The checklists force a process that ensures all aspects of the situation get addressed. If you aren’t going to take a Wilderness 1st Aid class or Wilderness 1st Responder, then at least read their full set of posts.

### **The Patient Assessment System**

1. [The First Five Minutes](#)
2. [Patient Assessment System – Scene Survey](#)
3. [Patient Assessment System – Primary Survey](#)
4. [Patient Assessment System – Vital Signs](#)
5. [Patient Exam: What are their injuries?](#)
6. [Patient Assessment System – AMPLE History: What is their past medical history?](#)
  - A** – Allergies
  - M** – Medications
  - P** – Previous Injury or Illness
  - L** – Last Input and Output
  - E** – Events leading up to the crisis
7. [Patient Assessment System – SOAP: What is our patient care plan?](#)
  - Subjective data: age, sex, the mechanism of injury, and the chief complaint
  - Objective data: vital signs, the patient exam, and the AMPLE history.
  - A** – Assessment: (problem list)
  - P** – Plan: (plan for each problem on the problem list)
8. [Rescue Survey / Plan](#)
9. [Patient Assessment Check List](#)

## **16 COLD INJURIES AND RECOGNIZING HYPOTHERMIA**

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The best treatment for cold injuries is to recognize the early warning signs and take action. Hopefully, with care one avoids the prospect of injury.

It is always a good idea to remain cognizant of possible injuries from the cold. Of course, our hands and feet are the most susceptible to cold injury primarily because they have a high surface to volume ratio, which makes them efficient at radiating heat. In addition, your fingers and toes are the last stop on the circulatory system's route and the warm blood from the body's core has cooled by the time it gets to them. Your toes are at further risk because they can also lose heat by conduction against the cold ground, ice or snow.

If your feet or hands are cold, now is the time to do something about it. If you don't, you may be heading for frostbite. If you still have the sensation that an extremity is cold or even feels "freezing," you have not yet entered frostbite. As the skin cools, blood flow decreases creating that cold or freezing feeling. As your skin continues to cool, a protective reaction called cold-induced vasodilatation (CIVD) occurs. CIVD is also called the "Hunters Response." Your blood vessels will dilate at short intervals to bring warm blood to the skin's surface. Eskimos and Nordics have developed a strong CIVD response. However, if the skin temperature continues to lower, circulation will withdraw completely from the surface and CIVD will stop. The heart and core organs are not as efficient as the cold blood is circulated through them so the brain shuts off the blood flow from the extremities in order to protect the organs of higher priority.

### **16.1 FROSTBITE**

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The initial stage of frostbite is when your skin starts to feel numb due to the lack of blood flow. However, numb skin is not necessarily frozen. To test for actual freezing, dent the skin with your finger nail. If it remains dented, you have superficial freezing, which can be passively re-warmed. You can vigorously shake your hands or whirl wind your arms to restore blood flow. Although a bit harder, you can do the same with your feet and toes. Once the feeling returns, head for warmth as soon as possible.

Re-freezing after initial warming can cause permanent damage to blood vessels and nerves. If you attempt to dent the skin with your nail and you can't, the underlying tissue is frozen. You now have a serious medical emergency. Initial treatment for frostbite is to warm the part as fast as possible without causing any damage to the tissue. The best method is to use warm water. Water transfers heat 30 times faster than air and won't damage the fragile frozen tissue. Passive re-warming by shaking can damage tissue and warming by radiant heat (holding the frozen part over a warm fire) isn't fast enough. The water should be just warm, not hot, and circulated or changed to maintain a constant warm temperature until feeling occurs. The thawing of a frozen body part will be very painful. As the re-warming occurs, you can gently wiggle your toes or fingers, but do not massage them. After the feeling returns, protect the digits with dry cloth and immobilize while on the way to a medical facility.

The Wilderness Medical Society Practice Guidelines for the Prevention and Treatment of Frostbite provides this summary of field treatments for frostbite (over 2 hrs from definitive care)<sup>41</sup>

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<sup>41</sup> <http://www.wemjournal.org/article/S1080-6032%2811%2900077-9/fulltext>

1. Treat hypothermia or serious trauma
2. Remove jewelry or other extraneous material from the body part
3. Rapidly rewarm in water heated and maintained between 37-39°C (98.6-102.2°F) until area becomes soft and pliable to the touch (approximately 30 minutes). Allow spontaneous/passive thawing if rapid rewarming is not possible
4. Ibuprofen (12 mg/kg per day divided twice daily) if available
5. Pain medication (e.g., opiate) as needed
6. Air dry (i.e., do not rub at any point)
7. Protect from refreezing and direct trauma
8. Apply topical aloe vera cream or gel if available
9. Dry, bulky dressings
10. Elevate the affected body part if possible
11. Systemic hydration
12. Avoid ambulation on thawed lower extremity (unless only distal toes are affected)

## 16.2 HYPOTHERMIA

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Hypothermia, a condition where your body is losing more heat than it can produce, is an often talked about environmental injury. The initial stages of hypothermia simply include constant and uncontrollable shivering. The person or child is still alert and coordinated but just can't stop shivering on their own.

If introduced into a warm environment, with dry clothes and a hot drink, the condition quickly subsides. However, there is a fine line between stage one and stage two hypothermia. In stage two, continued exposure to the cold affects the brain's metabolism. In addition, the cold heart is much less efficient at pumping oxygenated blood to the brain and vital organs. Slurring of speech, loss of coordination and confusion will occur. In stage two, the shivering has stopped. Re-warming a stage two hypothermic requires the placement of heat packs against the torso, under the armpits and against the neck. Never warm the extremities first or massage a stage two victim. Massaging the skin of the extremities will only stimulate circulation returning very cold blood to an already overworked and oxygen deprived heart, which can trigger ventricular fibrillation. Stage two hypothermics should be evacuated immediately.

In stage three, or profound hypothermia, the body is stiff and unresponsive. Attempting to re-warm a stage three victim in the field is not practical. Re-warming in the field will most likely result in a sudden drop in heart temperature (when the very cold blood from the arms and legs returns) causing cardiac arrest. The recommended treatment for a person in profound hypothermia is to prevent further heat loss by removing all wet clothing and wrapping the person in warm clothing, linens, sleeping bag, etc with immediate evacuation. All hypothermics should be handled very gently as a jar to the cold vital organs can damage them.

The best treatment for cold injuries is to recognize the early warning signs and take action. It also wouldn't hurt to watch the others around you. Often, in a group setting, when one person is struggling and the others are not, that person's first reaction is to cover it up. Speak up if you think someone is in trouble and help them out. Sometimes a warm drink, energy bar and an extra stop is all it takes.

So what to do if you are cold or one of your camping buddies is cold?



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First get dry clothes on. Find a spot sheltered from the wind and, if possible, in the sun. If possible provide insulation from the ground with a pad or pack. Remove all damp clothing, to include socks and underwear. Put on the warmest, driest layers available. Don't forget to cover the head and neck.

Second warm yourself by generating more heat. If you are still shivering or feeling clumsy you need to raise your body temperature. Start with exercising. Do jumping jacks or run in place. Sugary drinks and foods boost a hypothermic person's ability to generate body heat. Drink something warm and sweet with no caffeine or alcohol (both are diuretics, and dehydration hampers temperature regulation). Eat an energy bar and/or candy.

Third if you continue to display the signs of hypothermia such as slurred speech, resisting help, and confusion then more drastic measures are in order. Zip the individual into a dry sleeping bag and treat them for shock by raising their feet. Place a warm water bottle or heat packs against their chest, back, groin, and head. A 1994 Canadian study in the Journal of Applied Physiology showed that body-to-body contact doesn't warm up hypothermia victims any faster than applying heated water bottles at these key areas.

## **17 WINTER CAMPING WITH YOUR DOG**

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Thinking of taking your dog winter camping with you? Before you take your dog winter camping objectively assess if your dog is suited to being outdoors in the winter. Try to honestly consider these factors to assess your dog's suitability as a winter camping companion.

- Is your dog susceptible to cold weather? Small and/or short haired dogs are more susceptible to cold weather as are the very young and very old dogs.
- Is your dog obese or underweight?
- Does your dog have pre-existing health issues such as arthritis? Does your dog have appropriate breeding?
- Does your dog have short legs that will cause it to struggle walking through the snow?
- Has your dog spent time outdoors during the winter?
- Has your dog successfully accompanied you on day trips?
- Your dog should be under voice and sight control at all times, or should be on a leash. Will your dog stay within sight and respond immediately to voice commands?
- Your dog should not charge, chase or display aggression towards other skiers, dogs or wildlife on the trails.

If your dog is not "trail ready" please leave him/her at home.

Assuming your dog is a suitable candidate here are items to bring and suggestions to make the experience more pleasant for you and your pet.

Have your dog wear a back pack doubles as a harness which gives control on a leash. The bag should be large enough for your dog's frame and large enough capacity to carry the food needed for your longest journey. Some dog packs have pouches with zippers that allow for contraction as the food load gets smaller or for shorter hikes with less gear.

Spend time in advance to fit and load pack. Adjust the harness on your dog so it's snug but won't chafe. You should be able to fit two fingers under it. Load the bags with dog food, treats, bowls, and/or extra gear. The total load shouldn't exceed one-third of your dog's body weight. Make sure both sides are weighted equally.

Consider dog booties to avoid snow packing in the paws. Booties should fit above the dew claw. Alternatively, a dollop of Bag Balm or Vaseline on your dog's feet will insulate against the cold and prevent snow and ice from clumping up in the fur.

Always carry a leash. Fortunately there aren't too many people around in the winter but you will want to be prepared to put your dog on leash if you encounter people or wildlife.

Bring one or two collapsible bowls for food and water. Do not change the dog's basic diet. Extra milk bones or other snacks for nutrition are appropriate for snack breaks.

Trim your dogs toenails pre-trip to prevent rips in the tent floor.

Plan to provide bedding for your dog to lie on in camp. Pack a small closed cell foam pad for sleeping and/or a wool blanket in cold weather. You may choose to have your dog sleep in your tent so you don't have to worry about interaction with other critters.



THE RIGHT DOG, PROPER PLANNING AND EQUIPMENT MEANS YOU CAN TAKE YOUR DOG WINTER CAMPING.

Items to bring in your dog's back pack:

- Plan to clean up after your dog; so bring plastic bags to pack out dog poop.
- Bring a camp towel and/or brush to clean and dry your dog thoroughly before letting them in your tent. A brush is useful for getting out burdock or clumps of snow.
- Keep track of dogs at night with LED lights or glow stick bracelets on collars.
- A small multi-tool should be considered. Although you may never have to pull quills out, it serves many functions.
- Imodium. Many veterinaries recommend taking small Imodium tablets in case of stomach issues from water, food, cramping, etc.

Continually monitor your dog's condition and watch for symptoms of hypothermia. Hypothermia occurs when your dog's temperature drops below the level necessary for normal bodily functions. Your dog's normal rectal temperature should range between 100 and 102.7 F, and hypothermia occurs when your dog's rectal temperature drops below 95 F.

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If you don't have a thermometer you can monitor your dog's temperature by sliding your hand along their belly. If your dog is curled up and its belly is cold then you might be dealing with hypothermia.

With mild hypothermia your dog may be shivering and appear lethargic. Your dog may whine, display an anxious behavior and look for shelter for protection. As hypothermia increases in severity other symptoms become evident to include shivering, lethargy, muscle stiffness, lack of coordination, a low heart rate, shallow breathing, fixed and dilated pupils, collapse, and, finally, coma. Early recognition and intervention is important. Wrap your dog in warm blankets. You may apply external heat sources such as warm water bottles or human body heat. A small amount of warm sugar water may provide benefit if you can get your dog to drink it. If not treated, hypothermia can be fatal.

You can find dog gear at: Lone Wolf dog gear, Ruff Wear, and Granite Gear, among others.

## 18 POST TRIP

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This guide spent a lot of pages discussing gear and procedures for getting out and enjoying your winter camping trip. Now it is time to put the icing on the cake and make your return pleasurable as well. Simply planning ahead will make you comfortable for the ride home and give you a head start on the next winter camping trip.

### 18.1 WHAT TO PACK FOR THE RIDE HOME

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When you get back from your winter camping trip it is nice to shed your camping gear and dirty clothes and to have a few creature comforts available. Prior to the trip you may want to pack a small duffel bag or knapsack and leave it in your car to access after the trip.

**Toiletries.** If the location permits then a quick clean up using a wash cloth or bandana and towel or wiping up with an antibacterial wipe will make you feel better and your companions will appreciate it when sitting next to you in the diner or car ride home. Mint gum may help freshen your beef jerky breath.

**Change of clothes.** Once you have arrived back at your car change out of the smoky, dirty, smelly clothes into a clean change of clothing. If you can't do a full clothing exchange from clean socks and underwear to pants and a shirt, then at least pull on a clean, dry shirt.. After several days of wearing synthetic clothing, cotton is a luxury. Don't forget a baseball hat to cover up the unwashed hat hair and a change of footwear.

**Snacks and drinks.** Food that won't freeze, such as granola bars, candy or chips/pretzels, is a welcome treat. That salty junk food you admonish your kids not to eat will taste wonderful after a long winter camping trip. If you are only out for an overnight you may leave a thermos or drinks in a cooler to remain unfrozen until your return.

### 18.2 POST TRIP ANALYSIS

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On the ride back home from your winter camping trip discuss 'lessons learned' with your camping partners. What equipment would you alter or leave home next time? Were there items you wish you had included? I also try to make note of gear or clothing that met and/or exceeded my expectations. What would you do differently? Document these in your checklist to help smooth out your next trip and help you winnow out little used, nonessential items.

### 18.3 POST TRIP CHECKLIST

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Once you have completed your analysis it is on to the work of cleaning up:

- Throw out all my accumulated trash.
- Air out my sleeping bag and make sure it's dry before storing un-stuffed in a large cardboard box.
- Wash dirty clothes.
- Get all outer clothes and footwear dry.
- Hang up my tent/tarp and make sure it's completely dry before storage.
- Replenish any items used from my first aid kit, such as Ibuprofen supply.
- Replenish my toilet kit with toilet paper, plastic bags and/or hand sanitizer if necessary.
- Rinse out my water bottles and thermos.



- Stash any uneaten leftover food or snacks for the next trip.
- Store any unused fuel in a safe place and dispose of used fuel canisters.
- Wash cooking gear and eating utensils.
- Store everything away for the next trip.

## 18.4 CLEANING AND STORING YOUR WINTER CAMPING GEAR

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At the end of the winter camping season it is important to properly clean and store your gear.

Before storing your winter sleeping bag away for 6 months give it an inspection, fluff it up and make sure it is dry. If you need to clean your sleeping bag read the manufacturer's directions. There is variability between outdoor gear materials and their proper maintenance and repair. If you didn't hang on to the care instructions that came with your gear (likely) you can check the manufacturer's website as many manufacturer's list care instructions online. To wash use only mild soap and wash in a front-loading or commercial machine or by hand (NOT in an top-loading agitator machine or by dry cleaning). Rinse very well and be very careful lifting up a wet sleeping bag; support all of its weight. Tumble dry on low heat (throw in some tennis balls with a down bag). Store your winter sleeping bag loose, not stuffed, in as large a space as possible such as a breathable stuff sack, a large cardboard box or hung. Compressing a sleeping bags crushes down feathers and breaks synthetic fibers, reducing the sleeping bag's ability to trap air, maintain loft, and keep you warm. Keep compressed sleeping bags away from hot and/or humid spaces as compression combined with heat and humidity will reduce the lifespan of a bag even faster than each alone.

Wash, clean, and treat any clothing, outerwear, and footwear that you're putting into storage. There are numerous products made to clean and treat specific materials: soft shells, down, wool, hard shells, full-grain leather boots. (Grangers, McNett, and Nikwax, among others all sell cleaning, repair, and treatments products and kits for outdoor gear, with detailed instructions.) Clean your hiking boots and let them dry completely before storing in a closet. Apply durable water repellent (DWR) treatments to waterproof apparel. DWR coatings naturally degrade in sunlight and after frequent use. Signs of reduced DWR performance include condensation build-up, reduced beading of water droplets, and fabric saturation after light rains.

Set up your winter camping tent and clean off excess dirt and debris. Re-apply seam sealer, if necessary. Make sure your tent is fully dry before storing it away.

Make sure your stove is clean and ready to go. Read the manufacturer's instructions closely. Many stove manufacturers sell repair and maintenance kits for specific stove models. Stoves with pumps may need the pump oiled. Wipe-down gas stoves to remove carbon deposits and food stains; carbon stains can eventually clog the fuel lines and burner pores, causing a stove to sputter.

Don't leave old fuel in a stove you're not using regularly. Store stove fuel and pressurized canisters in a garage, basement, or shed separate from the rest of you gear to reduce the risk of leakage, fire, and explosion.

Clean the hard-to-clean spaces of the water bladders and tubes. Uncap water bottles and hydration bladders to open them up to continuous air flow.

Store your battery-powered devices and extra batteries in cool, dry locations; avoid excessive heat which drains unused batteries.

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Once it is clean and dry store your gear in its proper place with all of its parts; same for any insulated garments.

Review your supplies. Check first aid kits for outdated medicine and prescriptions, then restock. Restock or replace any gear repair and maintenance kits and survival gear you carry. Check batteries and replace spares.

Make a list to buy supplies like stove fuel, trail maps and guidebooks, favorite meals and snacks now, so you won't waste time looking for them on your way to the trailhead.

Get organized. Once your gear and supplies are ready for the trail, organize and label the bins in your gear closet/room/storage space, so you can find exactly the gear you need when you need it. That way, you can get out the door quickly, without leaving something essential behind. Update and print out your gear checklists (if you've got a laminator, put it to use). Taking the time to clean and organize your gear now can mean better backcountry trips next time out.

## **19 CONCLUSION**

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Go winter camping because it's fun. While it is easy to become a gear head and oh-and-ah over each new items of camping gear you can probably go camping with the equipment you currently accessible. The equipment and techniques described in this book provide a basic methodology for you to use.

"Good judgment comes from experience, and experience comes from bad judgment." <sup>42</sup> Adapt the procedures described and your gear to suit your own preferences. After each trip assess your performance and the performance of your gear. Making this assessment and adapting your procedures and gear are part of the process and enjoyment.

A winter camping trip can be a difficult, arduous event requiring advance preparation and attention to detail; as well as the most uplifting and self-satisfying thing you have ever done. Of course, you will only find out by going winter camping.

Celebrate your own winter camping experience!

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<sup>42</sup> Barry LePatner

## 20 GEAR LISTS

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*“There is no such thing as bad weather....only the wrong clothes.” -Scottish Proverb*

Please note: This list is merely a suggestion and required gear should reflect the conditions and terrain of the trip. Winter camping can be inherently dangerous and should only be attempted by the most experienced of campers. WinterCampers.com takes no responsibility for the chill that you might develop during the night.

### 20.1 WINTER CAMPING EQUIPMENT CHECKLIST

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#### 20.1.1 THE TEN ESSENTIALS

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- Navigation: map and compass
- Extra food
- First aid kit
- Fire starter, matches, lighters and tinder
- Headlamp or flashlight
- Extra clothes such as an insulation layer and/or hard shell jacket
- Sunglasses and sun screen
- Pocket knife or multi-tool
- Emergency signaling device(s): whistle, mirror, satellite phone

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#### 20.1.2 SHELTER

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- 4-season tent, tarp or bivy sack
- Tent stakes, tent poles & repair sleeve and guy lines
- Snow shovel or snow saw
- Tent stove if hot tenting

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#### 20.1.3 SLEEPING SYSTEM

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- Sleeping bag (liner optional)
- Sleeping pad(s)

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#### 20.1.4 TRANSPORTATION

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- Backpack, sled, toboggan or pulk
- Snowshoes, crampons and/or skis (with skins) depending on conditions

- Ice axe and/or trekking poles (w/ snow baskets)

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#### 20.1.5 MEALS

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- Stove, fuel and windscreen
- Lighter or matches
- Cook set with large pot for melting snow &/or boiling water
- Insulated mug / drinking measuring cup, bowl/plate and eating utensils such as a spork
- Food (breakfast, lunch, dinner, snacks such as energy bars, candy, gels, and/or trail mix)
- Energy beverages, hot chocolate coffee/tea or drink mixes
- Water bottle(s) and bottle cozy
- Paper towels
- Water treatment

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#### 20.1.6 CLOTHING

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- Base layer: wicking underwear
- Mid layer: insulating jacket/vest/pants
- Hard shell or soft shell jacket
- Extra Pants (or soft shell pants)
- Extra set of dry clothing for camp
- Insulating hat, cap or headband
- Balaclava and/or face mask
- Bandanna or buff
- Goggles

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- Gloves and/or mittens

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#### 20.1.7 FOOTWEAR

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- Hiking boots, ski boots and/or mukluks,
- Wool socks, liner socks, and spares
- Gaiters
- Camp booties or overshoes

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#### 20.1.8 SANITATION

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- Toilet paper
- Wag Bag and/or colored Ziploc bags for waste removal
- Hand sanitizer
- Quick-dry towel
- Toothbrush and/or toiletry kit

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#### 20.1.9 OPTIONAL PERSONAL ITEMS

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- Ax, hatchet or saw
- Notebook and pencil
- Extra nylon cord
- Permits, if needed
- Guidebook or field guide(s)
- Book/reading material
- Cards or small games
- Camera
- Binoculars
- Two-way radios, cell phone or satellite phone
- Extra batteries and/or charger
- Small amount of cash or credit card
- Trip itinerary left with family and/or friends and with car

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REI posted [a list for snow camping](#) with recommendations for the 10 Essentials, Clothing, Outerwear, Footwear, Camping Gear, Personal Items, and Other.



## **21 RECIPES FOR WINTER CAMPING**

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A winter camping dinner staple is brats over a fire –no fuss and no mess, but when you feel liking doing more than heating cylindrical meat or re-hydrating soup try one of these recipes for back-country bread or a Ziploc meal.

### **21.1 BACK COUNTRY BREADS**

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There is something about holding and eating warm baked goods while winter camping that really makes them seem like a treat. Bread becomes a special treat you will enjoy.

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#### **21.1.1 5-MINUTE MEAL SPEEDY BANNOCK (MOUNTAIN BREAD)**

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- 1 cup white flour
- 1 cup whole wheat flour
- ½ cup powdered milk
- 4 teaspoons double-acting baking powder
- ½ cup (1 stick) butter
- ½ teaspoon salt
- 1 cup water
- cooking oil

At home- Mix dry ingredients and pack in a zipper-lock bag. Carry butter in a small container (Lexan works best for both butter and oil). It'll soften nicely on the trail.

In camp Place butter and water in a pot and warm until butter melts. Mix in dry ingredients. Press into well oiled 10-inch skillet (no need to cover). Bake on medium heat (if your stove has only high heat, hold the pan an inch above the flame for best results) until edges look slightly brown (about 3 minutes). Flip and bake 2 to 3 more minutes. Makes 2 servings. Variations: Add raisins, sugar and cinnamon, or walnuts. Even easier: Use Bisquick to make a lighter, fluffier, but slightly less hearty bread.

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#### **21.1.2 5-MINUTE MEAL CHAPATIS**

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- 2 cups whole wheat flour
- ½ teaspoon salt
- ¾ cup water
- 2 tablespoons cooking oil

At home Mix dry ingredients and pack in a zipper-lock bag.

In camp- Add water and oil to dry mixture and knead until dough is smooth. Pinch off 12 small balls of equal size. Use your palms to pat balls into thin, round disks. Drop the flattened dough into lightly oiled hot skillet. Cook each side about 2 minutes or until golden brown. Spread with jelly for breakfast, hummus for lunch, or eat with cheese as an appetizer before dinner. Makes 2 servings.

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#### **21.1.3 5-MINUTE MEAL CORNBREAD**

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- 1 cup cornmeal
- 1 cup flour
- ½ teaspoon salt
- 1 tablespoon sugar
- 2 teaspoons double-acting baking powder
- 2 tablespoons powdered egg
- 1 tablespoon cooking oil
- 1 cup water
- extra oil for cooking

At home Mix dry ingredients and pack in a zipper-lock bag.

In camp stir together remaining ingredients and dry mixture in a bowl. Divide into 2 or 3 portions and flatten like a pancake if you have a large skillet. (If not, thicker dough pressed against the sides of a pan will still cook up just fine.) Bake over medium heat (if your stove has only high heat, hold the pan an inch above the flame) in well-oiled skillet until the edges look slightly brown (about 3 minutes). Flip and bake 2 to 3 minutes more. Makes 2 servings. Variations: Add ½ cup sunflower seeds into batter for crunchy cakes, or ½ cup grated cheddar or jack for a cheesy bread.

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#### 21.1.4 5-MINUTE MEAL HUSH PUPPIES

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- 1 cup cornmeal
- ½ cup white flour
- 1 tablespoon sugar
- 2½ teaspoons double-acting baking powder
- 2 tablespoons powdered egg
- 1 tablespoon onion flakes
- 3 tablespoons powdered milk
- ½ teaspoon salt
- ¾ cup water
- cooking oil

At home- Mix dry ingredients and pack in a zipper-lock bag.

In camp Add water and mix thoroughly. Add just enough oil to the skillet to almost cover the bottom. (Hush puppies are traditionally deep-fried, but you can get away with less oil by turning them frequently.) Heat oil and pan on high heat, then drop dough by the spoonful into hot oil and fry until brown. Makes 2 servings.

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#### 21.1.5 TORTILLAS...AN UNWRAPPED WRAP

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- Butter
- Tortilla
- Seasoning of choice

This tasty treat comes courtesy of the folks at Wintergreen Dog Sledding in Ely, MN. Heavily butter the bottom of a pan. Place the tortilla flat in the pan and cook lightly. While cooking season the top of the tortilla. Cook until lightly brown and serve.



TORTILLAS PROVIDE A TASTY SNACK OF WARM BREAD

## 21.2 ZIPLOC RECIPES

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Freezer bag cooking is ideal for winter camping. It's lightweight because you prepare all your dried ingredients at home and pre-package them in Ziploc bags. You only need a single pot to boil water in, enough fuel to boil the water, and a fabric cozy for your bagged meal (a spare garment will work in pinch).

Once the water boils, pour it into the Ziploc bag and slip the bag in your cozy. Set it aside for 5-10 minutes for the meal to fully cook. You'll save fuel because there's no simmering. Cleanup is easy as there's no pot to scrub, just a bag to pack out.

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### 21.2.1 PUDDING IN A BAG

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- Instant Pudding
- Powdered Milk

- Mint Cookies (chopped)
- Water
- Ziploc Freezer Bag

Place pudding mix in Ziploc with chopped mint cookies. Add enough powered milk as per amount of milk needed. At camp add necessary water to bag. Seal bag and shake to mix. Place bag in snow or cold stream or lake. Allow pudding to set then serve

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### 21.2.2 OMELET IN A BAG

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- 2 eggs
- Chopped Ham, Onions, Cheese, Milk, etc.
- Ziploc Freezer Bag

Before leaving add eggs, milk, ham, onions etc. to bag. Allow to freeze overnight if hiking in warmer conditions. When ready to eat place bag in boiling water until eggs appear to be cooked. Breakfast is served!

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### 21.2.3 MASHED POTATOES IN A BAG

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- Canned Chicken Breast
- Stove Top Stuffing
- Instant Mash Potatoes
- Good Gravy

Place the stuffing and potatoes in separate Ziploc bags and note amount of water needed with a marker on the outside. Boil water necessary and add to mash potatoes. Massage bag to mix thoroughly. Place chicken in boiling water that will be used for stuffing. Add this water to stuffing bag and massage to mix. Prepare gravy in a separate pan or simply open can and place in coals in fire to warm. Dinner is served.

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COOKING IN A PLASTIC BAG IS EASY.



## **22 TWO PERSONAL EXPERIENCES: WINTER CAMPING EXTREMES**

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Let me tell you two winter camping stories that typify a range of winter camping experiences.

During a family Christmas gathering my nephew Matthew and I got into a conversation about camping and decided to go winter camping. We had backpacked and canoe camped, but never winter camping together.

That was the extent of my snow camping experience when I agreed to an overnight trip to Adirondack Park's John's Pond for Saturday of Martin Luther King weekend. We met at 10am at the Siamese Ponds Wilderness Area with gorgeous sunny weather and hiked in 3 miles. A check of the trailhead log revealed that a Boy Scout troop had hiked in before us and was staying at the lean-to, so we tented. We camped across John's Pond from the scouts in an area where the beaver had been working among the saplings. Matt made a fireplace with reflector logs braced by a stone. We cooked hot dogs for dinner and sat up until about 8:30pm (it was dark by 5pm). We both slept pretty well and stayed warm as the overnight temperatures only got down to 20 degrees. We had 1-2" of snow overnight and we heard it slide off the tent during the night. I was hooked on the winter camping experience!

Contrasting the ease and wonderful conditions of this initial trip was one taken by myself, my two nephews and our friend, Len, who was a first time winter camper. We attempted to snowshoe to Adirondack Park's Indian Pass from the north in late December.

The trail from Heart Lake and the Adirondack Loj leads South West towards Wallface Mountain. Matt and Mark brought inexpensive snow sleds for gear transport. Matt and Mark were towing sleds with their gear wrapped inside of a tarp.



OUR FIRST EXPERIENCE WITH TOWING GEAR ON A SLED WAS LESS THAN SATISFYING.

Len towed a sled, but placed his borrowed backpack on the sled – a wise decision as it turned out. I, fortunately, declined a sled altogether.

Our trip occurred the 1st year that DEC required registration in the High Peaks. There wasn't much snow on the ground and as we passed the register bound for the lean-to at Scott's Clearing (3.8 miles) the trail turned rocky. The large rocks and uneven trail caused the sled's contents to shift, the sleds to tip over and items spill out on the ground. Choice words were uttered more than once.

To add insult to injury our meal planning involved a large loaf of Italian bread, which never seemed to fit in anyone's pack. So we took turns hand carrying the loaf of bread. I managed to shed carrying duties whenever the group approached other people – not wanting to appear like a bread carrying newbie.

At about 2 miles in we passed the Rocky Falls lean-to on Indian Pass Brook but ice and open water made it treacherous to approach. We stopped just off trail and had a lunch: Matt had PB&Js while I had a huge leftover ham sandwich. Well fortified from our meal we launched off again with Matt and Mark cursing every sled miscue.



EQUIPMENT IS ADJUSTED ON A BROKEN SLED.

Finally, the inevitable happened – Matt gave his yellow sled a good jerk to clear a small dip in the trail and when the sled landed it cracked and split. Len unloaded his backpack and donated his sled to Matt, doubling up Matt's broken sled on top of Len's.

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EXPECT TO DEAL WITH FAILED EQUIPMENT IN THE FIELD



HOME FOR A NIGHT – THE LEAN-TO AT SCOTT’S CLEARING

We were relieved when we finally reached the clearing at Scott’s Clearing. We cut wood for a fire and cooked a dinner of angel hair pasta. The logic behind the choice of angel hair pasta for dinner was that the thin noodles would not require a long boiling time. The drawback of this choice is



that the difference between cooked Angel Hair pasta and over-cooked Angel Hair pasta is less than 3 seconds. Our meal was mush followed by a dessert of chocolate pudding that never quite set.

Since this trip we have attended Leave No Trace (LNT) training and adopted LNT as part of our camping philosophy, but this was during our ignorant phase so we dumped the leftover pasta onto what remained of the fire. The pasta smoldered and the fumes stunk up the lean-to. As we climbed into our sleeping bags to sleep, the temperature began to drop and the trees started popping as the water inside them froze – a phenomenon that I associate with temperatures dropping in the low teens.

A word about sleeping bags, if I may. This was Len's 1st trip and Mark hadn't done much winter camping so Matt loaned the two of them quite a bit of gear. Matt let Mark use his winter sleeping bag. Depending on your point of view Matt was either being a nice guy or he wanted his younger brother to pack in the heavier sleeping bag. Matt hadn't checked the weather forecast. The end result was that Matt had a light weight sleeping bag and a fleece blanket liner for a night when the temperature rapidly tumbled towards the negative side of zero. Through a stroke of good fortune I had looked at the weather forecast prior to leaving and, seeing the potential for night time temperatures in the negative teens, I decided to bring two sleeping bags – the 1st time I ever had done that.

During the night we heard the trees popping and Matt moaning as the cold settled in. Matt wrapped the blanket around him as best he could and sleep for 15-20 minutes and then re-position, trying to cover up again. Mark was comfortable once he got his head covered by the mummy bag. Len was revealed to be a snorer of prodigious talent in the cold temperatures. Layered inside two "zero degree" bags I slept great – except for hearing Matt. Overnight the temperature bottomed out at -15 degrees.



As first light appeared Matt uttered "I am not going to lie to you" line – confessing he would rather be awake than trying to sleep. This utterance later prompted a poem about the trip.

We brought two stoves for heating breakfast water. Mark's butane stove which he neglected to bring into his sleeping bag for warmth, so by morning the butane canister was too cold to provide pressure or ignite. Matt's white gas stove developed a leak and a resultant fire rendered it useless. We had minimal water for the morning and only snacks for breakfast, but we decided to try to hike onward anyway. We thought at least the activity of hiking would warm us.

Previous attempts to hike Indian Pass from the south had been stymied by losing the trail in the snow and this attempt from the north was no different. After hiking for a couple of hours we lost the trail.

SEARCHING FOR A SNOW COVERED HILLSIDE TRAIL

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We could see Wallface Mountain, less a mountain and more of a cliff, rising over 600' feet above Indian Pass in some places. With a cover of snow the trail and even trail markers were impossible to discern.



WALLFACE MOUNTAIN BATHED IN SUNLIGHT



A WONDROUS WINTER LANDSCAPE

After three hours of hiking I stepped through some snow into water, soaked my foot and it started to get numb. We decided to head back. Upon returning to the lean-to we grabbed our packs and high tailed it back to the ADK Lodge where we drank copious fluids. On our drive home we stopped at a McDonald's in Tupper Lake where we ate the best salt laden French fries we ever experienced.

These trips represent two extremes of comfort and preparedness. Although mistakes make a better story, they make for a miserable experience. But you can be a novice at winter camping and by planning, forethought and careful execution, have an enjoyable time and celebrate the winter camping experience.



## ***I Am Not Going To Lie To You***

*I am not going to lie to you, said Matt with a smile.  
It's a pretty long hike, a little over 4 mile.  
To get to the lean-to at the clearing named Scott's  
It will be a hard haul and take what you got.*

*The temperature may chill us to well below zero,  
But I have a solution; to this problem you know.  
We can load extra gear on these handy snow sleds  
They slide by themselves, they just have to be led.*

*So we loaded our gear –on our winter trek did embark.  
Jim with his pack, pulling sleds were Matt, Len and Mark.  
Matt set the pace as he led the group off on the trail  
But soon we heard a whine, a yell, then a loud wail.*

*I am not going to lie to you! through clenched lips he hissed  
This sled keeps tipping and I am getting quite pissed.  
I have to carry it over logs and it bumps into rocks  
Each person that passes by stares, giggles and gawks.*

*The only thing worse than pulling the sled  
Is breaking the thing and having to carry the bread.  
We made it to the lean-to with time in excess  
It was around three PM or so I would guess*

*We had angel hair pasta and it tasted de-lish  
But what didn't get eaten became frozen to the dish  
For the temperature was sinking, passing zero and dropping  
As we climbed in our sleeping bags the trees were popping..*

*Matt gave Mark his good -30 winter sleeping bag  
And rolled up in his summer sack, plus just one rag.  
I am not going to lie to you, said Matt through teeth a chattering  
I'm cold and not having any fun, not that it's mattering.*

*Cause I've never been colder and these feet are a keeping  
My mind wide awake and the rest of me from sleeping.  
I am not going to lie to you, just for courtesy sake  
Instead of lying here shivering I rather be awake*

*We arose at eight and searched for the trail for Summit Rock  
But a long trail and cold feet stopped us at 11 o'clock  
I am not going to lie to you, Matt said with despair  
Though we come quite a ways, we're not close to being there.*

*So we all turned back, loaded our gear and headed out  
Using the same trail in for our outward bound route.  
I am not going to lie to you, it was a trip to remember  
That one we took on The Twenty-Seventh of December.*