Cold Weather Leader Training

PARTICIPANT GUIDE

Northern Tier National High Adventure
Boy Scouts of America

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Welcome from the Chairman

Greetings!

Congratulations on signing up to join us at the Boy Scouts of America's premier cold weather education: Cold Weather Leader Training (CWLT) at Northern Tier National High Adventure. We're excited that you'll be joining us "Up North" to experience the thrill of cold weather camping.

Our volunteer Instructors – Scouters with significant outdoor experience, particularly in cold weather camping – work year-round to plan a training like none other. These guys are among the BSA's best at camping when the mercury drops, so be sure to take advantage of their cumulative knowledge. I'm certain that, by the time you head home, you'll know more about the cold weather camping than you thought possible…and hear some great stories, too!

Please review this guide, IN ITS ENTIRETY, **to prepare for your adventure**. You'll likely have questions. Feel free to reach out to me at miller.shane.a@gmail.com or to Northern Tier's Associate Director of Program for Bissett and Okpik Operations Sean Ferrier (sean.ferrier@scouting.org) and we'd be happy to answer them (or point you in the right direction.)

Also, note: there is some expected **prerequisite knowledge**. Some material is, by its nature, more classroom- centric. To spend more time engaged in hands-on education, it is our expectation that you review certain materials before arriving and have a basic knowledge of certain subjects – this will allow us to do a quick on-base review that uses less time. Please be sure to review this guide, the *Okpik Guide to Winter Camping* that you will receive, and check your email regularly for updates.

On behalf of the entire CWLT team, we look forward to meeting you this January. Safe travels!

Yours in Adventure,

Shane A. Miller
Cold Weather Leader Training Chair
Northern Tier National High Adventure

About Okpik and CWLT

For over forty years the Okpik program of Northern Tier National High Adventure Programs has provided safe, exhilarating and challenging adventures for thousands of youth and adult participants. The name, Okpik, comes from the Inuit word for the Arctic or Snowy Owl which has been used as the symbol for the Okpik program since it began in the early 1970's. Beginning in 2018, Northern Tier has opened a new and exciting opportunity for cold weather camping called Kapvik. Kapvik will be held at Gerber Scout Reservation near Muskegon Michigan and will be the new home of Cold Weather Leader Training. Kapvik in inuit means wolverine which is the symbol of Northern Tier's winter program in the wolverine state.

CWLT Participants will receive an introduction in how to cross-country ski, snowshoe, ice fish, build snow shelters and enjoy life in extreme weather conditions and temperatures. You will be accompanied by a trained staff instructor, called an Interpreter, along with experienced volunteer CWLT instructors. The program fully outfits participants with group gear and almost all necessary personal clothing. The goal of the CWLT program is to instruct you on how to see low temperatures as an opportunity, not a barrier, to turn a 3-season camper into a year-round camper and how to take it back to your Troops, Districts, and Councils.

Cold Weather Leader training is hosted at the Gerber Scout Reservation near Muskegon Michigan, home to Kapvik. Crews explore the backcountry trails of Gerber Scout Reservation and Owassippe Scout Reservation, No city lights, no noise, simply wilderness.

Okpik and Kapvik are the premier Cold Weather Camping Program of the Boy Scouts of America. We are excited by your interest in cold weather camping and we look forward to introducing you to the wonders of a North Woods winter.

Pronunciation Guide

Okpik	(the winter program)	***Ook*** pick
Bizhiw	(2-night award)	***Bee*** zhoo
Quinzhee (sometimes spelled Quinzee)	(snow shelter)	***Quin*** zee

How Do We Prepare Mentally and Physically?

Winter Camping requires a good deal of stamina. The cold temperatures drain energy, as the body spends more effort working to keep itself warm. While out on the ice, you can expect to expend far more calories than you normally would – 4,000 - 5,000 would be a good estimate!

Because of these factors, arriving at Cold Weather Leader Training in good physical condition will enhance the enjoyment of your trip. Try to exercise for thirty minutes three times a week for at least the month before you arrive at Cold Weather Leader Training. We recommend high amounts of cardiovascular exercise. Pulling a sled, snowshoeing, and skiing all require significant cardiovascular capacities. Run, swim and be active to prepare for your trip.

Participants in CWLT must meet Northern Tier's weight requirements to attend:

Weight-to-Height Table Northern Tier National High Adventure Programs		
Height	Recommended Weight (pounds)	Maximum Weight (pounds)
Minimum Allowed Weight ***Participants weighing less than 100 pounds will have a very difficult time and are discouraged from attending.		100 pounds
5' 0"	100 - 138	166
5' 1"	101 - 143	172
5' 2"	104 - 148	178
5' 3"	107 - 152	183
5' 4"	111 - 157	189
5' 5"	114 - 162	195
5' 6"	118 - 167	201
5' 7"	121 - 172	207
5' 8"	125 - 178	214
5' 9"	129 - 185	220
5' 10"	132 - 188	226
5' 11"	136 - 194	233
6' 0"	140 - 199	239
6' 1"	144 - 205	246
6' 2"	148 - 210	252
6' 3"	152 - 216	260
6' 4"	156 - 222	267
6' 5"	160 - 228	274
6' 6"	164 - 234	281
6' 7" +	170 - 240	295
Maximum Allowed Weight ***No participants weighing more than 295 (250 for dog program) pounds will be allowed to participate.		

While it is not required, it is also a good idea to do at least one overnight preparation trip, or have some basic cold weather camping experience before you attend Cold Weather Leader Training.

We also recommend you thoroughly review the *Okpik Guide to Winter Camping* prior to your attendance. **A copy will be provided to each participant** (if you have not received your copy, please contact Northern Tier at 218.365.4811.) We also encourage you to review resources available online and in the bibliography included in this guide.

It is the expectation that each participant has reviewed and has a familiarity with:

- Homeostasis and its effects on you
- Menu planning

We will be forwarding you several prerequisite assignments to aide in your preparation and planning.

Remember, our time is limited on the base. If participants come with a stronger familiarity on "classroom" topics, we can spend more time working on "field" topics.

Winter camping is a fascinating and little studied branch of outdoor skills. We encourage you to study up on the various techniques and approaches to winter camping. Spending several days in the cold requires a methodical and meticulous approach to even the most mundane task.

WHAT ARE THE RISKS? (RISK ADVISORY)

The Northern Tier National High Adventure Programs have an outstanding safety record. The Boy Scouts of America and Northern Tier emphasize safety through education and strict adherence to established policies and procedures. The safety of your group is dependent upon your attention to these procedures as well as being physically fit, properly equipped and trained for the rigors of cold weather camping.
Northern Tier and the Boy Scouts of America's policies and procedures, if followed, will minimize these risks as much as possible. Parents, leaders and participants should be advised that despite our best attempts at risk management, it is not possible to remove ALL risk from a cold weather wilderness expedition.

- Possible risks include (but are not limited to) motor vehicle accidents; severe weather conditions such as extreme cold temperatures and high winds; medical conditions such as heart attack, appendicitis, hypothermia, dehydration, frost bite, severe allergies and asthma or diabetes related conditions; accidents such as cuts, embedded fish hooks, burns or falls; risks associated with being on frozen lakes and encounters with wildlife.
- Medical evacuations and search and rescue services are coordinated by Northern Tier in close cooperation with local authorities.

- Please carefully read the information in this Participant Guide. If you have any further questions about risk management contact Northern Tier by phone 218.365.4811 or email info@ntier.org

HOW DO I PREVENT PROBLEMS?

- **KNOW FIRST AID** – You need to know basic first aid. You will learn how to prevent common cold-weather injuries, and how to identify and treat ones that may occur.
- **PURIFY ALL DRINKING WATER** - All water from natural sources must be purified by bringing it to a rolling boil or through use of a water purification filter. Chemical treatments are less effective in the cold.
- **TOBACCO** - It is strongly suggested that adult participants limit the use of tobacco on the trail. Smoking is not permitted in the presence or vicinity of youth, tents, camp buildings, BSA vehicles or near maintenance areas; only in designated areas on base.
- **ALCOHOL AND DRUGS** - Possession or use of alcoholic beverages, illegal drugs or the misuse of prescribed drugs is prohibited. Participants found in violation of this National BSA policy will be sent home.
- **ABUSE** - Physical, sexual or emotional abuse (including hazing) of a camper by his or her peers or by an adult leader is unacceptable anywhere. Local, county and state authorities as well as the BSA council representative will be contacted if abuse is suspected.
- **PRESCRIPTION DRUGS AND MEDICATION** - If a participant is on regular medication, their physician should be consulted. Be sure to consult your physician to determine the effect cold weather may have on your medications (i.e. inhalers or epinephrine) or effects your medications may have on you in cold-weather conditions.

GENERAL POLICIES AND INFORMATION

EMERGENCY PHONE NUMBER – In the event of an emergency at home, participants can be reached by calling the base at (218)-235-8957. Please be advised that there might be a delay in relaying the message to the participants, particularly if they are on trail. Cell phones may have limited reception and short battery life when out in the field.

OKPIK PARTICIPANT AND ADVISER PLANNING GUIDES – Please review the Okpik Participant Guide and Kapvik Adviser Planning Guide for general information regarding the Okpik programs. Do note, however, that these guides were prepared for *crews*, so some information may not apply to the CWLT program.

YOUTH PROTECTION TRAINING (YPT) – All adult participants are required to present proof of current Youth Protection Training (YPT) upon arrival at Northern Tier.

HOW DO I GET THERE?

You are responsible for your own transportation to Gerber. Kapvik is based out of Gerber Scout Reservation, located approximately 20 miles north of Muskegon, Michigan. It is located approximately 60 miles north of Grand Rapids Mi. If you have questions about shuttle services, please visit our webpage at www.ntier.org/tripplanning.

We recommend planning your route prior to making the trip and that you do not rely on GPS systems. These may often take you via routes that are potentially impassable in winter conditions. Watch out for deer and other wildlife on the Michigan roads.) If you plan on obtaining a rental car, we encourage you to make sure renting one that is suitable for the potential wintery conditions in Michigan.

We will be requesting a travel advisory consisting of your plans (method of travel, estimated arrival time, a contact number where you can be reached while traveling, etc.) prior to your arrival. **If plans change or conditions prohibit your making it to Gerber by your expected time, please call and advise us. Remember: We'd rather you arrive late and safe than for you to have an accident.** We invite you to enjoy the scenery of Michigan and visit local shops along the way, but if you are ready to come to base before check-in, you are invited to come and have a cup of coffee with the instructors. Please follow the signs to the Program Center.

WHAT DO I NEED TO PACK?

You've probably been wondering what gear you'll need to bring along. Northern Tier has a well-stocked Bay Post and outfitting capabilities to make sure you're safe and comfortable even in the coldest conditions. You don't have to go out and buy a ton of gear!

There are, however, some items you need to bring along: particularly, you will need to pack most items that directly contacts your skin. The list below provides a general outline:

Personal equipment list:

- ❑ A **COMPLETED** BSA Health and Medical Record, signed by a doctor within the past twelve months. This applies to both youth and adult participants.
- ❑ For adult (18 years old and older) participants: A copy of your current, valid Youth Protection Training certificate.
- ❑ 2 winter hats (windproof synthetic or wool)
- ❑ 2 pairs of synthetic or wool long underwear, top and bottom. (No cotton) Merino wool is a good option.
- ❑ 2 pairs liner gloves (light gloves that are worn inside mittens)
- ❑ 2-3 pairs wool or heavy synthetic socks (no cotton)
- ❑ 2-3 pairs synthetic liner socks
- ❑ 3-season sleeping bag. This will be combined with an Okpik-issued cold weather sleeping bag to form your sleeping system.
- ❑ Headlamp or flashlight and extra batteries (MUST HAVE – days are short in the winter, so if you plan on staying up later than 5-6 PM you will need some light). Battery life is **greatly** reduced in cold weather.
- ❑ Toiletry articles (toothbrush, toothpaste, etc.)
- ❑ Prescription and other required medications
- ❑ **Plastic** cup, bowl and spoon
- ❑ Stuff sack or small duffel bag for all personal gear
- ❑ Items for showering (towel, soap, etc.) and clothes for the trip home
- ❑ Scarf or Neck Gaiter
- ❑ Winter Outdoor Essentials (see page 16 of the *Okpik Guide to Winter Camping*). While we have a strong support system at CWLT, everyone should be in the habit of carrying knife, whistle, fire starting materials on body always, and have other essentials in belt pack or similar ready to go when venture away from camp, of if separated from sled.
- ❑ Rain gear (though, most years, the temperature at CWLT is low enough that it is not necessary)
- ❑ Ice picks. A set will be issued from Outfitting and should be worn around the neck and on body always while on ice. (Note, the areas we deal with generally are very thick during CWLT – however, it is always good practice to Be Prepared.)
- ❑ Sunglasses or Snow Goggles
  Note: "color-changing" glasses may darken with extreme cold and remain dark until they warm up – effectively you could be wearing sunglasses all day and night (not permanent).

The following items are available through Outfitting but you may be more comfortable in your own:

- ❑ 2 sweaters – preferably wool or polar fleece (No cotton).
- ❑ 2 pairs wool or fleece pants

Recommended / Strongly Encouraged items:

- ❑ Insulated parka/jacket and bib overalls or pants. Synthetic or down fill.
- ❑ Suspenders (better than a belt in cold weather)
- ❑ Slippers (your On-Base stay will be in heated cabins, but the floors are cold)
- ❑ Fleece Vest
- ❑ Pocketknife/matches/bandana
- ❑ Sunscreen and chap stick
- ❑ Camera and Film (many find that batteries don't last in phones/cameras – be prepared)
- ❑ Funds for the final night dinner. Typically, the course participants and staff take an *optional* trip to town once the course has concluded.

Okpik provided, but feel free to bring your own:

- ❑ 2-3 pairs of mittens (mittens are warmer than gloves)
- ❑ 1 outer wind layer jacket
- ❑ 1 pair wind pants
- ❑ Fleece layers
- ❑ Skis and snowshoes
- ❑ Warm winter boots (e.g., Sorels or Kamiks) *with removable liners*

PLEASE NOTE: While Northern Tier strives to have clothing available for all sizes, we are limited in the number of XX-L and XXX-L items. For these sizes, we recommend that participants bring their own.

The weather can be unpredictable, but most CWLT sessions will have "wet snow" and sub-arctic conditions.

First Aid Kits: Since CWLT is an individual program, Northern Tier will supply the group first aid kit when we go on trail. However, it is always a good idea to bring your own small, personal first aid kit to carry with you.

Uniforms: While the uniform is one of the Aims and Methods of Scouting – it's not an ideal piece of cold weather camping equipment. It's up to you if you bring one – but there is not a time during the course where it will be required.

Classroom attire: A large portion of the early portion of the course is spent in an indoor, conference room style setting. Pack comfortable clothes for spending time indoors.

Paperwork: Please remember to bring the following; you will not be allowed to stay on base, or participate in the program, without them:

- A completed BSA Annual Health and Medical Record, signed by an appropriate healthcare provider. Northern Tier staff will review your Health and Medical Record with you upon arrival.
- A **printed** copy of your current Youth Protection Training (YPT).

Patches and Program Awards

Kapvik Award/Patch

The basic Kapvik patch, this is awarded to every participant in the programs who spend at least one night out.

CWLT will participants receive one patch

Okpik Instructor Award/Patch

This patch is the Cold Weather Leader Training's completion award. Unique in that it's an oval, rather than the circle of the other Okpik patches, it illustrates that the holder has completed a Cold Weather Leadership course and is qualified to teach locally. CWLT participants will receive one patch.

Bizhiw Patch

The Bizhiw patch is available to any participant who spends two nights out among the elements off base. Not all Okpik participants, including those who spend time out on the trail, qualify. But, the Cold Weather Leader Training curriculum does include two nights out – so all participants will qualify.

Those who qualify may purchase this patch in the Trading Post.

Zero Hero

One of the most coveted Okpik awards, the Zero Hero is available to anyone who spends a night out when the temperature goes below zero Fahrenheit- meaning -1 or colder. Not all CWLT participants qualify – it all depends on the year and the weather; those who do are in for a memorable experience!

Those who qualify may purchase this patch in the Trading Post.

Feed the Cold(a pre-CWLT assignment)

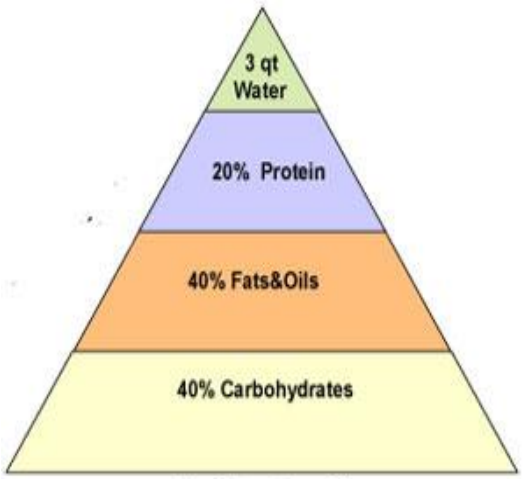
Nutrition is always important when camping, but in winter it is critical. Food is energy, and energy is needed to keep the body warm. It takes roughly 4000 calories per day when winter camping (more as the temperature drops or activity rises) – not your time to diet! We will have detailed discussions on this topic in class and on ice, but are asking everyone to help us by doing some learning, thinking and planning before the session.
Based upon the following criteria, please prepare a menu for one day of winter camping in sub-arctic (0^F) weather:

1.) Use the winter food pyramid to balance the menu.
2.) See "Proper Nutrition", below, for guides to food group focus during the day .
3.) Keep in mind ease of preparation and ease of cleanup.
4.) Menu is for "remote camping", using a sled for transport (much easier than backpacking)

Food pyramid

Proper Nutrition

- Breakfast should give enough fat to satisfy the appetite "
- Lunch is abundant in high carbohydrate energy.
- Dinner includes the highest amount of protein.
- Nutritious high caloric snacks at any time of day



The Winter Pyramid

Remember that food spoilage is not a major concern in the winter but freezing will occur unless you take precautions.

You may use any resources available to you. There are detailed notes further in this book.

Please bring your menu to Base when you come, either in electronic form or printed. There are no wrong answers, and they won't be graded. We feel that this will stimulate discussion and increase the number of options that you will have to better enjoy "Feeding the Cold" when you return home.

Sample Course Schedule

Day 1

Start Time	End Time	Activity
3:00 PM	5:30 PM	Student Arrivals
5:30 PM	6:30 PM	Dinner
6:30 PM	7:30 PM	Welcome & Introductions
7:30 PM	8:00 PM	Introduction to Winter Programming
8:00 PM	9:15 PM	Gear on a Budget
9:15 PM	9:30 PM	Night Hike Preparations
9:30 PM	9:30 PM	Gather for Night Hike
9:30 PM	10:00 PM	Night Hike
10:00 PM	11:00 PM	Reflections; Cracker Barrell
11:00 PM		Back to Cabins

Day 2

Start Time	End Time	Activity
7:30 AM	8:15 AM	Breakfast
8:30 AM	8:45 AM	Quick Intro to Winter Camping Essentials
8:45 AM	10:00 AM	Dressing for Success
10:00 AM	11:00 AM	Sleeping Systems
11:00 AM	12:00 PM	Shelter Options @Northern Tier
12:00 PM	1:00 PM	Lunch
1:00 PM	1:15 PM	Preparing to Go Outside
1:15:00 PM/TBD	3:00:00 PM/TBD	Dog Yard Visit
1:15:00 PM/TBD	3:00:00 PM/TBD	Shakedowns, Equipment & Policies
3:15 PM	3:30 PM	Going Outside In Winter - The Patrol Method & Buddy Systems
3:30 PM	4:30 PM	Emergency Shelters for Troop and/or Larger Scale Events/Expeditions
4:30 PM	5:30 PM	Menu Planning, Food Packing, Water, and Sanitation *Discussioin of Cold Weather Food - Outside of NT*
5:30 PM	6:30 PM	Dinner
6:30 PM	7:00 PM	Risk Management: Personal Sanitation
7:00 PM	8:00 PM	Risk Management: Emergency Plans and Winter Travel
8:00 PM	9:00 PM	Risk Management: Prevention of Cold Weather Injuries & First Aid
9:00 PM	9:30 PM	Homeostasis Review; Wet versus Dry Cold Review
9:30 PM	10:00 PM	Break / Bay Post
10:00 PM	11:00 PM	Reflections and Social Gathering
11:00 PM		Back to Cabins

Day 3		
Start Time	End Time	Activity
7:30 AM	8:15 AM	Breakfast
8:15 AM	8:30 AM	Leave No Trace - Winter Applications
8:30 AM	9:00 AM	Demonstration Sled Review
9:00 AM	10:30 AM	Sled Packing & Final Preparations
10:30 AM	10:30 AM	Depart for the Ice
10:30 AM	11:00 PM	On-Ice Day
10:30 AM	11:00 PM	Build Kitchens and Quinzees / Snow Trenches
11:00 PM		Quinzees/Snow Trenches/Tents

Day 4		
Start Time	End Time	Activity
7:00 AM	11:00 PM	On-Ice Day
		Risk Management: Ice Safety/Ice Rescue
		Snowshoeing - ?
		Skiing - ?
		Ice Fishing Demonstration
		Fire Starting
		Winter Activities
		Dog Sled Demonstration
11:00 PM		Quinzees/Snow Trenches/Tents

Day 5		
Start Time	End Time	Activity
7:00 AM	1:00 PM	On-Ice Day;
1:00 PM	2:00 PM	Return to Base
2:00 PM	3:00 PM	Turn In Equipment, WARM Shower / Steam Room & Relax
3:00 PM	3:15 PM	Coffee Break / Down Time
3:15 PM	3:45 PM	Planning Troop, District, and Council Cold Weather Events
3:45 PM	4:00 PM	Taking it All Home
4:30 PM	5:00 PM	Debrief and Evaluations
5:00 PM	5:30 PM	Packing/Bay Post/Down Time
5:30 PM	11:00 PM	Dinner and Evening Social Time
11:00 PM		Back to Cabins

Day 6		
Start Time	End Time	Activity
7:30 AM	8:30 AM	Breakfast
8:30 AM	9:30 AM	Closing Ceremony
9:30 AM		Depart for Home

Cold Weather Camping

Northern Tier National High Adventure Programs

Homeostasis

Clothing / Personal Equipment

Shakedown

Sleeping Systems

Food, Water and Sanitation

Cold Weather Injuries

Winter Hazards and Emergency Preparedness

Homeostasis

Homeostasis is the medical term for the processes that control the equilibrium of the body's temperature. To function properly, your body must maintain an even temperature around the vital organs. A few degrees too high or too low can cause serious illness and, if unchecked, death. The homeostatic process functions as your body's thermostat, using your arms and legs to radiate heat away from your torso. When your body is producing more than enough heat to maintain a core temperature of 98.6 degrees, the homeostatic process dilates the blood vessels in your arms, legs, hands and feet to allow full blood flow to the skin surfaces of your extremities.

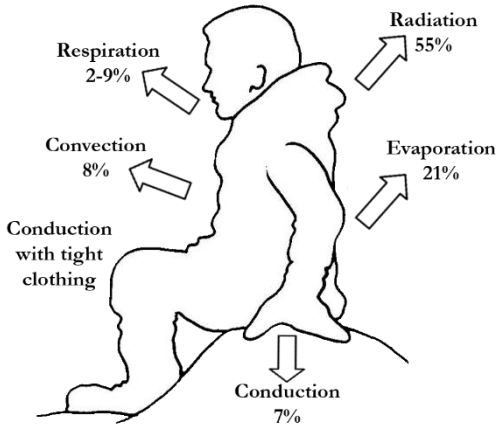
When cold threatens your body temperature equilibrium, the homeostatic process constricts the blood vessels, decreasing blood flow to your extremities as much as 99 percent or more. This is why your hands and feet feel numb when you're cold, and it's why they are particularly vulnerable to frostbite.

Because your brain needs oxygen to function, your body can't cut off the flow of blood to your head in order to conserve heat. Consequently, much of your body heat can be lost if your head and neck are not covered. Wearing a hat can even help keep your hands and feet warm. Because your hat reduces the loss of body heat through your head, your body can afford to send more body heat to your extremities. Minimizing body-heat loss is vital in cold-weather camping.

I. Understanding Heat and Body Function

To understand how to prevent cold injuries it is important to have a basic understanding of physiology, especially how your body loses and generates heat. These are the five ways the body loses heat:

- **Radiation**: Direct heat loss through the skin. (exposed head, etc)
- **Convection**: Warm air surrounding the body is swept away and replaced by cooler air. (wind-chill, etc)
- **Conduction:** Heat loss through direct contact with cold objects and substances (ice, metal, water, etc.)
- **Evaporation**: From overheating (the body perspires to remove excess heat).
- **Respiration**: Heat loss due to breathing out warm, moist air.



Radiation – 55%
The loss of heat through radiation can occur through any exposed surface. The amount of loss can be significant; that is particularly true of loss from the head. The brain is the most important part of your body and its temperature must be protected at all cost, but it's at a disadvantage. It's perched on top of your body on a long stalk (your neck) and is enclosed

in a cold box (your skull). To keep it warm, your head, face, and scalp are provided an extensive circulation. This circulation cannot be decreased or constricted as it can with cold stress in other parts of the body. Warmth is thus preserved for the brain's sake, but it also allows tremendous loss of heat through the head. The uncovered head can lose 50% of the body's total heat production when the outside temperature is 39 degrees F. and up to 75% of total body heat production at 5 degrees F.

Convection – 8%

Have you heard the weather reporter refer to how cold it feels to a person who is outdoors? What do we call this? Wind-chill. Familiarization of the term wind-chill has made us aware of the power of convection, or wind currents, to strip away heat from our bodies. This is probably the most potentially dangerous method of large heat loss under normal circumstances.

Conduction – 7%

Heat loss from direct contact with a cold surface is always possible through our feet. But with adequate insulation, our heat loss there may be minimized. When sitting or lying down, conduction loss through other areas in contact with the ground can become important. Insulating ourselves from the ground for sitting, kneeling, or sleeping should be done automatically to preserve our body heat. The largest conduction losses will occur if a person falls into cold water or "cold water immersion." This is when a massive heat losses occur through conduction. The thermal conductivity of water is 240 times as great as that of still air. This means that wet clothing also extracts heat from your body much faster than dry clothing.

Evaporation – 21%

For water to evaporate, that is to change from a liquid state into a vapor, it consumes heat. Without raising the temperature of the water at all, it still takes 245 kcal to simply evaporate 1 pound of water. Wet clothes can easily have a lot more than 1 pound of water or sweat in them. When one considers that man cutting firewood rigorously for an hour will only generate about 294 kcal, the amount of heat consumed by evaporation is obviously significant.

A particularly dangerous form of evaporation takes place if liquid fuel is spilled on exposed flesh. Petroleum products evaporate so rapidly that frostbite can occur almost instantaneously. Interpreters should emphasize extreme caution in pouring fuels.

Respiration – 2 - 9%

When you exhale you breathe out warm air from your lungs and when you inhale you take in colder, outside air. Therefore, with each breath you take, your body is losing some of its heat. This phenomenon is particularly noticeable when you can see your breath as the warm vapor from your lungs condenses into tiny droplets upon contact with cold air. During an entire day, your body can loose a significant amount of heat as well as fluids, through breathing. If you engage in strenuous activity, such as cross-country skiing or snow shelter building, the loss of heat and fluids can become enormous. Wearing a facemask or scarf can reduce some of this heat loss, but moisture may condense and freeze, which may be worse.

II. How the Body Generates Heat

The major ways the body gains or generates heat prevents hypothermia and other cold injuries. The five ways the body generates or gains heat include the following:

- **External Sources:** Sun, campfire.
- **Food:** Calories and balance of proper nutrition.
- **Basal Metabolic Heat Production:** Heat output from basic body function (heartbeat, breathing, digestion, etc.)
- **Shivering:** An automatic, involuntary response of the body, which increases heat production.
- **Work or Exercise:** Moderate amounts increase heat production without becoming overheated.

External Sources

The environment can provide us heat directly. Exposure to a warm habitat and radiant energy from the sun can total 150 kcal/ hour of additional heat. In a cold environment, this amount will obviously be less, but the warmth of the sun is a source of heat. How much heat the sun is providing is frequently noted by outdoorsmen after it has set behind the hill, clouds, or after it has gone down for the night. The sudden chill which results from the loss of solar heat may cause an otherwise adequate outfit to become now obviously inadequate.

Fire from a campfire can be an obvious source of heat. The use of fire for heat at Okpik should be minimized for several reasons. Adequate clothing should negate the necessity of using a fire for warmth. If clothing is truly adequate, it will also be preventing its wearer from obtaining warmth from the fire. If external heat can penetrate the clothing, then internal body heat can escape. Placing boots or clothing too close to the fire in an effort to get warm, may cause it to melt or burn. **Fires should only be used during Okpik for companionship.**

Food

Proper and adequate nutrition is a critical factor in preventing hypothermia and cold injuries. Food is our source of calories, which will keep us warm. Much has been written about the relative values of various foods, that some burn quicker and others take longer, etc. The most important aspect of food intake is that an adequate amount be provided. Ideally this will be balanced. Under high calorie usage, it is best to increase the amount of fat in the diet, both due to its higher calorie content and its usefulness in helping the body to process proteins and carbohydrates. It is also important to eat snacks during the day to provide the body with additional fuel to produce heat.

Carbohydrates, consisting of simple sugars and complex starches, are the primary source of calories in the American diet. We can obtain 4 cal/gram or 56 cal per tablespoon from carbohydrates. Carbohydrates are converted to high-energy compounds, such as muscle glycogen, or are stored after conversion to glycogen in the liver, or fat for storage in fat cells.

Protein consists of amino acids, which can provide 4 cal/gram; about the same amount of energy as carbohydrates. The amino acids can be used to construct muscle tissue in persons who are exercising, or they can be converted into storage forms by being

transformed into fats or into energy forms after conversion into sugar (blood sugar or glucose). This complex conversion process results in an energy loss. This loss of energy is called the "specific dynamic action of food." For every 100 kcal of pure protein consumed, 30% of it will be "wasted" (in the form of this heat production), and not usable for shiver or work energy. The addition of fat or carbohydrates to the protein decreases the energy lost from the body's conversion of food into energy. A balanced diet allows a person to obtain more caloric benefit for use as work or shiver energy, but less heat will be generated by the actual digestion of the food.

Fat is the storage form of energy, each gram providing 9 kcal or 126 kcal/ounce. There is an SA for pure carbohydrate of 5% and an SA of 13% for fat. Due to the high caloric content of fat, an SA of 13% can provide a significant amount of heat after consumption. It also provides about 33 kcal per ounce of metabolic processing heat. Eating a meal or a bed time snack of fat and protein will, therefore, actually produce warmth from their metabolic processing which will be equal to an increase of about 30 kcal per ounce, consumed over about two hours. Eating carbohydrates will provide less of a metabolic heat increase (only about 8 kcal per ounce), but more of the energy. What are the means of producing heat within the body?

Basal Metabolic Heat Production
We have already discussed one aspect of the basal metabolic heat output, namely the additional heat that the body will generate trying to metabolically process food substances. The body at rest must breathe, using the muscle of respiration. The heart must beat, and blood circulates. These activities that are necessary for routine life functions also produce heat as a by-product. This heat is known as the Basal Metabolic Rate or BMR. It amounts to about 70 kcal/gram.

Shivering
Shivering can increase heat production over the basal metabolic rate from 2 to 7 times. Not all people have a shiver response and the older a person gets, the less of a shiver response he or she will have. But generally, a person can produce about 500 kcal/hour by shivering. The limit to a persons ability to shiver when exposed to chronic, slow heat loss is the loss of muscle glycogen, or energy source. The ability of replacing this energy is contingent upon the person’s level of physical conditioning and the availability of food to be turned into that energy.

Work or Exercise
Skiing, snowshoeing, dogsledding, digging an ice hole, exercising in place or hiking from one point to another are all forms of using our muscle to accomplish some task. The by-product of this work is the production of heat. A man chopping firewood will produce about 300 kcal/hour. Walking 2.5 miles per hour in soft snow with snowshoes will generate about 830 kcal/hour. A man in good physical condition can sustain a work output of up to 630 kcal/hour for long periods of time. Again, the limit to a person’s ability to produce work (and thus heat) is the loss of muscle glycogen or energy source.

The ability of replacing this energy is contingent upon the person’s level of physical conditioning and eating more food to be turned into energy. More food must be consumed

to continue to generate calories needed for work or exercise. Too strenuous work or exercise may produce overheating which causes the body to perspire. When sweat evaporates, it strips away large amounts of heat.

III. The Secrets of Warm People

People acclimated to winter know the importance of eating properly, getting adequate rest, being in reasonably good condition and having a positive mental attitude. The more time spent thinking about miserable conditions, the harder adaptation becomes. When winter arrives, remind yourself that little can be done about it. Learn to enjoy it. After all, winter will be here for a few months every year.

The people who really enjoy the colder months are those who do the following:

- **Keep the body core warm.** When they cool internally, our bodies reduce the amount of blood circulating to the extremities, so it is important to keep activity rate and clothing appropriate for conditions. This assures adequate warmth throughout the body.
- **Make sure your blood circulates freely.** Most of your heat is generated in your head, trunk and muscles. The blood then warms your entire body by flowing unrestricted to the extremities. That's why it's important to avoid snug or tight fitting garments, especially gloves and shoes.
- **Select the proper type and amount of clothing.** Regulate your clothing according to your activity rate in the environmental conditions in which you live, work, and play. This is the most effective way to ensure comfort.
- **Pay attention to internal signals.** Don't wait until you are cold to put on more clothing. Act when you first begin to feel cool.

Over a period of time, usually a couple of weeks, our body can adjust to almost any condition. Exposure should be slow at first, and then gradually increased. Soon you will feel at home in even the coldest weather.

IV. Maintain Comfortably Cool

The body is constantly finding its equilibrium and naturally adjusting its temperature. The body sweats to cool off and shivers to warm up. It is more important in the winter time to help your body regulate its temperature through the proper clothing worn. Staying comfortably cool is key to comfort because most people think they need to stay warm instead of comfortably cool. Being warm is on the verge of hot and hot is when you sweat. Sweating will make you cooler quicker, preventing you from being comfortable.

Comfort in the winter is directly affected by clothing worn. To understand why one should wear certain types of clothes and for clothing care, refer to what the word "COLD" stands for:

- **C** keep **Clean**: Dead air pockets within the fibers of clothing trap heat and, in turn, keep the body warmer. Dirt, snow, sweat, water and food clog up the air pockets and reduce the insulating value.
- **O** avoid **Overheating:** Preventing your body to sweat is a big challenge in the winter time. Mentally, people want to be warm but it's best maintaining comfortably cool.

Understand what layers of clothing are best to wear for different activities to prevent sweating.

L wear **Layers:** Wicking, warmth and wind layers work in conjunction with each other. Each layer has a specific purpose and it's a way to manually regulate body temperature. It is suggested that layers should be loose, light and long in the winter.

D stay **Dry:** Wet clothing will cool the body off quickly. Along with preventing sweat, dust off powdered snow from clothing when digging out a snow shelter prior to the snow melting on your clothing. Change into dry clothing to sleep.

V. Layering of Clothing

Okpik clothing design incorporates the principles of insulation, ventilation and layering to make the clothing work for various people. This becomes important when environmental conditions or activities change, altering the amount of warmth needed for comfort and safety.

Clothing insulates the body from the cold temperatures and allows the body to breathe out excess heat produced. The various layers also trap heat produced by the body both, between the layers and within the clothing fibers. This air trapped is also known as "dead air." For example, several layers of medium weight clothing provide more insulation and flexibility than one heavy garment; even if the heavy garment is as thick as the combined layers. This is possible because air is warmed by body heat and trapped between each clothing layer, as well as in the air pocket between the cloth fibers.

Ventilation helps to maintain a comfortable body temperature. It is important to ventilate before becoming over-heated, because evaporating perspiration cools the body. Perspiration can also fill the air spaces of the clothing with moisture-laden air, reducing their insulation qualities. Scientists advise to "allow outside air to cool overheated layers by adjusting openings such as cuffs and front closures. If more cooling is necessary, it may be time to remove a layer." Heat generated in the torso region of the body can be retained better by a longer, mid-thigh jacket. Similarly, wearing a hooded jacket captures body heat and retains it longer than a jacket without a hood. This is referred to as the "chimney effect."

The layering system of clothing maximizes the insulation values without creating unnecessary bulk. Wear three or four layers of lighter weight clothing instead of one or two bulky, heavy layers. Use a lightweight wind parka and wind pants for the outside shell. There is a tendency for beginners to overdress. Watch for this to avoid having someone become overheated. Dress to keep comfortably cool so that your body will sense cold stress and compensate to maintain its core temperature.

Layers of clothing include the three W's; wicking, warmth and wind. Each layer has a specific purpose along with working in conjunction with each other. There are countless combinations and it changes throughout the day. Snowshoeing, cooking dinner and sleeping all require different combinations of layers. The layering concept works for everyone but specific layers will differ between each person's homeostasis.

Wicking Layer
The purpose of the wicking layer is to transfer moisture away from the skin. Most wicking layers are made out of a synthetic material including polyester or microfiber-based fabrics. Wool has fairly good wicking properties but is not as comfortable on the skin. Silk is comfortable, hard to take care of and less commonly used. Cotton feels comfortable but it absorbs moisture easily and is hard to dry out. Cotton clothing is not recommended for cold weather use.

Wicking layers are also referred to as long underwear or base layer. Okpik outfitting doesn't include any wicking layers due to hygiene. It is recommended that participants bring synthetic tops and bottoms, synthetic socks and some may bring glove liners. Some warmer socks have wicking properties within them to combine the two layers into one sock.

Warmth Layer
The purpose of the warmth layer is to hold body-warmed air both between layers and in air pockets within fibers. Many people use multiple warmth layers together instead of one thick one. It is recommended that warm layers fit loose and comfortable over the previous layers. Ventilation at the waist, wrists, neck and ankles allows body moisture to escape.

Warmth layers could be made out of fleece, wool or down synthetic fiberfill. It is recommended that participants bring warm tops and bottoms, socks, gloves, hats and a neck gator or scarf. Okpik outfitting offers fleece jackets, pants and gloves. Socks, neck gators and hats are not outfitted due to hygiene.

Wind Layer
The purpose of the wind layer is to retain body heat and keep cold air out. The wind-chill in cold weather conditions is sometimes brutal and it clearly changes the layering system for everyone. Wind layers have a combination of windproof, water repellent and breathable properties. These properties vary between the manufacturer and the original purpose of the jacket.
A wind layer could be a generic raincoat or an insulated winter coat with wind and water repellent properties. It is recommended that large winter coats have the capability to separate the warm layer from the wind layer to adjust to various activity levels. Ski pants are more difficult to separate warm and wind layers, but it is commonly not an issue due to less heat produced from the legs. Okpik outfitting offers wind jackets with a hood as well as wind pants.

Clothing and Personal Equipment

This section is in direct correlation with Homeostasis but provides more detail to clothing materials. One effective way to teach this topic is to split the group up into three groups and pick from a pile of clothing specific layers that would be worn in cold weather. Give the three groups different situations including skiing, cooking dinner and hiking in strong winds. Then have each group present why they chose the articles of clothing for their activity.

I. Clothing Materials

As mentioned in the Layering of Clothing section of Homeostasis, each layer (wicking, warm and wind) has its own properties all relating to either retaining or transferring body heat or moisture. When looking over clothing materials, remember the acronym COLD and www.stayingwarm.com (wicking, warm, wind, staying warm comfortably).

Wicking Layers

Polyester
Polyester has great wicking properties and is most commonly used for base layer clothing. A blend of polyester with other microfiber-based fabrics is very common. Polyester is particularly good because it feels comfortable next to the skin and it retains some insulated value when wet. It dries out quickly and there are many air pockets within the fibers to retain body heat.

Silk
Silk is very comfortable but hard to take care of. It has good wicking properties but is less commonly used for cold weather clothing.

Warmth Layers

Fleece
Fleece is a very common insulator that retains effectiveness when wet. It is soft and comfortable to wear with great breathability. It is heavy when it's wet but it dries out quickly. It is primarily used as a warm layer but some fleeces have windproof properties (Wind Wall). There are all types of styles and uses with fleece clothing including pants, gloves, jackets and more. There are multiple thicknesses of fleece that can be worn together or substituted for various activity levels.

Wool
Wool is a proven insulator that retains some of its effectiveness even when wet. There is dead air space within fibers to retain body heat. Similar to fleece clothing, there are all types of styles and uses including pants, tops, gloves, hats, socks and more. Wool is not always comfortable directly on the skin so usually an under layer is worn.

Marino Wool
Marino wool is a synthetic/wool blend combining the wicking and warmth properties together. Some Smart Wool garments have these properties.

Down
Down garments have increased warmth to decreased weight ratio. The primary issue in cold weather is the inability to dry out down clothing. Once down is wet, it will continually transfer heat away from the body. They lose their insulating value as soon as they become damp. Over a period of a couple of nights, dampness will accumulate rapidly. When it is far enough from the warmth of your body, it will freeze. Once this occurs, additional dampness will also freeze because it cannot penetrate the ice barrier. The garment soon loses its insulated effectiveness.

Synthetic fill

Synthetic garments also have increased warmth to decreased weight ratio. Compared to down, synthetic will retain insulated values when wet. There are many dead air spaces within the fill to retain body heat. Synthetic filled clothing is commonly used as jackets and pants.

Cotton
Cotton is not recommended for cold weather camping. Cotton absorbs moisture and strips heat away when wet, keeping one cooler. It is hard to dry out so it's best to recommend other clothing choices.

Wind Layer

Nylon
Nylon has wind and water proof properties and is breathable. It is a durable product and will dry out quickly.

Gore-Tex
Gore-Tex has water and wind proof properties but with less breathability.

II. Moisture vs. Clothing

Moisture is, of course, the greatest concern since heat loss to moisture is up to 240% as fast as to dry air. Since many items of clothing hold moisture, the following points may prove helpful.

Hydrophilic (water-loving, water-gathering) Most natural products are proteins: cotton, wool, etc. and they are hydrophiles, that is, they absorb water in the cell structure of their fibers. Cotton absorbs a great deal more than wool. The lesser degree of absorption prompts the saying "wool is warm even when wet." Nothing is warm, however, when frozen! Most synthetics used as winter clothing insulation are non-hydrophilic but instead hydrophobic.

Hydrophobic means not having the ability to combine or dissolve in water. Polypropylene, an excellent moisture wicker used primarily in underwear, absorbs less than 1% of its weight in moisture. This is about one-sixth the absorption of wool. Synthetics are generally much quicker to dry since they only hold water on the outside of the fiber, not in the cell structure.

III. Personal Equipment

Personal Equipment includes headlamps, toiletry items, knife, matches, bandana, chap stick, sunglasses, etc. A headlamp or flashlight of some kind is strongly recommended, as the sun sets around 4:30 pm in December and 6:00 pm in March. A knife of any kind is very useful for opening meal packages. Matches or a lighter is a must but is commonly in the crew box for the stove. A bandana is useful for anything, but again it's personal preference. Chap stick and sunglasses are very rewarding in times of need.

Shakedown

A shakedown should be performed before winter camping activities begin to ensure that each participant has adequate clothing and gear. It is important to ensure each person has the necessary clothing items to be comfortably cool throughout the weekend. Winter clothing is expensive and it is expected that participants need to use some of our clothing available in the Bay Post. Respect their personal equipment they brought because it's probably the best they have. Have each crew member unpack and organize their gear on their bed so they can easily find each item. Go to each crew member individually and follow the Personal Equipment List. Mark the items that are needed to be checked out from the Bay Post.

Consider what program the crew is interested in for the weekend. There is plenty of space in a pulk sled to pack extra personal equipment but there is limited space if the crew is on a Dog Trek. Crews participating in a Cabin Stay or Musher Camp are sleeping in heated cabins so a winter sleeping bag is not necessary to check out. Consider the projected forecast and the last known ice conditions. Colder temperatures and wind effects how many layers are worn.

I. Crew Equipment List

The following items are required for each crew to bring to Northern Tier. Other programs may also require cook kits depending on availability

- **Crew First Aid kit:** If a crew didn't bring it, there should be alternatives available.

II. Personal Equipment List

The following items are required for participants to bring to Northern Tier, feel free to adapt this list to meet your needs.

- **2 Winter Hats:** Preferably fleece due to greater warmth. One hat is used throughout the day and the other hat will be used when sleeping.
- **2 pairs of long underwear:** Both tops and bottoms are recommended. Synthetic based materials are more efficient and it is discouraged to use cotton.
- **2 pairs of liner gloves:** This is primarily for crews participating in Dog Trek or Musher Camp to have dexterity when hooking up the dogs.
- **2-3 pairs of wool socks:** It is better to bring more socks than expected due to the lack of footwear breathability.
- **Sleeping bag:** It is recommended to bring a summer or 3-season bag. We outfit a cold weather bag that works in conjunction with their summer bag.
- **Headlamp or flashlight:** Must have item and it will be missed if forgotten. Days are short in the winter.
- **Toiletry articles:** Toothbrush, toothpaste, etc.
- **Cup, bowl, and spoon**

- **Stuff sack** or small duffel bag for all personal gear: People always have some type of bag that their gear is in. It is more important for crews participating in Dog Trek so the sleds may be easily packed.

The following items are optional for participants to bring. Most of the items listed below can be checked out at the Bay Post, but it is suggested to bring them if they own them.

- **2-3 pairs of mittens:** Mittens are warmer than gloves.
- **2-3 sweaters:** Preferably wool or polar fleece; NO cotton.
- **1 winter jacket** (wind layer)
- **1 pair wool or fleece pants**
- **1 pair snow pants or rain pants**
- **Scarf or Neck gaiter:** Not able to check out at the Bay Post
- **Warm/winter boots** (Sorels or Kamiks)**:** Boots with removable liners will dry out overnight as one sleeps with the insoles and liner.
- **Pocketknife / matches / bandana:** Personal preference
- **Sunscreen and chap stick:** Personal preference
- **Sunglasses:** Personal preference
- **Skis and snowshoes:** People are able to bring their own but they are most likely going to check then out at the Bay Post.

III. Extra Gear

It is always a good decision to have extra personal equipment while winter camping. Wet clothing never provides sufficient insulation compared to dry clothing. Extra gloves and socks are more likely to be needed. If a crew member doesn't want to bring an important clothing item that you know they will want once they are on the trail, bring it just in case.

Sleeping System

I. Daytime Setup

It is the Interpreter's responsibility to teach sleeping systems to the crew at some point in the daylight. Setting the sleeping area up in the day time will be easier prior to the sun going down. Do the following to set up the sleeping area:

- **Tarp:** The tarp is a waterproof barrier between the ground (ice or land) and the person. If multiple people are sleeping in a snow shelter, overlapping tarps is an option.
- **2 Closed Celled Foam Pads:** Foam Pads act as insulation between the person and the ground to decrease body heat loss to the cooler ground. Closed celled pads provide more insulation for cold weather camping compared to an open celled pad. Moisture blown into an open celled pad when inflating will cool in cold temperatures.
- **Winter Sleeping Bag:** Okpik outfitting offers winter bags that are -20 degree.
- **Summer or 3-season Sleeping Bag:** Place this bag inside the winter bag for additional insulation. Participants are expected to bring one, but Okpik outfitting offers either a 20 degree bag or fleece liner.

Fold the tarp over the entire sleeping system to keep snow off of the sleeping bags if not in a covered snow shelter. Zip sleeping bags throughout the day. If changing campsites on the trek, some people are able to keep the two sleeping bags together and stuff in a bag. This completes the necessary day time setup.

II. Going to Bed

Prior to going to bed, it is important to do the following:

- **Get completely warm:** Take your crew for a night hike or play some games that get people moving.
- **Hot Water bottles:** Fill up everyone's personal water bottle with hot water an hour or two prior to getting to bed, and suggest that they put it inside their inner sleeping bag to begin warming it up. Some people wrap their clean pair of long underwear around the hot water bottle to warm up the clothes they are going to change into. Make sure the water bottle doesn't leak!
- **Bathroom:** The body works hard to keep urine warm and that heat produced could be working to keep your hands and feet warmer. Remind people to go pee in the middle of the night if they need to.

The process of getting in your sleeping bag is easily understood, but things always take longer in the cold weather. Everything worn has a specific location overnight because wet or moist clothing could freeze if they are forgotten. More body heat is created from the torso so it is best to locate items between ones knees and shoulders. Changing into a new set of long underwear from what was worn throughout the day is important. Your body will sweat even if it is not noticeable and any moist clothing will be more noticeable in the middle of the night. Lastly, if items are left out overnight, snow fall throughout the night may cover them.

III. Placement of Equipment

- **Boots:** Take the liners and insoles out of the shell to dry them out individually instead of having the entire boot freezing together. Occasionally, the liner is difficult to take out as it has already begun to freeze due to moisture from the day's activities. The liners the next morning will be frozen solid so keep trying to pull the liners out.
    - **Shell:** Lay the boot fabric between the two foam pads lower than the hips and the sole just outside of the pads. This will prevent it from freezing in a shape where you can't get it on. If you allow it to freeze overnight, open the fabric up fully.
    - **Liners:** These are most likely damp from the day's activities and it's best to place them in the inner bag. Some people place them directly under the arm pit.
- **Wind Layers:** Place both the jacket and pants between foam pads if they are partially moist or in a duffel bag if they are not wet.
- **Warmth layers:** Place both the jacket and pants between the outer and inner sleeping bag if moist or in a duffel bag if they are not wet. Even if they are not wet, they will be warm for the morning if placed between the two bags.
- **Wicking layers:** Change to sleep in a dry pair and place the used pair in the inner sleeping bag. Even if they don't seem too wet, it is best to keep them warm and dry.

- **Hat:** Change into another hat to sleep in and keep a daytime hat in the inner bag. Wearing a hat overnight will retain a lot of heat the body is producing.
- **Gloves:** Place in the inner bag to dry them out.
- **Socks:** Place in the inner bag to dry them out. Be sure to change into a clean, dry pair.
- **Hot water bottle:** Fill with hot water as mentioned above and keep in the inner bag.

IV. Tucking into Bed

As an Interpreter, allow everyone to get their sleeping system situated. Go around to each participant including adults and tuck them in for bed. Ensure clothing items are placed properly to dry out overnight and boots are separated. Ask specific questions including the following:

- Where are your boots located? How about the liners and insoles?
- Did you change completely… socks, hat, etc.?
- Are you warm and comfortable?

If you don't ask specific questions, people will try to hide that they didn't change their socks or they had trouble with getting their liners out of their boots. It is best to discover problems prior to waking up knowing items may be frozen.

V. Staying Warm Overnight

Lastly, provide tips to stay warm if they wake up cold in the night. It is common for people to wake up a few times through the night when cold weather camping. Suggest breathing outside of their sleeping bag to prevent moisture build up with in the bag that will in turn reduce the insulation value for future nights. Also, remind them of the following:

- **Bathroom:** Go pee in the middle of the night if needed. The body is working hard to keep the urine warm when that heat produced can keep your extremities warmer.
- **Eat midnight snack:** Eating something will start the digestion process and in turn create body heat that will last longer.
- **Drink warm fluids:** Their water bottle has warm water already in it.
- **Do pushups:** Move around in your sleeping bag to create body heat.
- **Lastly, wake Interpreter:** The Okpik experience is desired to be an enjoyable one. It is your responsibility as the Interpreter to problem solve and to ensure everyone has fun.

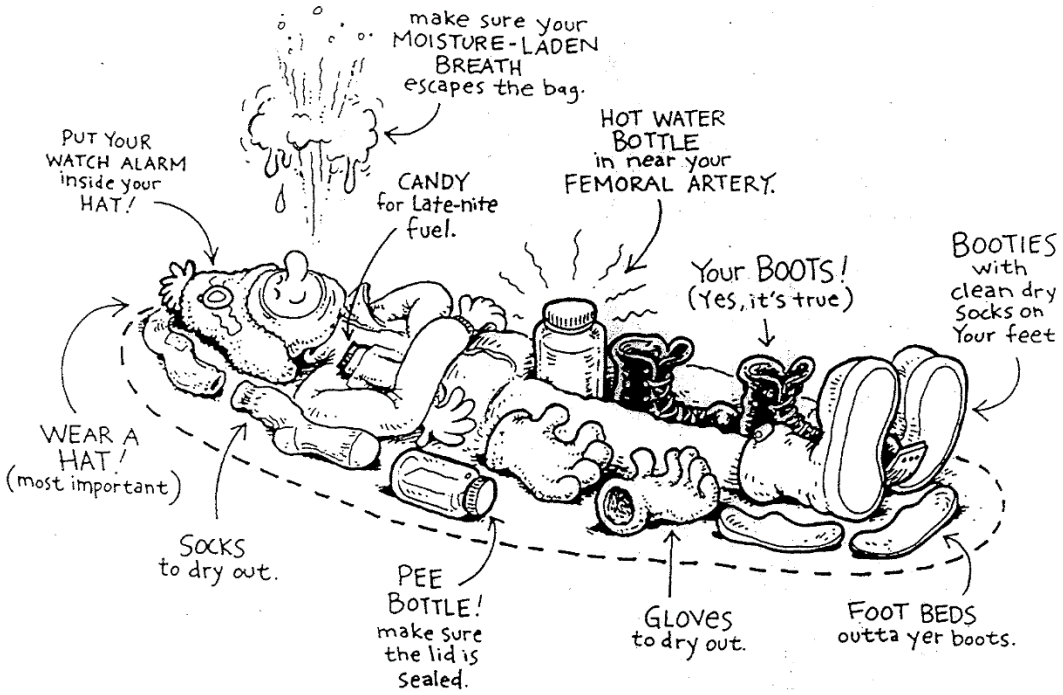


Image Source: Allen and Mike's Really Cool Backcountry Ski Books by Allen O'Bannon with illustrations by Mike Cleiland. Chockstone Press, Evergreen Colorado, 1996.

Food, Water and Sanitation

I. Nutrition in Winter

Proper and adequate nutrition is a critical factor in preventing hypothermia and cold injuries. Food is the fuel that keeps our bodies warm. Managing both the quantity and quality of food intake is essential for winter camping.

Much has been written about the relative values of various foods in the winter, but the main rule of thumb is that **the body requires a high caloric intake when winter camping**. During the average day of winter camping you can expect to expend 4,000-5,000 calories. Because many people have reduced appetites during the wintertime, it sometimes requires a bit of cajoling to make sure your crew consumes enough energy to replace what they burn.

The composition of caloric intake changes in the winter too. Winter diets tend to be relatively high in fat, moderate in carbohydrates, and low in protein. The recommended distribution of calories for winter camping is 30% fat, 50% carbohydrates, and 20% protein. Fat is a high density source of calories (9 calories/gram compared to 4 calories/gram for protein and carbohydrates). It also takes the body several hours to metabolize fat – meaning that it provides a fairly constant amount of energy to the body over a long period of time.

In contrast, carbohydrates provide an immediate energy boost. Easy to digest, carbohydrates provide ready fuel for the body. Particularly in the morning, carbohydrates can help to immediately warm the body. Participants at Okpik are encouraged to "eat their way through the day," predominantly to insure that they are getting a steady stream of simple sugar carbohydrates.

Protein is essential for the maintenance and building of body tissue. Its secondary role is to provide calories, which it does with rather low efficiency. Consequently, the winter diet should be designed so that enough protein is eaten to repair muscle mass – but not enough that protein calories are wasted by being metabolized into energy.

Okpik participants are encouraged to "eat their way through the day" by snacking regularly from breakfast through dinner. Because the body is burning so many calories trying to stay warm, it requires almost constant additions of food. This "Caloric Drip" insures that participants can stay active throughout the day while preventing the sudden highs and lows in energy levels caused by overconsumption.

The Okpik menu is designed to fulfill the needs of all the participants. Breakfast provides a high quantity of carbohydrates to start the body's engine as well as a solid amount of protein and fat to provide the foundation for the rest of the day's energy consumption. Lunches are usually broken up into smaller snacks that can be consumed throughout the day. **Interpreters should distribute lunches to participants at Breakfast and demonstrate how to thaw them out (store them in some internal pocket) so that the**

food is not ice-hard at Lunch. Dinner should provide enough calories to keep participants warm throughout the night. It is integral that everyone eat a good dinner – if a participant is "not hungry," that is a sign that something is wrong.

After participants go to bed, the Interpreter should walk around the campsite checking to make sure all sleeping systems are correctly laid out and to hand out a "Good Night Snack." The "Good Night Snack" should be saved for midway through the night – if a participant wakes up and is cold, they will have a snack to fuel their bodily metabolism for the rest of the night.

On the trail, there are three points to keep in my mind about food:

- Make sure everyone is eating – a lot
- "Eat your way through the day"
- Plan ahead – make sure lunch is thawed

Sample Okpik Menu

The following is a sample trail menu used by Northern Tier during Okpik.

Breakfast

Oatmeal
2 packets of Oatmeal per person
2 sausage patties per person
1 honey stinger bar per person
1 packet of pop tarts per person
1 pouch of applesauce per person
1 hot cocoa packet per person
1 apple cidar packet per person

Omelet in a Bag
1 bag egg(heat seal bags work best but sturdy Ziploc brand bags can also work)

- 3 eggs per person
- Shredded cheese
- Precooked bacon
- Get creative(mushrooms, peppers, etc.)

1 honey stinger bar per person
1 packet of pop tarts per person
1 pouch of applesauce per person
1 hot cocoa packet per person
1 apple cidar packet per person

Lunch

Crackers and cheese
2 sleeves of saltine crackers per crew of 8 or less
3 beef sticks per person
2 string cheese sticks per person
Cheese block
Trail mix
Energy bar
Fruit punch drink mix

Bagel
1 bagel per person
2 packets of peanut butter and jelly per person
2 string cheese sticks per person
3 beef sticks per person
Trail mix
Energy bar
Fruit punch drink mix

Dinner

Chili Mac
Precooked taco meat or ground beef
Wide egg noodles
Powdered cheese sauce or real cheese
Fajita seasoning
Frozen corn
Instant soup packets for snacking
Individual bag of doritos or other chips
Oatmeal crème pie(or similar sweet treat for midnight snack)
Granola bar
Hot chocolate
Apple cidar packet
Oven bag to ease cleaning

Beef stroganoff
Precooked meatballs
Rotini
Stroganoff seasoning
Sour cream
Frozen peas
Instant soup packets for snacking
Individual bag of fritos or other chips

Cosmic brownie (or similar sweet treat for midnight snack)
Granola bar
Hot chocolate
Apple cidar packet
Oven bag to ease cleaning

II. Water

There is plenty of water available but drinking water is not in an easily accessible form. Melting snow is a possibility, but it would take a long time to melt a significant amount of snow. Snow is 16% moisture so 5 cups of snow melted is only 3/4 cup of water. Melting ice is more efficient than melting snow but the most efficient method is to dig a hole through the ice to the lake water. Once water is received from whichever source desired, it needs to be purified by boiling it.

Once you access lake water through an ice hole, use a water bucket to carry it to camp. One bucket will fill the blue kettle perfectly. Keep the water buckets empty unless transporting water. Water will freeze and expand cracking the plastic water bucket. Drinking water is commonly boiled in the kettle and then transferred to individual water bottles. Encourage participants to keep their water bottle on them to prevent it from freezing. Once individual water bottles are full, begin to fill up the 2 liter silos to store the purified water. It is best to bring full silos when out for a snowshoe or ski. The kettle and the cooking pot are both durable enough to keep water in them throughout the day. Bury them overnight in the snow kitchen if they are filled with water to prevent them from freezing. Filling them in the evening will prevent a trip to the ice hole in the morning. Keep in mind that water in the pot will boil faster than in the kettle.

Staying hydrated in the winter time is more difficult than other times of the year. More fluids should be consumed in the extreme temperatures and with increased activity. The body naturally loses fluids through respiration and perspiration, which may not be easily noticed. Overnight, 2 to 3 quarts are lost overnight through respiration. It is strongly recommended to drink 6 to 8 pints, which is 3 to 4 liters. It is better to be hydrated and go pee all day long than to be delirious and dehydrated. As an Interpreter, fill up the silos at least 2 or 3 times a day and make sure individual water bottles are being refilled.

Alcohol doesn't freeze at 32 degrees but rather at a much lower temperature. If drinking alcohol that is super cold and not frozen, it can cause frost bite to the throat. Secondly, alcohol is a vasodilator which can give you a false sense of warmth. Lastly, drinking alcoholic beverages is not allowed with BSA activities and should not be mixed with outdoor activities in the winter.

Nicotine use is prohibited around youth and discouraged around adult advisors. It is considered a vasoconstrictor, which can affect the body taking blood vessels to its extremities. This can contribute to frostbite as the extremities are not warmed up by the blood vessels. Caffeine is considered a diuretic and can contribute to dehydration. Use decaffeinated coffee or limit the amount of coffee consumed.

III. Sanitation

Food Handling

Winter camping creates unique opportunities and difficulties in handling food. On the one hand, the cold temperatures prevent bacterial growth – since food is frozen in the winter, ServSafe practices are easy to follow (particularly for meats). However, the cold temperatures make certain aspects of safe food handling difficult. In particular, the washing of hands requires some planning and is often inconvenient.

Try to get your scouts to clean their hands twice a day, at Breakfast and Dinner, when you are heating up water. Be careful when using products like hand sanitizer – the alcohol will not freeze, so you may be putting a -20 degree alcohol product on your hand. Much like dealing with white gas, exposure to liquid at this temperature can cause frost nip. If you do use hand sanitizer, make sure you keep it in a pocket near your body to insure that it is kept at a safe temperature.

Most Okpik food is packaged individually, minimizing food handling concerns. When cooking dinner and breakfast, make sure the cooks wash their hands before they begin food preparation. Make sure you store food in a safe manner. Keep your Green Box tightly closed so that animals.

Dishwashing

Food clean-up is made simpler by the use of oven bags. After a meal, the oven bag can be thrown into the crew trash bag – where it will promptly freeze. Encourage your scouts to lick their bowls and spoon clean. Any remaining food residue on the cutlery will freeze solid, eliminating worry about bacterial growth.

Dig a cathole for waste water at least 150 feet from any trail, campsite, or water source. All trash should be packed out and thrown away in the dumpster upon return to base.

Disposing of Human Waste

Participants should take care of their business at least 150 feet away from any trail, campsite or water source. Encourage the group to condense their urine output at the pee tree. Fecal matter follows the same requirements, though participants should dig their own individual cathole. Toilet paper should be packed out. One good way to transport soiled toilet paper is in an empty chip bag from the night before. Deposit toilet paper in the bag, toss it in the trash when you return to the campsite, and the problem is solved.

Cold Weather Injuries

This is the **most** important aspect of training in winter camping. Cold injuries are potentially threatening to life and limb. Taking appropriate steps to prevent cold injuries is the best way of dealing with them. Many cold injuries are interrelated so the same measure will help prevent most of them. Whenever the body core temperature drops below normal, 98.6 F, the potential for a cold injury escalates and must be dealt with immediately. One of the aims of the program is to instruct participants in the prevention, detection, and treatment (to some extent) of cold injuries.

I. Dehydration

Although it is not often referred to as a cold injury, dehydration is a critical concern in cold weather. Because the person afflicted may not be thirsty, dehydration can occur without being aware of it. Dehydration is interrelated with both hypothermia and frostbite. It decreases thermal control, so great effort must be taken to prevent it.

There are several reasons why the body dehydrates easier in the winter than other times of the year. One is the reduction of core body temperature. When the body loses heat and becomes chilled, the circulation becomes restricted and the heart has to work harder. This in turn speeds up bodily functions which means urinary output is increased. Diuretics, such as coffee and tea, also increase body functions and thus contribute to dehydration.

Another major cause of dehydration stems from respiration. Cold air contains very little moisture, so when you breathe it in, the body warms it with warm moisture from the tissues. Each time you breathe out this warmer air, body fluids go with it.

Water is often difficult to obtain in winter when everything is frozen solid. Therefore, some people do not consume enough liquid because it is inconvenient for them to get it. Others do not drink enough fluids before going to bed to avoid a late night/early morning nature call. The consequences of failing to consume enough liquids can be serious, or even dangerous. Every participant carries a personal water bottle inside the outer layers of clothes so it will not freeze and inside the sleeping bag at night. Interpreters need to emphasize that every time some of this water is consumed during the day, it must be replaced.

Prevention

Throughout the weekend, look for headaches, undue fatigue, and stomachaches. Urge participants to prevent dehydration. The body needs at least six to eight quarts of fluids a day, which may come in different forms to break the monotony of drinking water. Soups, cocoa, beverage base and weak tea are all good. Coffee with caffeine should be discouraged because the caffeine is a stimulant that speeds up kidney functions. It should not, however, be prohibited because the negative effects of caffeine withdrawal can, in some cases, be worse than the stimulant effects of the caffeine. Tea and chocolate also contain caffeine, but they don't affect the body as much.

Avoiding perspiration is a good way to prevent dehydration and on extremely cold days it helps to warm up the air before breathing it. This can be accomplished to some degree by using your hood, wearing a stocking cap with a facemask or wrapping a scarf loosely around your face.

Becoming dehydrated will result in a significant decrease in ability to handle cold stress. In fact, dehydration of 20% will result in a 30% to 40% decrease in thermal control. Once you become thirsty, you are already dehydrated and you are playing catch-up rather than preventing dehydration. Drink fluids before thirst develops. During the winter the dry relative humidity robs you of additional moisture from respiration beyond what you would experience from similar exertion during summer activities. Many winter activities, such as skiing and snowshoeing, involve hard work, so that your respiratory rate is increased.

Symptoms
The signs and penalties of dehydration are, for the most part, one and the same. The longer you dehydrate, the harsher the consequences. The signs to look for are: undue weakness and fatigue, headaches, dizziness, fainting, stomach pain and nausea.

When dehydration becomes advanced, the surface blood vessels may constrict (enhancing the possibility of frostbite); shock may occur even after relatively minor injuries and in the final stages of dehydration, blood may clot in the veins and eventually cause death.

Because the body conserves water when you dehydrate, there is an easy way to check for dehydration in the winter. The pee tree used in the winter time becomes a resource to know if crew members are hydrated or not. The urine will concentrate, thus forming a darker and darker yellow color, until it is finally orange and then brown. Checking urine color in the snow will provide proof of the level of you and your companion's dehydration status. A fully hydrated person will have almost colorless urine.

Treatment
Once dehydration is noticed, it is important to treat it immediately by sipping warm fluids slowly. Ensure the core body is warm because the body is naturally conserving energy and body heat for the torso. Change any wet clothing to prevent more heat loss through moisture. If symptoms continue or worsen over a period of time, contact the manager on call for further assistance.

II. Hypothermia

Hypothermia is defined as the decrease in the core body temperature to a level where normal muscular and mental functions are impaired. The body loses enough heat so that it doesn't work properly. When the body begins to lose heat it activates a couple of natural defense mechanisms to preserve the core temperature. These are only temporary measures, but they are good warning signs that can be observed using the buddy system.

Prevention
Staying hydrated, physically active and properly clothed will all prevent hypothermia. Once you notice your feet or hands are cool, walk to the ice hole if you are just standing around

talking. More than likely, you are not the only one cold. Use the buddy system to ensure everyone stays warm. Ensure your crew is comfortable saying, "I am cold and I need help." Prevention is very important with hypothermia.

Symptoms

As we have learned, the body helps itself by shivering. It doesn't slow down heat loss, but does generate heat. Shivering burns energy quickly and therefore generates heat for only a short period of time. Shivering may not be apparent if a person is engaged in some form of strenuous activity.

Constriction of the blood vessels in the skin and extremities is another defense mechanism. This reduces heat loss by making a protective shell of the skin and by reducing the temperature of hands or feet to near that of the surrounding environment. Be alert for signs including a pale complexion, a skin that is cold to the touch, and extremities that feel real cold. This mechanism preserves body core temperature but it doesn't prevent frostbite. Constriction of blood vessels and shivering are automatic reflexes that are only temporary. When the body resorts to them, it is already cool. When these reflexes cease, a person requires prompt medical attention.

In fact, nearly everyone has a mild form of hypothermia when getting up in the morning. This is especially true for winter campers. There are several stages of hypothermia, which vary with the individual including;

- Phase 1: (98.6-95) chills, shivering, paleness and minor difficulty in use of the hands.
- Phase 2: (95-93) shivering and muscular difficulties increase, slight confusion is present.
- Phase 3: (93-89) violent shivering, slurred speech, and gross muscular incoordination.
- Phase 4: (89-86) shivering ceases and muscle becomes rigid. Incoherence, confusion and irrationality are present.
- Phase 5: (86-78) semi-conscious, severe muscular rigidly, dilation of the pupils, faint heartbeat and pulse, death.

During the Okpik program, early hypothermia signs should be noticed and treated prior to needing additional medical attention.

One of the major consequences of hypothermia is the decrease in the basal metabolic rate. The cooling of the body core temperature reduces the need for oxygen by body cells and the need for energy sources such as muscle glycogen, glucose and fatty acids. Changes occur in the acid balance of the blood due to dehydration. Imbalances of sugar, potassium and other electrolytes occur, the blood clots, body tissue becomes oxygenated and fewer waste products are produced. This loss of metabolic control means that rapid responses to chemical imbalance must be made for the safe recovery of the severally hypothermic patient during rewarming.

Test for Hypothermia

Because most winter campers will not have clinical thermometers with lower readings, the ability to spot the physical signs is important. The phases are not clear-cut; be prepared to act at the first sign of trouble. A good test is to use the hypothermia challenge: ask a person

who is suspected of being hypothermic to walk a 30 foot line marked in the snow or dirt, heel to toe. If the person is truly hypothermic, he or she will not be able to accomplish this.

Treatment
The goal of treating a person who is hypothermic is simply to restore the core body temperature to normal. Even after rewarming has begun, core temperature will drop for several hours. This is because the core of the body is still becoming chilled before the outside warming gets to it. Don't stop treatment when the patient's skin feels warm; continue until the afflicted person is completely rewarmed.

Here are some other treatments and cautions:

- Change out of wet clothes and drink warm fluids slowly. If conscious and alert, this may be adequate for a person with a mild case of hypothermia. Cocoa, soup or sugary drinks such as lemonade will help.
- If the patient does not respond to warm food and fluids, the patient should be brought to base for treatment rather than getting worse on the trail. Base is a more controlled environment for warming someone up.
- If the person is in worse condition, strip them down to their underwear and put them in a sleeping bag that has been pre-warmed by someone else.
- Common sense will tell you whether to evacuate or not (weather, extent of hypothermia, etc.) but don't stop rewarming. Radio the manager on call and medical assistance will arrive soon or an evacuation will occur.
- Prevention is always best and **always** easier.

III. Frost Brothers

Frostbite occurs when the body tissue becomes frozen. This type of cold weather injury usually occurs on the extremities and on exposed skin. The most common cause is related to the lowering of the core body temperature. When the blood vessels in the extremities constrict to preserve core temperature, frostbite can occur. Common causes of frostbite include exposure to wind and contact with cold metal, ice, or stove fuel.

Prevention
Covering the body's extremities is the best way to prevent both Frost-Nip and Frost-Bite. This includes hands, feet, cheeks, nose and ears. Use the buddy system to observe each other's faces as each individual can't see their nose, ears or cheeks. The wind in the cold weather can quickly capture body heat away from exposed areas. Change from wet clothing to prevent additional heat loss.

Frost-Nip
This is the 1st degree and is a very light frostbite. Whiteness of the skin is a sign and the area becomes numb. There is no tissue damage if spotted soon enough. It can usually be treated by placing a warm, bare hand on the affected area; warming frost nipped fingers in an armpit; or placing a cold foot on the chest/belly of a companion. Use skin-to-skin contact

if possible. Once an area has been frost-nipped, it is more susceptible to a reoccurrence. Frost-nip is the only form of frostbite that can be treated in the field.

Superficial Frostbite
If frost-nip is not caught in time, it can become superficial or 2nd degree frostbite. This affects the outer layer of skin and the tissue directly below it. The skin will be waxy, white and firm, but it will be resilient deeper down. It will spring back when you press on it. Further freezing must be prevented. If there is no possibility of re-injury, the affected area may be rewarmed. However, it may be best to wait and rewarm it in a controlled environment.

Deep frostbite
This is the most severe form of frostbite and is also known as 3rd degree. It usually involves the deep tissue and sometimes the muscle and bone as well. It looks the same as superficial frostbite, but the flesh will not be resilient or spring back when pressed. It will be firm and board-like. Prevent further freezing, but do not attempt to rewarm the person until you are in a controlled environment, preferably a hospital. Medical personnel can rewarm the area by immersing it in a constant bathe (105-110 degrees), until all paleness has turned pink or burgundy red.

Frostbite, like other cold injuries, is not to be taken lightly. During the weekend, concentrate on preventing frostbite and only treat frost-nip. **Anyone suspected of having frostbite will be taken back to base and possibly taken to the Ely hospital.**

IV. Snow Blindness and Sunburn

Anyone who travels or camps in the snow and ice should be aware of the possibility of sunburn and snow blindness. Sunburn is caused by excessive exposure to the ultraviolet radiation of the sun. Don't be fooled by overcast days; it need not be sunny to expose skin to harmful rays. In the winter, the threat of sunburn is compounded by reflected radiation. Snow and ice reflect as much as 75% of the sun's rays. Be aware of this added exposure to avoid serious injury. Warn participants if you sense the possibility of sunburn. Light complexioned persons will usually be affected sooner and may incur the most serious cases. Earlobes, the underside of the chin, and the underside of the nose and lips, require protection from reflected rays.

Sunburn and snow blindness are difficult to detect because you do not feel them immediately. It takes about six or eight hours before either condition becomes noticeable. Prevention is always best. Use the buddy system to detect them early.

Snow blindness occurs when the sun is shining brightly on an expanse of snow, and is due to the reflection of ultraviolet rays. It is particularly likely to occur after a fresh snowfall, even when the rays of the sun are partially obscured by a light mist or fog. The risk is also increased due to negligence or failure to use sunglasses. Waiting for discomfort to develop before putting on glasses is folly. A deep burn of the eyes may already have occurred by the time any pain is felt. Putting on glasses is then essential to prevent further injury, but the damage has already been done.

Snow blindness is sunburn of the surface of the eye. Unlike sunburn everyone is susceptible to becoming sun blind. To prevent it, wear dark glasses and a hat with a brim. Sunglasses must be UV A/B protected. Otherwise, they are just fooling your eyes into thinking it's dark and the pupils will expand, letting even more ultraviolet radiation in and making matters worse. It may also occur on cloudy days, so protect yourself and your crew.

The first symptoms of snow blindness occur six to eight hours after exposure and are detectable as dryness and/or irritation. As the condition worsens, the eyelids swell and become red, the eyes fill with tears and they hurt to blink, feeling like sand is in the eyes.

IV. Burns

The most common types of burns while cold weather camping are from boiling water, spilling fuel, campfire or camp stove. Use caution in all situations to prevent burning yourself or others. When filling individual water bottles, place them in the snow instead of people holding them to prevent wet gloves or slight burns in case water is spilled.

Only the Interpreter should handle the fuel for the stoves. When pouring fuel, use rubber gloves and a funnel. Fuel doesn't ever freeze but if it comes in contact with the skin, an immediate 3rd degree burn will occur.

Winter Hazards and Emergency Preparedness

While winter camping offers many unique opportunities, it also can expose campers to many unique dangers. Because people in our society generally spend relatively little time outside during the winter, they may have difficulty discerning the difference between safe conditions and dangerous conditions: At what point does wind-chill drop too low to remain outside? At what thickness is ice too thin to travel on? How do you tell the difference between good ice and bad ice?

Thankfully, with proper training, winter campers can usually make the right decisions. The following are descriptions of commonly occurring winter hazards and the steps that should be taken to handle them.

I. Falling through Ice

For the winter traveler, ice is a nifty thing. It converts barriers like water into a perfectly paved highway. However, ice can be an inconsistent road material.

The rule of thumb for travel on ice is that it should be at least 4 inches thick for safe human travel on foot, 6 inches for safe travel by snowmobile, 8 inches for safe travel by car, and 12 inches for a medium sized truck. Ice in northern Minnesota often reaches a few feet of thickness by the end of winter and can handle sizeable loads. Check the thickness of ice early and often. Remember: ice thickness on a lake is rarely uniform.

Ice integrity can also be threatened by several other environmental conditions. A fast current (or even a fairly slow one) can prevent ice from forming. In the region traveled by Okpik crews, the finger of Flash Lake that empties into Blackstone and the narrows between Moose and Newfound Lakes are good examples of areas that may have weak ice at any point during the season.

Beaver activity can also affect ice strength. Beaver dams, because they change the flow of water, always create some sort of current system that can weaken the ice. Beaver lodges, because they are heated by the body heat of the beavers themselves, are usually surrounded by somewhat suspicious ice.

High winds on large lakes can create "pressure cracks." Formed by the pressure of the wind on the ice, pressure cracks can fracture the ice into large plates that can collide and overlap one another. Pressure ridges and open cracks, called "leads," are the result of pressure cracks. The phenomenon, which is comparable to plate tectonics, can create weak areas in the ice – especially around the cracks.

If you fall through the ice, there is an important first step. **Turn Around!** You do not know the ice conditions in front of you, but you do know that the ice you came from did support your weight. Once you've turned around, manipulate your body into a horizontal position and begin to crawl your way back onto the ice. Often the ice will crumble beneath your weight for several feet before it is thick enough to hold you up. Once on safe ice, roll around in the snow. The snow is so dry that it will absorb the moisture from your body and clothing like a towel(while this may be true in northern Minnesota, many areas have damp snow that may not work as well). Change clothes (especially inner layers) immediately after. **On a Northern Tier trip, falling through the ice would necessitate an immediate radio call and evacuation**.
When aiding someone who has fallen through the ice, **do not approach them**. Toss a rope to the individual or reach out to them with a long stick, to help them pull their way back on to good ice.

II. Slush

Slush – a mixture of snow/ice and water – can be created by a variety of conditions. High temperatures and melting snow can lead to slush. Sleet itself creates slush. Slush can be especially prominent in swamps, where exposed muskeg heats over the course of the day and melts the snow around it.

Perhaps the most common source of slush is a large accumulation of snowfall on the lake. The weight of the snow puts pressure on the ice, which consequently cracks or develops eruption holes. Waters seeps up through holes and cracks, settling on top of the ice (which can still be very thick). This water mixes with snow and can create a consistent layer of up to 10 inches of slush. Often the top of this ices over. It is a relatively common experience to step through this top layer of ice and soak a boot in the slush below.

Try to avoid slushy conditions. Usually areas that have been used before (campsites and trails) have fewer slush issues because the snow is compacted. When you suspect slush, wear snowshoes or skis to help you stay on the top layer of ice. It may be a good idea to stay at a land campsite and only venture out on the ice for water.

If you break through the ice and get your boot wet, respond immediately. If you drag your boot through the snow, you can dry it off before it soaks into your sock. Often, a layer of ice is created on the outside of the boot, which has little effect on its usefulness. Because of slush, it is usually a good idea to bring an extra pair of mukluks and mukluk wraps. If you outfit crews with mukluks, you personally should bring several mukluk wraps and wrap sleeves to prepare for a wet foot.

III. Extreme Cold Temperatures and Wind Chill

Northern Tier crews generally do not stay out in temperatures colder than -30 degrees Fahrenheit unless the crew is capable. If you see a thermometer at that temperature, consider radioing in. On weekends with particularly cold temperatures, the manager on call will contact you to consider getting off the ice.

A high wind chill can create equally hazardous conditions. If you encounter high winds, try to camp at a land campsite and create wind blocks. Life out on the lake can be miserable. Similar to extreme temperatures, on trail Interpreters will be contacted (according to itinerary) for a change in trip plan.

Because of the capacity for extreme temperatures, the weather forecast will be published every weekend for staff. Contingency plans should be created in advance. It should also be noted, that a crews ability to handle these temperatures is variable and consequently is handled on a case by case basis. Remember: they always have a heated cabin and sauna back at base.

IV. White Out

A white out occurs when snow, either falling from the sky or blowing up from the ground, reduces visibility to a dangerous degree. White outs occur only rarely in Minnesota, caused by either significant blizzards or high winds.
White outs pose a danger to winter campers because it is very easy to become lost, disoriented, or separated from one's group when visibility is low. If white out conditions occur, hunker down and stay where you are. Make sure your groups stays together until the conditions have abated.

V. Deep Snowfall

Snow is the winter's greatest thief! It is very important to keep a clean and tidy campsite in the winter because even a few inches of snow can cover up all of your possessions. This problem is only magnified when greater quantities of snow are factored in.

Deep snowfall can have a significant effect on the camping environment and experience. Trail conditions will change significantly, making transportation far more difficult. The weight of the snow on the lake ice can affect the ice's stability and create slush conditions. At night, heavy snowfall can clog openings and breathing holes in quinzees and snow shelters - as well as making sleeping outside very uncomfortable. Snow often occurs in "wet cold" conditions (temperatures 15 degrees and above) meaning that in the day time participants are far more likely to get their clothing wet. Therefore, heavy snowfall can lead to hypothermic conditions.

The sum of all of these conditions is that when heavy snowfall occurs (or when forecast), Interpreters should be ready to change itineraries and plans to handle it. Snowfall is a significant variable – and while it does not preclude any winter adventures, it will affect what a crew is able to do over their weekend.

VI. Driving on the remote Roads

Driving to and from town during the winter will be the most dangerous thing you do during the winter season. Please, please, please store blankets, sleeping bags, and other warm gear in your car. If your car spins into a ditch on a remote icy road you'll probably not encounter another person until 7:00 AM the next morning. There could only be very spotty cell phone reception once you leave town. **Drive Safe and Drive Prepared.**

On Ice Skills

Northern Tier National High Adventure Programs

Trip Planning / Camp Site Selection

Camp Site Organization

Shelters

Snow Kitchen

Stove Demonstration

Pulk Sled Demonstration

Winter Trails

Cross Country Skiing Instruction

Snowshoeing Instruction

Dog Sledding Program

Winter Ecology

Games to Stay Warm

Leave No Trace

Trip Planning / Camp Site Selection

The night your crew arrives will be busy. Check-in, Shakedown, Outfitting, and Orientation all have to be taken care of. Last but not least, you have to plan your trip. Trip planning is an important Interpreter skill – and it takes some thought to develop it. Your goal should be, with every trip, to find out what the crew wants to do and then to serve as a resource helping them design the trip of their desire.

While walking your crew through check-in and shakedown, begin to ask questions about what activities they are interested in doing. Ask them if they have very much winter camping experience? If they want to focus on one skillset or if they want to try out several? Do they want to travel a greater distance or spend more time in camp? Are they interested in the ice fishing program?

There are several different features that a crew must decide on by the time they design their itinerary at Cracker Barrel:

- What distance they want to travel (remember: ski treks must travel 10 miles and snowshoe treks must travel 7 miles for their patch)
- Whether they want to build their own quinzee or polar dome (both processes are time consuming)
- Whether they want to switch campsites

Camp Site Selection
Once you know the answers to these questions, work with the crew to choose campsites for their trip. Take into consideration current ice conditions. If the ice is poor, you may want to consider using land campsites exclusively. Ice and snow conditions (as well as the weather forecast) will also affect your ability to travel longer distances. The weather forecast and notes on trail conditions will be posted in several places on base to help you with the planning process.

Once you have determined which campsites you want to stay at, walk up to the campsite sign up station and reserve your campsite. On especially crowded weekends (Holiday Stay, MLK, and President's Day) you may have to alter your itinerary in accordance with the plans of other crews.

Fishing and Dogsledding
Any crew may ice fish and the necessary gear is available in the Bay Post. **If your crews decide to participate in the Ice Fishing program, fishing licenses must be purchased.**

Camp Site Organization

Campsites in the winter can be located in any open area on land or ice. Most campsites are protected from the wind either in a bay on a lake or behind a cluster of trees on land. All winter campsites for the Okpik program include the following elements:

- **Snow Kitchen:** This is commonly a social area for the crew so have enough standing space. It's protected from the wind and usually near shore or on land.
- **Ice Hole:** At least 200 feet from shore.
- **Snow Shelters:** Spread out the various shelters. Building any snow shelter takes a large area of snow and concentrates it on the ice. Separate quinzees or polar domes at least 100 feet apart and tents or wind breaks 20 feet apart.

Shelters

There are various types of shelters when cold weather camping. To choose between the various shelters, evaluate the level of experience of your crew. Consider the weather for the weekend including temperature, precipitation and wind. Evaluate the current snow and ice conditions to understand if there is enough snow at any given campsite to build one, two or three quinzees.

Depending on what type of shelters your crew chooses, set aside enough time to set up camp. A snow shelter with 1 inch thick walls will retain body heat and insulate from the colder outside temperatures better than a tent or lean-to shelter. With any shelter, the orientation of the door is placed opposite of the direction of the wind.

I. Polar Domes

Polar Domes are snow shelters that are continually packed throughout the building process. A kit is used to establish the circular form. Multiple pieces are gradually laced together to make a form for the shelter. The snow is packed as you build by scouts walking around the edges of the form. Once the polar dome is packed to the top of the fabric, snow is piled on top and packed with a shovel. Unlace the pieces and begin to carve out a door way and the snow inside. Place sticks that are a foot long throughout the walls to know when to stop carving out snow from the inside. The Polar Dome video is the best way to understand how to build one.

Pros: Blocks wind; Traps body heat; Protection from overnight snowfall; Sleeps 2 to 3 people.
Cons: Takes man power to build; Takes a LOT of snow; Need to pack in Polar Dome kit.

II. Quinzee

The quinzee is a snow dome that can be constructed without deep or hard-packed snow. Begin by shoveling up a mound of snow 6 feet high and 10 to 12 feet in diameter at the base. Leave it alone for a couple of hours to give the snow a chance to settle (the drier the snow, the longer it will take). If the snow is not allowed to sit long enough, there is a greater chance the quinzee will collapse. Gather several dozen sticks 18 inches long to push in the walls at regular intervals aiming them toward the center. As you approach the top of the shelter, use shorter (12 inch) sticks. Space the sticks about a foot apart in a grid like fashion.

Cut a 24 inch high entrance into the mound and hollow out the inside of the dome. Dig until you've exposed the ends of all the sticks. You should end up with a roomy, secure shelter inside. The snow that was previously inside can be used to build a wind break by the door or to build another quinzee. Punch several ventilation holes in the dome with a stick, orienting them at different angles so that drifting snow will not cover them.

When building multiple quinzees in the same campsite, space each quinzee at least 100 feet apart. The snow gathered for one quinzee has been consolidated into a smaller area. This increases the snow load on the supporting ice below causing pressure cracks around camp. If quinzees are too close together, they have the potential to sink over time as the ice below is not able to hold the consolidated snow load.

Pros: Blocks wind; No material to pack in; Traps body heat; Protection from overnight snowfall; Sleeps 3 to 5 people.
Cons: Takes man power to build; Takes a LOT of snow; Takes a lot of time for snow to settle.

III. Wind Break

The bare minimum shelter to build is a wind break made with snow. Its sole purpose is to protect from the wind that can quickly take away body heat. A wind break can be for one to three people and can be as tall as desired. Pile up snow as short walls creating a rectangular or square area to sleep in. Logs and other natural materials can be used to increase the height of the walls if desired.

Pros: Blocks some wind; No material to pack in; Quick to build; Sleep under the stars; One person is able to build it.
Cons: Body heat easily escapes; No protection from overnight snowfall.

IV. Lean-to

These shelters are usually made from a combination of materials including tarps, logs, branches and more. It is easier to build it on land tucked by trees or shrubs. Most lean-to shelters are for one person and they can design the space how they want to. The overall objectives of a lean-to are to protect from the wind and to redirect overnight snow fall to the ground instead of on the sleeping bag. There are countless methods to achieve these objectives so gather various resources and start building.

Pros: Protection against light snowfall; Blocks some wind.
Cons: Could collapse under heavy snowfall or high winds; Pack in or collect materials; body heat easily escapes; sleeps only 1 or 2 people; Could take a long time to build.

V. Russian Tent

These tents were previously used by the Russian Military. They are extremely light to travel with as ski poles were used to support the walls. There is enough space for the entire crew (maximum of eight) and quick to set up. The tent is ideal for housing more people and protecting from the wind. Some body heat is retained by the individuals sleeping in the tent but most heat escapes through the thin fabric.

To set up a Russian Tent, find 7 one-foot long sticks and 7 three-foot long sticks. The center pole used is available in the Bay Post or a long stick can be used. Follow these directions below:

1. Pack down the snow and remove any tree limbs from the area.
2. Lay out the tent and position the door on the leeward side (away from the wind).
3. Stretch out the footprint of the tent.
4. Attach the 3 feet long sticks to the tent (best understood by demonstration).
5. Crawl inside the tent and hook the two loops at the top of the tent to the pole. Extend the pole to the desired height which is approximately 8 feet tall.
6. Wrap the steak out line to the small sticks that are 1 foot long. Place on the ground or on the ice and pile up a foot of snow on top of the stick. This is called *deadman*.
7. Allow the steaks to sit in the snow as it will become stronger over time.

Pros: Fast and easy; Protection against light snowfall; Some wind protection; Traps limited body heat; Sleeps up to 8 people.
Cons: Pack tent into campsite; Could collapse under heavy snowfall or high winds.

VI. Sierra Design / Alps Tent

Tents for winter camping are usually sturdier than three-season tents. Some have an extra pole or two to help them stand up to snow loads and wind. Tents designed for arctic conditions have large vents so that water vapor can escape. Tents not ventilated properly trap moisture which will collect and fall on sleeping bags in the morning. The benefits of using a tent while cold weather camping includes a protection from wind and deflecting overnight snow fall from landing on sleeping bags.

Setting up a Sierra Design or an Alps Tent is a simple process that doesn't take too many people. Similar to the Russian Tent, pack down the snow and remove any tree limbs from the area. Position the door away from the wind and slide poles in their respective sleeve. Use *deadman* steaks where they are needed.

Pros: Fast and easy; Protection against light snowfall; Wind proof; Traps limited body heat; Sleeps 2 to 4 people.
Cons: Pack tent into campsite; Could collapse under heavy snowfall or high winds.

Snow Kitchen

Snow kitchens are always different and can range from basic to extravagant designs. The crew and Interpreter determine the elegance of their snow kitchen. The location of the snow kitchen is commonly tucked near the shore on the ice or on land. The crew usually socializes around the kitchen so make sure there is enough space surrounding if it's on land. It is best for the crew to start on the snow kitchen and let it sit while they work on their snow shelters. Pile snow at least 5 feet high and wait at least 1-2 hours before carving into it.

Orient the kitchen where one long side is protected from the wind. Begin carving or placing the following items in the kitchen:

- **Stoves:** Comfortable height, large enough stove board and fuel bottles, and protected from the wind. The cook will be facing into the wind while using the stoves but they will work more efficiently as they are protected from the wind.
- **Foot cove:** Under the stove area on the ground, carve out some snow in order to stand closer to the pots instead of having to lean over.
- **Food Preparation:** Any semi-flat spot near the stoves to mix dinner ingredients together or to lay out snacks for the meal.
- **Dishes:** Either a shelf or people can press their personal dishes anywhere into the kitchen. It is easier to locate dishes if they are kept near the kitchen throughout the weekend.
- **Food Box:** Raising it off the ground makes it a little easier to use. Optional.
- **Fuel Bottles:** Placing them in the side of the kitchen or just keep them in the crew box.
- **Silo Water Bottles:** Place them lid down into the side so the entire crew knows where they are located and the snow will mostly insulate them from freezing. Lid down first because they will freeze top down.
- **Cooking Pot and Kettle:** Overnight only, fill up both containers with water and bury them in one end of the kitchen. Cover them with snow to insulate them but keep the handle up so it is easier to pull them out in the morning.
- **Shovels, spud, etc:** Place them on the opposite side from stoves with the sheath side facing up, to keep camp organized and equipment location known.

Again, the snow kitchen is what the crew makes it to be. As an Interpreter, remind your crew to pick up loose crew and personal items especially in the evening. Overnight snowfall can cover up items and search parties will be called. It is best to keep loose items around the kitchen so you know the general area to search.

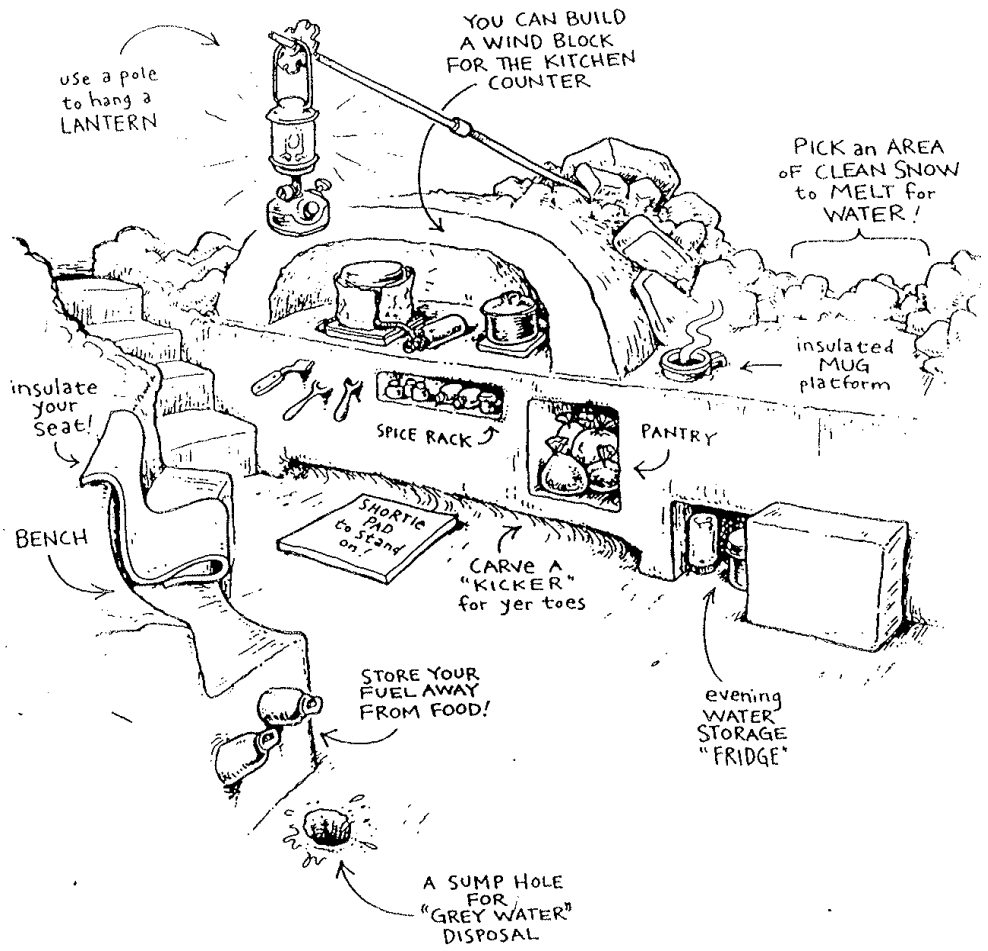


Image Source: Allen and Mike's Really Cool Backcountry Ski Books by Allen O'Bannon with illustrations by Mike Cleiland. Chockstone Press, Evergreen Colorado, 1996.

Stove Demonstration – MSR Dragon Fly

Each Interpreter will be checked out two MSR Dragon Fly stoves. It is each Interpreter's responsibility to properly maintain their stoves prior and following each crew. If there are any issues with your stove, either noticed in base or on the trail, contact the Okpik Outfitting manager and inform them about the issue after trying to fix the issue. Using these stoves in cold weather will be a little different than during warmer times of the year. The noticeable differences include a longer time to prime the stove and an increasing importance to lubricate both metal and plastic parts.

Lighting the Stove

- Make sure the fuel bottle is full but not above the fill line.
- Insert pump into fuel bottle and ensure threads smoothly connect.
- Be sure fuel valve is turned off.
- Pump fuel bottle 25 times. When you pump the bottle, it forces air into the fuel bottle creating pressure. It doesn't matter if the fuel bottle is connected to the stove or not.
- When restarting stoves in the morning, pump the fuel bottle 10 to 15 times to regain pressure.
- Unfold the 3 pot support / legs of the stove.
- Put 3-in-1 oil on the end of the fuel line and insert it into the pump on the fuel bottle.
- Fasten the metal clip to the fuel pump.
- Open the wire valve partially.
- Prime the stove by releasing a little bit of fuel by turning the valve on the fuel bottle. The fuel will come out towards the bottom of the stove on the wick.
- Turn off the fuel.
- Light fuel and allow coil to heat up. This prepares the exchange from liquid fuel to gas.
- Once the fuel is mostly burned, turn on the fuel.
- If the flame starts to get low, pump the fuel bottle 5 to 10 times.
- Secondly, if the stove is not lighting, release more fuel to continue to heat up the coil. It may not be hot enough to transfer the liquid fuel to a gas.
- After the stove is in great working condition, place the wind screen around the stove to concentrate heat.

Turning Stove off

- Open the simmer valve completely.
- Close valve on the fuel bottle first.
- Allow fuel to burn out.
- Keep stoves assembled at night and put away in green crew box.

Routine on base Maintenance

- Dry out stoves after each trip.
- Store the fuel pump with the stove.
- Store the fuel bottles in the fuel shed.
- Check the pump after each trip to ensure sufficient lubrication.

Oiling the Pump

- Oil the pump after every other trip.
- Take off the pump from the fuel bottle.
- Pull plunger out half way or till you see an arrow with a number 1.
- Look at the other arrows shown on the plunger. Gently turn the shaft counter clockwise.
- Once the shaft is released, pull the plunger.
- Put 3-in-1 oil on the black pump cup.
- Insert the plunger back into the pump assembly.

Trouble Shooting

The first things to check include the following:

- Is there fuel in the fuel bottle?
- Is there enough pressure in the fuel bottle?
- Is the stove primed enough to transfer the liquid fuel to a gas?

After checking the items listed above, try heating up one stove with a working stove. There could be frozen moisture in the stove preventing it from working properly. Lastly, contact another Interpreter located close by or radio the manager on call for further assistance.

Pulk Sled Demonstration

The most efficient way to move your camping equipment in a snow-covered environment is with the use of some type of sled. Through the centuries all the people in the Northern climates have used sleds of one type or another. During the Okpik programs, each crew member will pull a sled with their personal and some crew equipment. It is best and more efficient to stay in a single file on the trails and lakes while pulling sleds. Maintain space between people in case they fall or the sled tips over. With experience, it is possible to pull a sled while skiing or snowshoeing.

Packing a Sled

There are always multiple ways to pack a sled but always begin by laying down an opened tarp. Locate the sled in the middle of the tarp and begin placing personal and crew equipment in the sled. The therm-a-rests are sometimes difficult to pack because they take up space. Either lay them flat on the sled first or roll them up if the individual doesn't have much equipment. Balance weight throughout the sled especially from side to side. If there is a heavy item to be packed, place it towards the back of the sled. This includes the crew box that the Interpreter commonly packs in their sled and the food box which is either separated among different people or given to one person.

Once all equipment is in the sled and the weight is balanced throughout, fold one side of the tarp over. Fold both ends up and then fold up the other side onto itself. This is called a burrito wrap and will protect the equipment from getting wet. Begin to tie down the sled. Tie one end tight and then skip some hooks in the middle to tie the other end tight. After the ends are tight, finish the middle of the sled. Shovels, skis or snowshoes can be tied outside of the tarp. Lastly but most importantly, test your sled. This consists of tilting up

one end of the sled to ensure no equipment will fall out while traveling to or from camp. Retie the sled tighter if anything is questionable.

Winter Trails

General trail maintenance throughout the season includes corridor trimming, grading, and grooming. More importantly, crews and staff need to use trails so the fresh snowfall is packed on the existing trail. Trails can be difficult to find after 6 inches of snowfall if they are not used.

Groomed trails are very pleasant to ski, dog sled or hike on. These are continually maintained on a weekly basis and are 5 feet wide. Snowshoe trails are only 2-3 feet wide and they are packed better with more use. More energy is exerted to establish a trail with powder snow compared to a groomed or packed trail.

Cross Country Skiing Instruction

Cross-Country (Nordic) Skiing is an incredibly diverse sport – different types of skis, techniques, environments, trails, and skills determine an individuals preferred type of skiing. Because of this diversity, Nordic Skiing deserves far more attention than we can give here.[1]

I. Northern Tier Skiing

Several factors affect the ski equipment provided to Okpik crews and consequently the type of skiing that occurs during Okpik. Okpik crews ski on untracked packed trails and make their own trails through the backcountry, meaning that skis must be thin enough to make trail-skiing fun but have enough "float" (width) to enable backcountry travel. Okpik crews generally have never skied before, so Okpik skis are designed for classical skiing instead of skate skiing. Finally, Okpik crews bring a variety of boots with them. Berwin Bindings are used because they allow for different size feet and different size shoes to use our skis.

II. Fitting Skis and Ski Poles:

For Northern Tier skis, ski bindings determine the fit of the ski – ski length and flex is generic and cannot be customized. Instruct participants to find a pair of skis whose front bindings cross directly over the joints between their toes and foot when their heel is set squarely against the back of the binding.

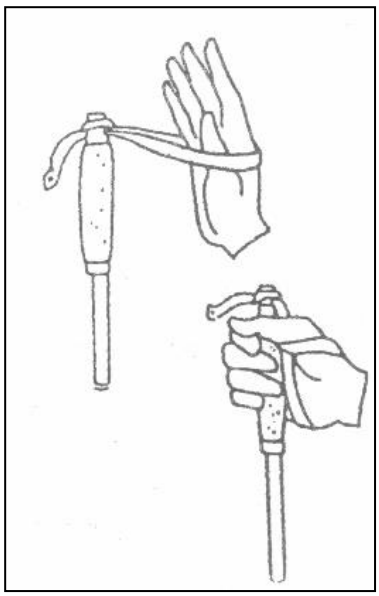
Berwin Bindings are screwed into the ski towards the front of the foot, leaving the heel of the binding loose. When skiing, one pushes off the ski with one's toes. The back of the foot lifts off the ski to enable this push. This is why the position of the strap over the toes is integral.

Ski poles are sized in centimeters. Each pole is marked with colored electric tape to facilitate storing it with poles of similar length. A correctly sized pole will, when stood upon the ground, rise to a height slightly above a participant's arm pit. In cross-country skiing, poles are used constantly – and it is important that they be at a height that allows the arm to thrust downward propelling the skier forward.

III. Adjusting/Replacing Berwin Bindings

(Berwin Bindings can only accommodate up to size 12 boots)

All Interpreters should carry 4 replacement Berwin Bindings (back and front bindings for both feet) and a screwdriver in their Green Box. Berwin Bindings are easily adjustable: remove the screws holding the binding in place, slide the back piece of the binding either backwards or forwards to achieve the desired length, align the holes of the two binding pieces together with the holes in the ski and screw the binding back into the ski. If a binding breaks, follow this same process but replace the broken binding piece with a new binding piece.



[1] To learn more about Nordic Skiing consult the following: Professional Ski Instructors of America, *Nordic Technical Manual: Skiing and Teaching Skills* (Lakewood, Colorado, 2005: American Snowsports Education Association Education Foundation); Allen O'Bannon, *Allen and Mike's Really Cool Backcountry Ski Book: Traveling &Camping Skills for a Winter Environment* (Helena, Montana, 2007: Falcon Guides).

IV. How (Classical) Skiing Works

Cross-country skis are long, skinny, and have a bit of an arc to their shape. This arc is called the camber of the ski. On the bottom of the ski, the front and back ends are very smooth, while the middle of the ski (the top of the arc, opposite the binding) has a textured surface referred to as fishscale. This is true on all Okpik skis which are wax-less. Other skis exist that use various types of wax to accomplish the same thing.

The classical skiing motion relies on controlled weight transfer. When the body's weight is shifted onto one ski, the camber of the ski is compressed so that the fishscales catch on the ground surface. This catch allows the skier to push off. When weight shifts away from the ski, the camber rebounds upward, moving the fishscales off the ground. This allows the ski to glide forward.

Classical skiing works, therefore, by transferring weight to one ski, pushing off, gliding and then landing on the other ski to push off again. This controlled weight transfer motion looks akin to walking or running, but with pauses between each step to allow for the skis to glide forward.

Poles add more power and stability to the motion (see above picture for how to hold the poles). When acquiring speed (as opposed to coasting), ski poles should be used one at a time and in opposite motion with the feet. When the left foot pushes off, the right pole should push off too – and vice versa. This causes a twist in the skier's torso allowing them to use their stronger core muscles to propel the body forward.

V. Climbing Hills

Because skis are slippery, climbing up hills can be difficult. If approaching a small hill with some momentum, the skier can often jog up the hill with small stomping steps. Each step compresses the camber, allowing the fishscales to catch the hill before the skis starts slipping downward.

On larger and steeper hills, the skier will have to use either the Herringbone or Sidestep technique. To Herringbone, the skier makes a "V" with their skis (the back ends of the skis should point towards each other) and digs the inside edge of the two skis into the hill. The skier then climbs up the hill, lifting one ski at a time and taking care not to allow the skis to overlap each other.

To Sidestep, the skier turns perpendicular to the hill and ascends sideways, digging the uphill edge of the ski into the snow. The downhill ski should never cross the uphill ski when sidestepping. Take care not to "bridge" the ski when sidestepping on narrower trails – if the fishscales are not touching the ground, the skis will have no traction and you will quickly find yourself on your back.

VI. Descending Hills

Descending a hill on skis can be alternatively exhilarating and frustrating. While Berwin Bindings have many wonderful characteristics, stability is not one of them. Practice and patience are important for developing downhill ski abilities with Nordic Skis.

Skiers at Northern Tier should always ascend hills one at a time – each skier waiting for the skier in front of them to clear the way before trying the hill themselves. When beginning the descent, keep the skis in a pizza slice formation (an inverted "V") to control the speed. When navigating turns, take small quick steps

with the skis to adjust the direction that you're heading. Adjusting weight balance from one ski to the other will also help change direction: you will turn towards whatever ski you put more weight on.

VII. Other Basic Tips for the Beginning Nordic Skier

- Focus on Ski-to-Ski Balance – the ability to shift weight gracefully and symmetrically from ski to ski.
- Flex and Extend – with every step, pre-load or flex your muscles before releasing sharply to gain maximum propulsion.
- Try to keep your core in front of your feet – lean forward!
- Relax…

Snowshoe Instruction

Snowshoeing is a very historic method of winter travel, allowing an individual to cross through very deep snow with relative ease. It is a very useful travel technique. That being said, snowshoeing is also hard work. Snowshoes do not prevent you from sinking into the snow – they merely limit how far you sink. Furthermore, walking with snowshoes requires you to, well…walk with snowshoes. The added weight on your feet can be tiring. However, the ability to access otherwise hard-to-reach areas makes snowshoeing worth the strain. If you want to go exploring off the trails and lakes, snowshoeing is the way to go.

Snowshoes come in a variety of styles – of which Northern Tier uses several different types. The most common are Bear Claws, Michigans, and Alaskans. Bear Claws are the smallest and are oval-shaped. Northern Tier Bear Claws are generally used only for WEBELOS groups. Michigans feature a round oval frame with a tail for tracking, and are a terrific all-purpose snowshoe. Northern Tier's white Canadian Military snowshoes are Michigans. Alaskan snowshoes resemble Michigan snowshoes, but with a more elongated frame. They perform very well in deep and powdery conditions, but have limited maneuverability. Northern Tier has a variety of different Alaskan snowshoes.

When sizing snowshoes, the main thing to consider is the body weight to surface area ratio. The surface area of each snowshoe gives a good gauge of how much "flotation" it offers. The higher body weight a person has, the more flotation they need. The weight of the snowshoe should also be considered. Smaller scouts will have a difficult time walking with large snowshoes (and they probably do not need that much flotation anyway). Experimenting with the different types of snowshoes will give you a better idea how much flotation each offers and what type of person they would be appropriate for.

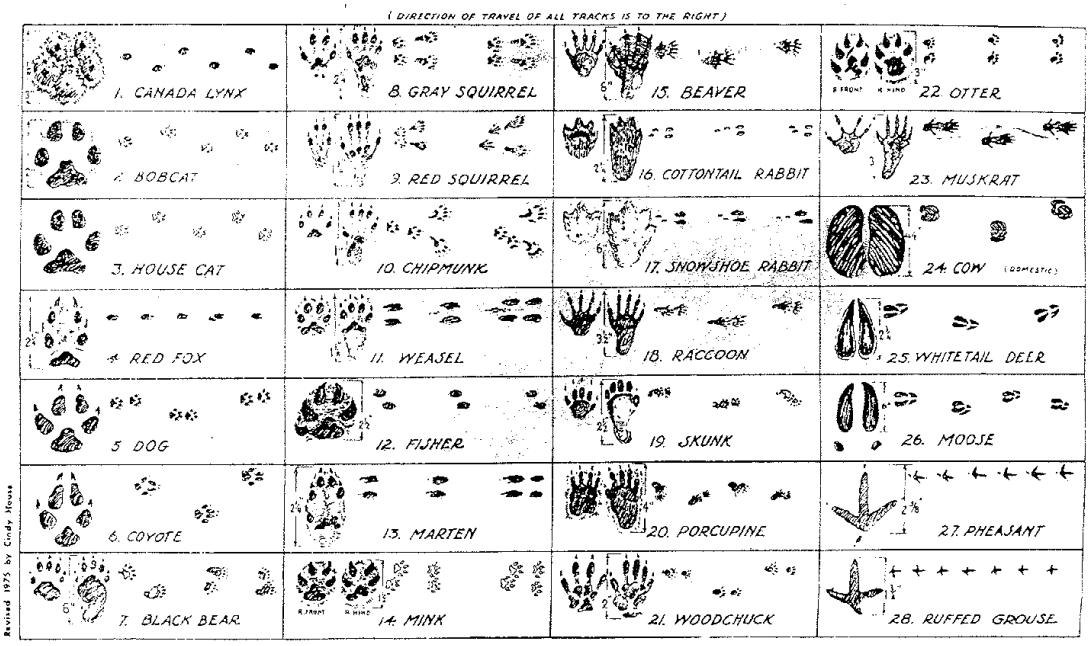
Walk with a wide stance when snowshoeing. Snowshoes are designed so that, when walking, one snowshoe can be lifted out of the snow, carried over the edge of the other snowshoe, and then placed back into the snow. This overlap is essential for comfortable snowshoeing. Scouts often have difficulty managing this overlap – if you place one snowshoe on top of the other, you will not be able to walk!

Snowshoes are most appropriate for use in deep snow. Walking with snowshoes on a packed or groomed trail is essentially a wasted effort. If you do not need any flotation, then you do not need snowshoes. Snowshoes also perform poorly in slush. The slush will freeze to the webbing of the snowshoe, making it feel like you're walking with increasingly heavy bricks on your feet.

When snowshoeing (or skiing/walking for that matter) as a group, walk in a single file line. The person in front will be "breaking trail." Breaking trail is hard work, and the individual breaking trail should be replaced every 5-10 minutes so that they do not exhaust themselves.

Winter Ecology

Animal tracks



Snowflakes

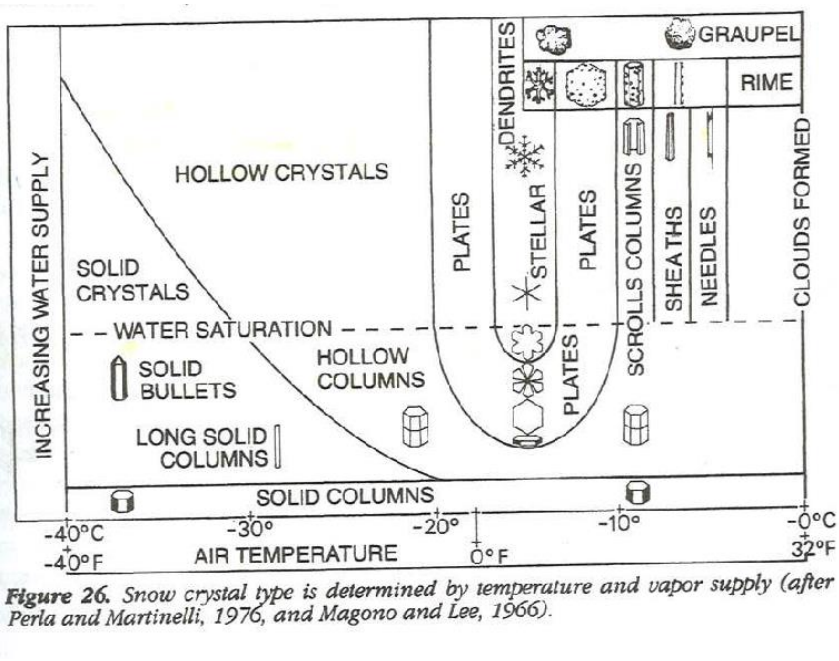


Figure 26. *Snow crystal type is determined by temperature and vapor supply (after Perla and Martinelli, 1976, and Magono and Lee, 1966).*

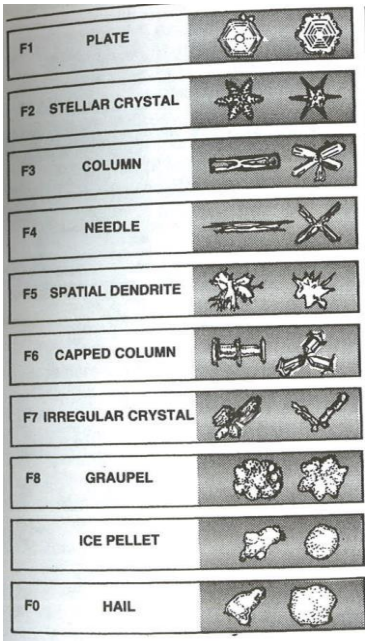


Image Source: *Winter, an Ecology Handbook* by James C. Halfpenny and Roy Douglas Ozanne with illustrations by Elizabeth Biesiot. Johnson Books. Boulder, Colorado. 1989.

Tree Identification

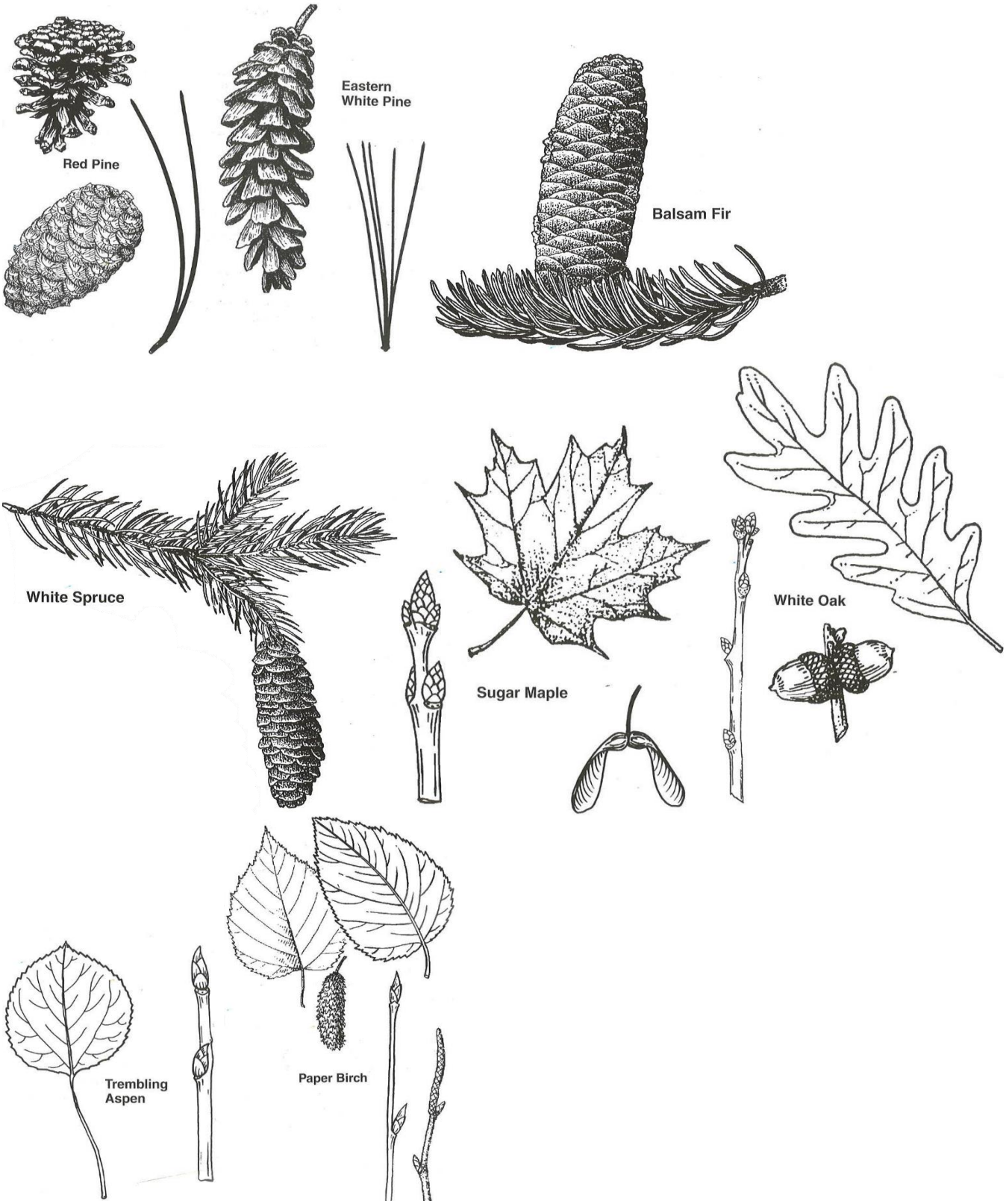


Image Source: *Minnesota Trees* by David M. Rathke. Communication and Educational Technology Service, University of Minnesota Extension Service. St. Paul, Minnesota. 1995.

Activities to Stay Warm and Entertained

There are countless ways to stay warm while cold weather camping. As an Interpreter, try any of the following games or activities to keep your crew warm and happy.

Chicken Dance
The purpose of this game is to warm up feet. It takes two people to dance and it begins by facing each other. Extend and tap right feet together then left feet and so on. Speed up the pace and soon enough the body's circulation has increased and feet are warmer. Remember, prevent sweating by delayering.

Run and Scream
Have the entire crew stand in a line shoulder to shoulder. This works better on a lake as you have plenty of space. One at a time, run and scream as long as possible. When you stop screaming then you stop running. Whoever runs the farthest is the winner.

Kick Ball
Same rules as when you grew up playing kick ball but on slippery ice. Mark the bases with kneeling pads and split up the crew evenly on two teams. Enjoy playing but remember that the ice is slick.

Angels and Demons
Many people can play and it begins by everyone standing in a circle. Each person chooses one person to be their angel and another person to be their demon. The goal of the game is to keep your chosen angel between you and your demon. The game ends when people are tired from running around.

TV Tag
You can easily play any version of tag that has been thought of. Again, running on ice is a risk and it should be respected. Be careful. TV Tag involves as many people that want to play. One person is "it" and runs around and tags everyone else. When you are tagged, then you stay put till someone else tags them and screams out a TV show. The game continues till everyone is frozen.

Hike, Ski, or Snowshoe
Remain warm throughout the day and before going to bed by going for a hike, ski or snowshoe. Go to another lake close by or hike around the trails in the surrounding area. There doesn't need to be a specific destination but rather a route to keep everyone warm.

What else to do when on the trail?
Ice Fishing
Sledding
Team Building Activities
GEO-Caching
Star Gazing
Build snowmen (Easter Island?)
Animal Track Identification
Plant Identification

Leave No Trace

Land Management

Northern Tier owns a relatively small parcel of land and the majority of the program we provide occurs on federal land. The Superior National Forest surrounds Northern Tier. The Boundary Waters Canoe Area Wilderness (BWCAW) is a region with special designations within the Superior National Forest. Heading South on Moose Lake (as well as certain areas of Snowbank Lake), crews can encounter private property. Northern Tier crews should never cross onto private property – and frankly, given that we are directly adjacent to several million acres of federal wilderness, there is no reason to.

The United States Forest Service has rules and regulations to control the use of these public lands. Rules in the Superior National Forest are different than rules in the BWCAW because the intended usage of the land is different. However, there are some constant rules.

Within the Superior National Forest, no permits are required during the winter time and there are no limits on crew sizes. Snowmobiles are allowed in the area, making evacuations relatively easy. "Dispersed Camping" – that is camping outside of declared campsites - is allowed. Most campsites used during Okpik fall into this category. While no permit is required for Dispersed Camping, the USFS website states that "you do need…a large dose of common sense and Leave No Trace Ethics." So please be a responsible and decent human being. Be sure to check the local regulations where you live.

To fish in Minnesota, you must have a Minnesota Fishing License and follow all related laws. The same goes for Michigan fishing licenses.

Obeying permit rules and groups size limits is integral. Do not violate them. Ever.

Principle 1: Plan Ahead and Prepare

Northern Tier provides most of the planning and preparation for crews. Packing proper food and equipment makes crews less reliant on the environment, eliminating the need to scar the wilderness in the attempt to garner food/shelter. The acquisition of the proper permits and education in proper wilderness practices (including LNT, which is covered during First Night Orientation) insures that all users are knowledgeable about how to relate to the environment in a sustainable, responsible, and respectful way.

During the First Night a crew is on base, a trip itinerary will be prepared. This serves two purposes: first, it allows Northern Tier staff to locate the group in case of an emergency and, second, it insures that the group plans their trip in accordance with their desires and abilities. Winter Camping is difficult, and an overly ambitious trip plan can lead to an endangerment of the group as well as an endangerment of the environment.

Principle 2: Travel and Camp on Durable Surfaces

Happily for winter campers, traveling and camping on snow and ice is extraordinarily low-impact. While crews certainly leave a trace on the landscape by building quinzees and igloos on top of lakes, these traces will vanish by May. The impact timeline is very short-lived.

Still, there are several factors to take into consideration when traveling and camping to further reduce the trace one leaves. Try to condense the impact of the crew when traveling and camping. Obviously, a campsite will have a high impact – shelters will be built and snow will be packed down. This is inescapable. Yet, while the corner of the lake your campsite occupies may be well-trodden, try to keep the rest of the lake undisturbed and pristine. Similarly, when traveling on virgin snow, try to keep your group to one path. This will have the benefits of making travel easier by packing a trail and minimizing the group's impact. When venturing into new areas, be respectful of what lies beneath you. Particularly in swampy areas, damage can be caused to the muskeg and rushes lying dormant beneath the snow. Finally, avoid using summertime campsites. These campsites work hard during the summer – they deserve their winter vacation.

Principle 3: Leave what you Find

The wilderness area is public, so nothing you find on trail belongs to you. This area has a long and vivid history, from the Ojibwe and Dakota to the French-Canadian Voyageurs to the miners, loggers, and resort owners of the last century. That history is something that we all share – and the remains, scars, and artifacts left by this history should be preserved. If you find an artifact on trail, please leave it. It does not belong to you and, if you enjoyed finding it, someone else will too.

However, as a user, it is important to try to maintain the pristine atmosphere of the wilderness by removing any garbage or misplaced belongings. Part of the United States Antiquities Act of 1906 mandates that anything found on federal land over 50 years of age constitutes an artifact; anything younger is garbage.

Natural objects should be left in the woods. Moose antlers, for example, in addition to being fun props for pictures, are an
important source of calcium for forest rodents. Everything has a role in the woods – and we should not deprive the forest of its own resources simply because of our selfish desires.

Principle 4: Dispose of Waste Properly

While wilderness users are expected to leave what they find, they should also take out what they brought in. Any trash should be collected and transported out of the wilderness. It is illegal to burn trash in Minnesota, so don't burn ANY trash. Emphasize one-piece trash practices with your crews. Much of the food we outfit with has wrappers – keep the wrapper in one piece when you open it. That way a small piece of plastic or foil will not fly away in the breeze.

In the wintertime, pee leaves a particularly vibrant trace. To avoid making yellow snow flowers everywhere, crews should be taught to visit a specific "pee tree" at every campsite to condense urine outflow. The pee tree should be well away (150 feet) from any water source or trail. In addition, the phrase "pee tree," while useful, is a bit of a misnomer. A more accurate title would be "tree that we all agree to pee near." Don't actually pee on the tree – it has a life to live.

Fecal matter should be disposed by walking well away from any campsite, trail, or water source and digging a cathole in the snow. Toilet paper should be packed out. One good idea is to save an empty chip bag from dinner to store used toilet paper in. The chip bag can then be tossed in the trash. The cold temperatures limit concern about bacteria.

Wastewater should be poured out on land, 150 feet from any campsite, trail or water source.

Principle 5: Minimize Campfire Impact

Fires are a time-honored camping tradition, but they do put a strain on the land. Particularly in the winter, because it is difficult to forage for wood, people often become lazy and take firewood from sources that are not sustainable.

Here are a few rules for fires in the winter:

- Use stoves for cooking meals to minimize the amount of wood you burn
- Always use a fire pan beneath your fire so that you don't mar the ice. This will also prevent the melting snow and ice from putting out your fire.
- Gather wood from "Dead and Down" sources. Do not take wood from the lake shoreline because this leaves an obvious and visible mark.
- All firewood should be smaller than the average adult male's wrist. It is unlikely that your fire will be large enough to burn all the way through larger logs – which you will then have to dispose of.
- At the end of the fire, walk into the woods 150 feet away from any campsite, trail or water source to dig a hole in the snow to dispose of your ashes.
- Always remember that fires are a "false" or "psychological" heat in the winter: the amount of insulation you are wearing prevents the fire from actually warming you.

Principle 6: Respect Wildlife

Always remember that we are visitors to the wilderness. We no longer live here, our stay is temporary and we therefore must be respectful of those who actually live in the forest. Do not attempt to scare or disturb animals. Do not approach animals, but observe them from a distance.

One of the most important ways to respect wildlife is to store food correctly. Wild animals that obtain regular access to human food cease to be wild. They become reliant upon humans for their nutritional needs and their behavior changes significantly. In the winter, one of the common campsite thieves is the Gray Jay. Please try to keep your campsite clean – do not entice the Gray Jays to come clean up after you.

Principle 7: Be Considerate of Other Visitors

Because we are using a shared wilderness, it is important that we are respectful of each other as well as other visitors. Try to spread out campsites. Don't yell needlessly. Allow all visitors to have a peaceful and true wilderness experience. Keep in mind that sound travels incredibly well during the winter.

It is recommended to have naturally colored clothing to minimize the visible impact you have on other visitors. However, this desire to respect others must be tempered by the realities of winter camping – snow tends to steal personal belongings, so it helps to have avoid having white colored equipment.

Bibliography / Suggested Readings

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In addition, there are several websites with good information:

- Frontierbushcraft.com
- www.nols.edu
- Wintertrekking.com
- Wintercampers.com

Please note: This bibliography is not an endorsement of any of the listed books or websites. Rather, it is provided as a list of *potential* sources of information. Additionally, some of the guides may be dated and/or provide information contrary to the BSA's method. It is your responsibility to ensure that all activities you conduct are in line with BSA policies and procedures, particularly the *Guide to Safe Scouting*.

Notes


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