Winter Camping – The Complete Experience

Photo: Dennis Power

Part Three: Food and Water: The essential survival fuels

by Rick Curtis

Welcome to the third and final installment of our special Winter Camping feature by Rick Curtis, Director of the Outdoor Program at Princeton University. This month's article features the final essential survival tools: food and water.

Stoves versus Fires

In most cases you will be taking stoves and fuel for cooking. Fires are possible in some locations - but in high use areas, it's best to rely on a stove, as firewood can be difficult to find in the winter. Your stove should have good heat output. In order to insulate the stove from the snow (so it doesn't melt itself into a hole) place something underneath it like a pot lid, or a piece of fiberboard. Since the burner is usually significantly smaller than the pot bottom, placing a metal pot lid on top of the burner can help spread the heat more efficiently to the pot. Wind shields are helpful in the winter to concentrate the heat. Priming stoves in the winter can be difficult; it's best to use alcohol or lighter fluid rather than trying to prime the stove with white gas.

Fuel

Plan on 1/4 litre per person per day if you need to melt snow for water. Plan on 1/8 litre per person per day if water will be available. *Make sure you have at least a day's surplus of fuel in case of bad weather, water being unavailable, etc.*

What to eat

Planning food for winter activities must take into account the great demands the cold weather and physical activity place on the body along with the difficulty of preparing foods in the winter (it takes time, stove fuel, and having a menu which appeals to the group). Appetite is generally reduced during winter activity even though the food needs of the body have increased. If the meal isn't appealing, it won't get eaten. In some situations you literally need to force yourself to eat.

All foods are made up of varying proportions of the basic food types - carbohydrates, fats, and proteins (and water, vitamins and minerals). Each of the major types can be converted into simple sugars and burned by the body to produce energy, but the time required for conversion increases with the complexity of the molecule. Therefore, carbohydrates are quicker to convert than proteins and proteins quicker than fats.

Vitamins and Minerals are generally found in most foods we eat and for a

trip less than 7-10 days no special resources are needed. For longer trips and expeditions vitamin and mineral supplements are necessary. See a physician to get specific recommendations for expeditions.

Caloric Requirements increase in the winter due to the energy expended in keeping the body warm. Caloric requirements for different activity levels are summarized below (kilogram-calorie/day):

- Basal metabolism
  1,500 calories
- Sedentary occupation
  2,500 - 3,000 calories
- Three season backpacking
  3,500 - 4,000 calories
- Winter backpacking
  4,500 - 5,000 calories.
- Keep in mind that there are definite individual variances on these figures based on age, body metabolism, general health, etc.

Meals

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

Breakfast should not be a complicated meal but a complete one since it supplies the foundation for a full day's work.

Breakfast - should not be a complicated meal but a complete one since it supplies the foundation for a full day's work. Time is also a factor since you probably want to get up and moving. Just standing around in camp in the early morning hours only leads to cold feet and bodies. Since the easiest thing to cook is water, it is best to go for items which can be made in each individual's cup. Suggestions include: instant oatmeal with hot milk and margarine, hot Tang™, Granola with hot milk, hot Jello™, hot chocolate with extra milk and margarine. It is best to supplement some of these items with extra powdered milk to add additional protein and margarine for fats. This is the meal to be careful *not* to dump too much sugar into the bloodstream at once, but rather to eat a good mix of all three major food types. The sugars will get you started and the proteins and fats will keep you going through the morning.

Lunch - There are two approaches to lunch on a winter trip. One is to stop for a traditional lunch and take a long break. This means cessation of activity which can lead to people getting cold. Additional layers would need to be put on and taken off; all of this adds up to a lot of extra time. But this also allows time for exploring an area and taking it easy. You can break out the stove and cook up a hot meal if you like.

The other approach is carrying a personal lunch which can be eaten throughout the day, at scenic points, water stops, clothing breaks, etc. The second approach minimizes the amount of time standing around, but also doesn't provide a major rest stop.

Now we're cooking!

Photo: Richard West

In both cases you should include all the food groups by having some of the following items: meats, cheeses, nuts, dried fruit, raisins, cookies, candy, granola bars. In the case of an "eat through the day lunch," a general formula is for each person to consume the following per day:

- 1/4 – 1/3 kg GORP - raisins, peanuts, M & M's, sourballs, coconut, chocolate morsels etc.
- 1/10 – 1/4 kg lunch meat and/or cheese - cut into bite-size chunks so you don't break your teeth.
- Other items include cookies, brownies, peanut butter, bagels cut in small pieces or wraps spread with cream cheese/peanut butter, etc.

Dinner - It is often good to start dinner with instant soup or a hot drink that can be made in each person's cup. This gives some internal warmth while waiting for the main course. In the winter, the main dish is usually some form of one pot glop/stew – good for saving time and stove fuel. A glop starts with a soup or gravy base, and includes a starch (rice, noodles), some vegetables (frozen vegetables keep well on winter trips), and whatever protein you are carrying (lunch meat, cheese, canned chicken, tuna). Spice it up to make it tasty. Remember, at the end of the day you will be more tired than hungry and having an interesting meal is essential to get you to eat.

- The other approach to dinner is freeze-dried foods. These have the advantage of simply adding boiling water to the dish, so less fuel is needed (they also weigh very little). There are a number of companies offering these items. They are generally more expensive than what you would pay for basic staples like rice and noodles. Be aware of portion size. Some companies give an unrealistically high estimate on how many their meal pack will feed. The meal is concluded with hot drinks (Tang™, tea, hot chocolate, Jell-O™, etc.) and possibly dessert. At the end of the meal water should be melted/heated up for personal water bottles at night. *(See the water section)*.
- Dehydrated foods *are not recommended* because they require large quantities of water to rehydrate them.

Food for sleeping - Eat a good meal before you go to sleep. If you wake in the middle of the night and are cold it is best to eat proteins. Protein will be broken down more slowly so the heat will be released over a longer period of time. If you eat sugar, you will get a quick "heat high" and then your body temperature will drop back down, sometimes falling below its previous level.

Utensils - All the personal utensils you will need are a large plastic cup (insulated if possible) and a plastic spoon. *(Do not bring metal utensils in winter*). It is also recommended that you tie a string between the cup and the spoon. Cleaning these utensils is generally only scraping out the remainder with snow. Anything left will be part of your next meal.

Food Packing - You will need to repack your food to minimize the amount of trash you bring in with you. It is best to combine food items by meal or type into separate stuff sacks (breakfast bag, lunch bag, dinner bag, hot drink and dessert bag). Label or color code them so you can easily distinguish them.

Winter Water

1) **Do not eat snow!** It takes an incredible amount of energy to transfer water from one state to another (solid to liquid). You are burning up too many calories to do this which can quickly lead to hypothermia.
2) Water may be obtained by digging a hole in frozen lakes or streams where there is running water beneath the ice. *Be careful about falling in.* Remember, in most cases water will need to be purified from giardia and other bacteriological contaminants (see below).
3) Snow can be melted on a fire or stove to make water. It should be clean snow, *no yellow* (urine) *or pink* (bacterial growth). Because it takes so much energy to convert from one state to another you should have some water in the bottom of your container. Heat this water and add snow to it *slowly* so it turns to slush and then water; this is much more efficient. If you dump in straight snow, you will only burn the bottom of your container and not

Photo: K. Poxton

make any water. By volume it takes about 9 litres of snow to make one litre of water.

4) Winter Solar Water Collector - In a spot that will remain sunny for several hours, dig out a depression in the snow about two feet across and one foot deep. If possible, line this depression with a foam pad or other insulation (not essential but it speeds the process). Then spread a dark plastic bag (trash bag) over the depression forming a shallow dishpan. All over the raised margins pack **clean** snow. Drawn by the dark plastic the sun's energy will melt the snow and water will collect in the depression.
5) Water in a pot can be stored overnight by placing the pot lid on and burying the pot under a foot of snow. Snow is such a good insulator that it will keep the water from completely freezing even in sub-zero temperatures.
6) Personal Water - you should have a water bottle with a wide mouth, otherwise the opening will easily freeze up. During the day you should carry at least one bottle next to your body (usually with a shoulder strap arrangement). Your body heat will keep it from freezing and the bottle is handy to rehydrate yourself throughout the day. Insulated water bottle holders are available for this. Other bottles can be kept upside down in an insulated container (sock etc.) preferably in an outside pocket on your pack. Being upside down will keep the mouth of the bottle from freezing. *Keep in mind that the lid must be on tightly or water will leak all over the place.* A cold water bottle may have ice crystals in the threads. As the bottle heats up from body temperature the ice may melt, causing the cap to loosen - also the lid may expand with heat (causing leakage). At night keep your water bottles in your sleeping bag to prevent them from freezing.
7) Getting Water - sometimes filling pots and water bottles from a stream or lake is a major expedition in itself. Make sure that the area you plan to get water from is secure. Avoid steep banks that might lead to a plunge and make sure any ice is sufficiently stable to hold your weight. Also make sure you don't get your mittens soaked with icy water. A loop of string tied tightly around the water bottle neck will allow you to lower a bottle in by hand or with a ski pole or ice axe. Don't trust pot grips on a large pot; with mittens you can lose your grip and your pot. Fill up the pot part way and then use a water bottle to top it off. Mark the area so you can find it next time.
8) Water purification - keep in mind that snow or water from streams in the wintertime may have bacteriological or other contaminants. You should check with local rangers about any water problems before going in. If the water does need to be purified, the best methods during the winter are either:
   a) **Boiling** - for at least 3-5 minutes (add one minute for every 1,000 feet above sea level so that at 10,000 feet you are boiling for 15 minutes). **This is the best method in winter situations.**

   Less Effective Methods:
   b) **Filtration** - using a filtration pump system such as PUR™, First Need™, or Katadyn™ is not recommended in sub-freezing temperatures. Keep in mind that the water in filters can freeze, preventing them from working. Also, as the water freezes, it expands and may crack the filter, rendering it inoperable or even worse - transmitting harmful microorganisms into your system. For these reasons, filters should be used with great caution in the winter. Be careful of inferior filters which do not strain out many organisms.
   c) **Chemical treatments** (iodination or chlorination) are **not recommended** because they become ineffective at low temperatures. Only use these methods if the water has been preheated to about 16 degrees Celsius.

The right healthy, energy-packed foods and a ready supply of fresh, clean water will provide the backbone of your exciting, outdoor winter adventure.

– Rick Curtis is Director of the Outdoor Action Program at Princeton University, author of The Backpacker's Field Manual *and founder of* Outdoor Ed.com. The Leader *thanks Rick for an informative and fascinating series.*

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