

# Winter Camping

## - The Complete Experience



Photo: Len Godwin

## Part Two: Shelter - Essential for Survival

by Rick Curtis

**W**elcome to Part Two of our Winter Camping special feature by Rick Curtis, Director of the Outdoor Action Program at Princeton University. Here, Rick describes in detail some fascinating facts about one of the essential elements of winter camping: shelters.

### Tents

In many cases you will be traveling to areas without shelters, so you need to bring your own. There is a range of tents available. The key factors are:

- Strength - to withstand both wind and snow. In general it is recommended that you use a tent specifically rated to be a four-season tent. Four season tents typically have stronger poles (to hold snow loads).
- Ability to shed snow - the tent must have a roofline that allows snow to fall off. Otherwise the tent will load up and the weight will cause it to collapse. (Four season tents are designed this way).
- Room - you need *lots* of internal space on a winter trip for all the bulky gear you are carrying. Also you may get snowed in and need to stay in the tent for an extended period of time. Being snowbound in a cramped tent with several other people can be unpleasant.
- Rainfly - the tent must have a rainfly. Having a breathable inner tent wall with a waterproof fly outside helps reduce condensation in the tent. It also helps provide better insulation by increasing (relatively) unmoving air space layers. Typically a tent will be at least 10 degrees warmer than the outside air (once your body is inside heating it up).
- Free-standing tents (dome type) are recommended because they shed snow fairly well and they provide efficient interior space. *Make sure* that the manufacturer recommends the tent for winter use. Many dome tents are designed for three season use only and the stitching and poles are not designed to take the weight of snow.
- Other shelter options include the Black Diamond Megamid™: This a single, center pole, pyramid tent with no floor. It requires some staking but is quite roomy. By adding a space blanket as a floor, and covering the edges with snow, you can seal off the tent quite well.
- Another issue with tents is condensation. During the night your

breathing pumps a great deal of humid air into the tent. This air rises and hits the inner tent wall where the moisture condenses into ice; these fine particles can get all over you and your gear. It is best to brush the ice particles off the tent in the morning and sweep them outside. A frost liner, hung inside the tent, allows moisture to pass through and provides a layer between you and the ice.

### Tips for Tents

- Make sure you bring extra poles with you and pole splints in case a pole breaks.
- A ground sheet (like a space blanket or tarp) can help protect your tent floor (the ground underneath usually turns to ice from your weight and body heat (sharp ice can tear the floor)).
- Always stake your tent down if you are going to be in windy areas or leaving your tents during day excursions. Bring stakes or know how to stake using “dead men” (see illustration).
- A whisk broom is an important addition to *every* tent. You should brush all the snow off your clothes and boots before getting into the tent at night. This helps reduce condensation and water buildup in the tent, keeping you and your belongings drier. Also when snow gets into the tent at night it often melts from your body temperature, then freezes during the day when you are not in the tent.
- Cooking - *Do not* cook in a tent. It is possible to asphyxiate yourself from accumulated carbon monoxide, and the water vapor leads to extensive condensation.

### Winter Campsites

Keep the following factors in mind when choosing a winter camp.

- Camping regulations
- Other campers
- Wind - avoid ridge tops and open areas where wind can blow down tents or create drifts.
- Be aware of “widow makers” - dead branches hanging in trees.
- Avoid low-lying areas where the coldest air will settle.
- Avalanche danger - select sites that do not pose any risk from avalanches.
- Exposure - south facing areas will give longer days and more direct sunlight.

- Water availability from lakes or streams will prevent you from having to melt snow for all your water.
- Level ground.

### “Dead men” Stake



### Setting up Camp

When you first get into camp, leave your snowshoes or skis on and begin to tramp down areas for tents and your kitchen. If possible, let the snow set up for 30 minutes or so; this will minimize postholing once you take snowshoes or skis off. Set up your tents with the doors at 90 degrees to the prevailing winds. Stake the tents out. On a cold night you can build snow walls on the windward side of the tent. Mound the sides of the tent with snow (have someone inside pushing out on the tent to keep it from collapsing). When the snow sets up, you will have a hybrid tent-snow shelter which will have better insulation than the tent alone. Dig out a pit in front of your tent for a porch - this makes taking your boots off much easier.

Put your foam pads in the tent; unstuff your sleeping bag and place it in the tent so it can “expand” from its stuffed size. If the snow is deep, you may want to dig out a pit for your kitchen. Dig a pit at least six feet in diameter (for four to six people). You can mark out the circle using a ski or a rope. Dig down about two to three feet and pile the excavated snow around the perimeter. Pack the snow at the perimeter of the hole with your shovel. This will give you a four to five-foot-deep area, protected from the wind. You can carve out seats and benches, put your skis or snow shoes behind the pile as backrests, carve places for stoves, etc.

### General night sequence

After dinner, getting warm water for water bottles, and putting gear away, it's time for bed. This is a general sequence:

1. Get warm before you get into your bag. Do some jumping jacks, etc. so your heat is built up for when you get in your bag.
2. Get any clothing/gear you will need out of your pack as well as full water bottles and tomorrow's lunch.
3. At the tent door, brush off any snow with the whisk broom. Sit down inside the tent entrance

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and, keeping your boots outside, either have a friend brush them off, or remove them and brush them yourself.

4. Climb into the tent and close the door.
5. Strip off your layers of clothing to what will be appropriate in your sleeping bag. The more layers you wear the better insulated and the warmer you will be (contrary to the myth that says sleep in your underwear). However, too much clothing can compress dead air space in the bag and reduce its effectiveness.
6. Remove any wet/damp layers and replace them with dry ones, particularly socks.
7. Pre-warm your bag with your body (get it nice and toasty).
8. Place damp items in the sleeping bag with you near your trunk. This will help dry them overnight.
9. Place your boots in your sleeping bag stuff sack (turned inside out) and place the stuff sack between your legs. This will keep them from freezing during the night and the stuff sack keeps your legs from getting wet.
10. Put water bottles and food with you in the bag.
11. A hat and polarguard booties are recommended to help keep you warm.
12. Try to sleep with your face out of the bag. This reduces moisture build-up inside the bag (which could be catastrophic for a down bag). A scarf on your neck may be better than using the sleeping bag

neck drawcord (which makes some people feel a little claustrophobic and creates a difficult night's sleep).

13. You will probably wake up a number of times during the night. This is normal in cold weather. Your body needs to change position to allow for circulation to compressed tissues and to move around a bit so that muscle movement generates more heat. If you are still cold, eat some protein to "stoke up your furnace". If that doesn't work, wake a tent-mate for some extra warmth.
14. With 10 or more hours in the tent, you are likely to need to urinate in the middle of the night. Go for it! Otherwise you won't get back to sleep, and your body is wasting energy keeping all that extra fluid warm. You will be surprised how quickly you can get out and back in and your body really won't chill that much.
15. It is useful to have a thermos of hot drink in each tent.

### Snow Shelters

The following snow shelters are useful in winter. Keep in mind that there is great potential for getting your clothing wet while constructing these shelters; dress accordingly.

*Snow Mound Shelter (Quinzhee)* - If the party does not have the experience or the snow conditions aren't good for an igloo, a snow mound shelter can be made. Once you have selected a spot, place an upright

marker (ski pole, ice axe, etc.) to mark the center. Tie a cord to the marker and scribe a circle in the snow to indicate the pile size.

The rule of thumb for size: if the snow in place is not to be dug out, the radius should be the interior size plus about two feet; if the snow in place is to be dug out, about one foot can be subtracted from the radius for each foot of in-place snow. Piling the snow for a two person shelter will take two people about an hour. Pile loose snow within the marked circle with shovels, tarp etc. Don't compact the snow.

When the mound is the right size and shape, do not disturb it; allow it to compact naturally - minimum time one hour. Chances of collapse are greatly reduced if you let it settle for two hours. Thirty-five degrees is the natural angle at which loose snow rests - be sure to allow the snow to settle at this angle (otherwise you will have thin spots or a buckling roof when you excavate the interior). After compaction you are ready for digging; the entrance direction should be away from the prevailing incoming weather. From the entrance point start digging toward the marker, and pass the snow out to helpers. After you reach the marker, do not disturb it. This is your guide for excavating the interior.

Clear out the inside to the intended radius. To check on wall and roof thickness, measure with a stick poked through. When the dimensions check, remove the marker and trim the interior; then install a vent in the roof. Get rid of waste snow



### Happiness is a warm Quinzhee...here's how.

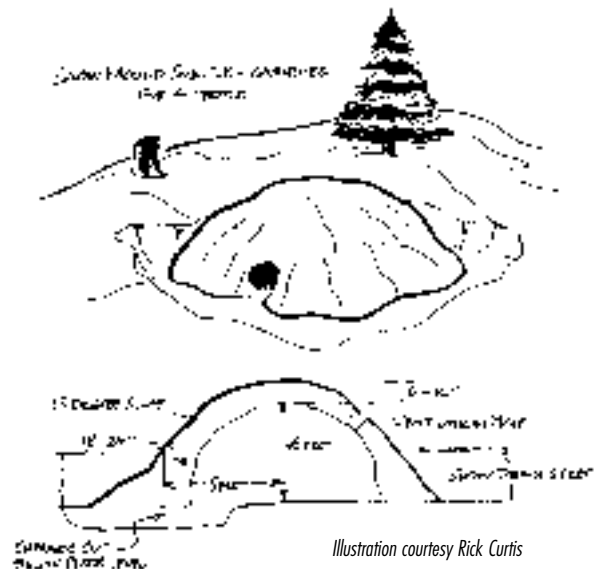


Illustration courtesy Rick Curtis

**Warm as toast and ready for a winter camping experience.**

**Close the door – it's cold in here!**

promptly before it hardens. The process is a wet one so make sure you have waterproof gear on and good shovels for making the mound and digging out.

**Snow Cave** - A snow cave can be dug into a hillside. Dig the entrance up so that the door is below the sitting level. Also there are natural snow caves formed by the overhanging branches of trees covered with snow - by digging down you can get into the cave beneath the branches. In both cases you should poke a ventilation hole and keep it clear.

**Igloo** - This can be constructed if there is snow of the proper consistency to pack into hard blocks. Keep in mind that building such a shelter takes a great deal of energy and time. Two skilled persons can build a two-person igloo in two to three hours with proper equipment and good snow. Obviously several such structures would need to be built to hold a larger group. Building an igloo is a process that requires a certain amount of artistry, but is less of an energy expenditure than a snow mound shelter. In general, rectangular blocks roughly 24" by 18" by 6" are cut and stacked in an ascending spiral. The rectangular blocks are placed vertically and the bottom shaped so that only the two bottom corners are supporting the block. Then the block is tilted inward, and the vertical edge contacting the adjacent block is cut away until the weight of the block rests only on the upper corner. The weight of the block is supported by the diagonally opposite corners, while the third corner prevents rotation.

Once the first row is laid you shave off the tops of several blocks (1/4 - 1/3 of the circumference) to create a ramp and build upward in a spiral. Once the structure is complete, snow is packed into all the open joints.

**Snow Pit** - This structure can be created by digging a trench in the snow down to ground level (if possible). The structure should be a little longer than your body and three to four feet wide. Line the bottom with insulative material to protect you from the cold ground (in an emergency you can use five to six inches of evergreen boughs). A roof can be made of skis and poles or overlapping boughs and sticks; then covered

with a tarp and loose snow or blocks of hard packed snow. The doorway will be a tunnel in from the side - it can be plugged with a door of hard packed snow. **A ventilation hole must be poked into the roof for airflow.** Keeping a stick in this hole and shaking it every so often will keep the hole open. If possible, the entrance should be lower than the level of the trench: this keeps the coldest air in the entrance rather than in the trench.

**Foam Pads**

You also need to insulate yourself from the underlying snow. Foam pads (Ensolite™) or inflatables (Thermarest™) work well. Your insulation should be a least 1/2" thick (two 3/8" summer pads work well, or use a Thermarest™ on top of a 3/8" foam pad). It's best to use full length pads so that all of your body is insulated.

**Minimal Impact Camping In Winter**

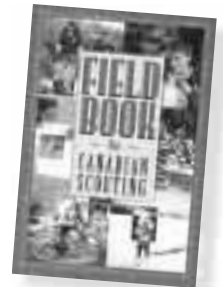
Winter generally provides a blanket of snow which protects underlying soil and vegetation, the major concerns for minimizing impact. However, when a thin snow cover is compressed and compacted in early or late season, snowmelt can be delayed, shortening the growing season. Also, early and late winter trips

can run into melting conditions, where top layers of soil melted by the sun lie ovetop frozen ground. Erosion, and destruction of plant life is extremely likely at these times, and winter travel is best avoided. Otherwise travel in small groups and visit either remote places where your disturbances won't be compounded by others following you (allowing for recovery) or high impact areas that have already been disturbed. Special considerations exist for high altitude and glacier conditions.

We've covered Keeping Warm (Part One), Shelter (Part Two); stay tuned for the final instalment - Food and Water: The Essential Survival Fuel (Part Three) in the March issue!

- 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.

*For great tips on shelters and more, read The Fieldbook for Canadian Scouting available at your local Scout Shop.*



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