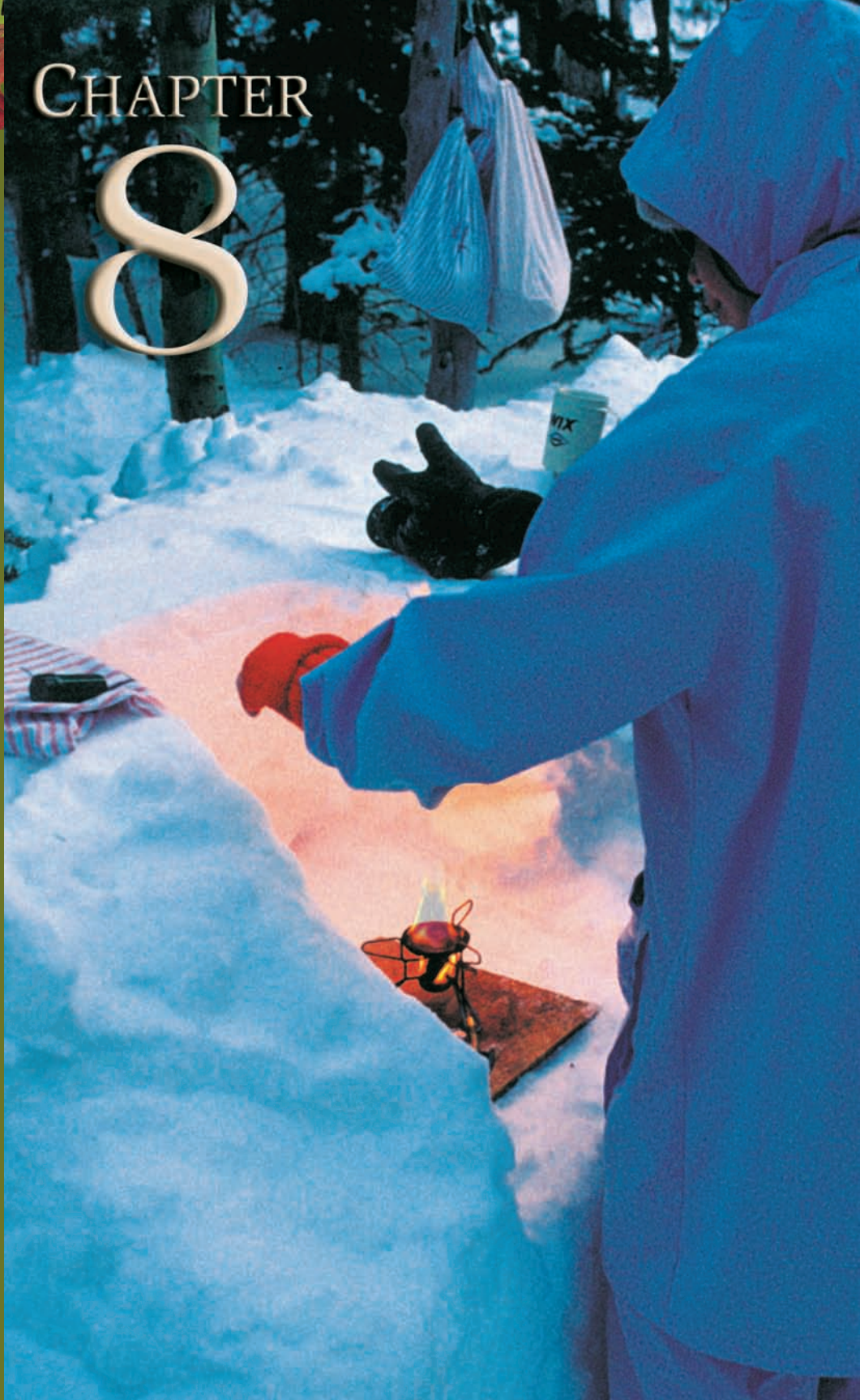
Chapter 8



Using Stoves and Campfires

"Our mountaineering equipment was very simple and extremely light. . . . For fuel we had wood alcohol to be burned in aluminum stoves and also petroleum to be burned in a Primus stove. The latter proved by far the more successful."

—Frederick A. Cook, *To the Top of the Continent,* 1908 (Among the first to attempt a climb of Mount McKinley, he reminds us that decisions concerning stoves and fires have confronted campers for a very long time.)

There was a time when campers could build fires wherever they wished. The skill with which they could kindle a blaze was a mark of their woodland expertise, and the fires they created became the centers of their camp activities. They cooked over them, dried wet clothing next to them, warmed themselves by them, and gazed into the embers. Few could imagine an evening without a fire, and even so thoughtful a wilderness advocate as Henry David Thoreau saw nothing wrong with building a bonfire in the Maine woods and leaving the glowing coals behind as he moved on.

We live in a much different age from that of Thoreau. There are still times when a campfire is appropriate and even desirable. If it is built in the wrong place or in the wrong manner, however, a campfire can leave scars on the ground that will take a very long time to heal. The mark of experienced campers has become not just the ability to build a fire, but also the wisdom to know when not to light one.

Reliable, lightweight stoves offer today's campers a reasonable alternative to open fires. By considering the advantages and disadvantages of campfires and stoves and then using the heat source that's right for a given situation, you will find that your own outings will be enhanced and that you will have one more means available in your quest to travel the outdoors without leaving a trace.

Minimizing Campfire Impacts by Using Camp Stoves

The most effective way to minimize campfire impact is to not build a fire at all. Camp stoves make that possible. They also extend the range of outdoor travelers by giving them a reliable means of generating heat anywhere, anytime, and in any weather.

Reliabilty, ease of use, and minimum impact make stoves a good choice for most backcountry journeys.

Advantages of Camp Stoves	*Disadvantages of Camp Stoves*
• They will not scar the ground or damage trees. • They burn nothing native to the backcountry. • They operate reliably under adverse conditions. • They create steady heat that won't blacken rocks or cooking gear. • They are quick and convenient. • They make travelers more self-sufficient and able to camp high on a rocky mountain, deep in a treeless desert, and in the drifts of a snowy forest.	• They have to be carried. • They require the handling of flammable liquid or gaseous fuels. • Empty fuel canisters must be packed out for disposal or recycling.

Choosing a Stove

Of the many stoves on the market, those burning the following fuels are most useful. Always read and follow the manufacturer's instructions for carrying, fueling, using, and storing camp stoves.

White-Gas Stove

White gas, a refined naphtha petroleum product commonly used in lightweight stoves in North America, is available at most camping stores. Choose only white gas specifically approved by stove manufacturers. White gas is very volatile and must be carried, stored, and used with the utmost caution. Legal restrictions often prohibit transporting white gas on aircraft, ferries, and other means of public transport. Scouts planning adventures that will involve travel on boats or airplanes should research their options well in advance to determine how best to get their stove fuel to the trailhead.

Carefully follow stove manufacturers' instructions when selecting fuel. Some stoves operate only with white gas, while others also burn unleaded gasoline, kerosene, or even jet fuel.

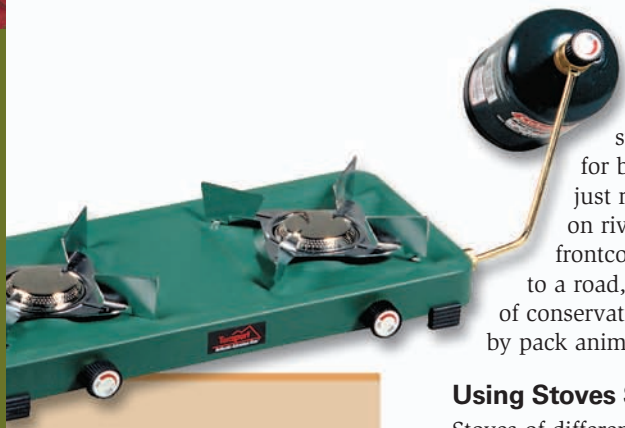
More advanced white-gas stoves are equipped with pumps to pressurize their fuel tanks, which can be a real advantage in cold weather.

Kerosene Stove

Kerosene is a hot-burning, nonexplosive fuel available almost anywhere in the world. While kerosene camp stoves are unusual in North America, they are a familiar sight on international expeditions. A kerosene stove must be preheated before it can be lit.

Cartridge Stove

Simplicity, safety, and convenience are features of butane and propane cartridge stoves. Cartridge stoves need no pumping or preheating; simply attach a fuel canister, turn the control knob, and light the burner. Cartridge stoves work well in warm weather and at high altitudes, but they lose efficiency as the temperature drops.



Propane Tank Stove

Two-burner propane stoves are too heavy for backpacking but can be just right for larger groups on river rafting expeditions, frontcountry camping close to a road, or remote base camps of conservation work crews supplied by pack animals.

KNOW AND FOLLOW CAMPFIRE RESTRICTIONS AND ALWAYS CARRY A STOVE

Before setting out on an adventure, check with the land managers of the area you intend to visit for current campfire regulations. Fires may be banned in sensitive environments where high use has caused excessive impact, and during dry or windy periods when there is an increased danger of wildfires. Carrying a stove allows you to cook meals even if you discover at the last minute that you can't kindle a campfire.

Using Stoves Safely

Stoves of different designs operate in different ways. Read and understand the manufacturer's instructions before lighting any stove, and then follow them exactly. In addition, *always* heed these stove safety rules:

- Position the stove in a stable location.
- Use pots appropriate in size for your stove.
- Always attend a lighted stove.
- Let a stove cool completely before you put it away. (If storing for a month or more, empty the fuel tank.)
- Never attempt to open or refuel a hot stove.
- Store liquid fuel in well-marked bottles designed for that use.
- Even if they are empty, keep fuel bottles and canisters away from sources of heat.
- Reduce fire danger at home by storing all fuel containers in a shed, detached garage, or other uninhabited structure.
- Never use a stove inside or near a tent.

Minimizing Campfire Impacts

An open fire creates heat, and that can be good. You can use a campfire for warmth, for cooking meals, and for the sheer joy of a fire in camp. Unfortunately for the environment, the heat of a campfire radiates not only upward, but also down into the soil where it can kill organisms that enrich the soil. Without a long period of recovery, that soil will not be able to support plant life, and the scar on the land caused by a fire might be visible for many years to come.

Advantages of Campfires	*Disadvantages of Campfires*
• They create heat suitable for cooking food, drying gear, and warming chilly campers. • They require no special equipment. • They provide a psychological lift on cold, stormy days and can be the focus of fellowship and contemplation.	• Fires can char the ground, blacken rocks, and sterilize the soil. Vegetation can have a hard time growing again where a fire has burned. • Fires consume dead branches, bark, and other organic material that could have provided shelter and nutrition for animals and plants. • Firewood collection can create new trails and damage trees. • Campfires must be closely watched to prevent them from spreading into surrounding vegetation. • Fire sites mar the natural appearance of an area.

Appropriate Fires

A good way to think about a campfire is to consider it a tool to be used for specific and important uses. If you are prepared to use a stove, too, or to go without an open flame at all, you can make appropriate choices about when and how to kindle a campfire.

Selecting and Preparing a Leave No Trace Campfire Site

A Leave No Trace campfire site has the following advantages:

- Fire will cause no further negative impact on the land.
- Fire cannot spread from it, and the area surrounding the site will not be further degraded by the concentrated trampling of people cooking and socializing.

The best places for your campfires are sites designated by the land managers. Many of these sites have metal rings, grills, or stone fireplaces that should be used where you find them. Otherwise, shield durable surfaces (exposed rock, for example) and more fragile earth (the forest floor or a meadow) from heat damage by using a *mound fire* or a *fire pan.*

Leave No Trace Campfire Checklist

Ask yourself the following questions before building a campfire. A *yes* answer to every question indicates a fire might be appropriate. If any of your answers is *no,* don't build a fire.

✓	YES	NO	
			Do current land management regulations permit open fires?
			Will the fire be safe?
			Will having a fire cause little or no damage to the environment?
			Is firewood plentiful?
			Can signs of the fire be erased?

Mound Fire

To make a *mound fire,* collect a good supply of *mineral soil*—silt, clay, or sand that does not contain organic matter that could be harmed by heat. Among the places you can find mineral soil are streambeds, gullies, beaches, and within and beneath the roots of toppled trees. Use a pot or stuff sack to carry the mineral soil to the fire site. Pour the soil onto a tarp, ground cloth, or trash bag, then form the soil into a mound 4 to 5 inches thick and 18 to 24 inches in diameter. Build your fire on top of the mound. After burning the wood to ash, extinguish any remaining coals. Crush the ashes and spread them over a wide area, then return the mineral soil to the site from which you borrowed it.

Fire Pan

A *fire pan* is a metal tray with sides high enough (more than 3 inches) to contain burning wood and ashes. Backyard barbecue grills and clean oil-drain pans can be used as fire pans on river trips, horse-packing journeys, frontcountry camp-outs, and other trips when the weight and bulk of gear are not great concerns. For backpacking, a lightweight aluminum pan designed for roasting turkeys can be folded to fit under the top flap of your pack. Protect the ground from heat by elevating fire pans on rocks or by lining them with several inches of mineral soil.

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NO PIT FIRES

Removing sod and digging a hole to contain a blaze is no longer considered an acceptable method for reducing campfire impact. Even if the pit is carefully refilled, the replaced sod often dies and the soil beneath it settles, leaving a noticeable scar on the land. Rely instead on a fire pan or mound for open fires, or use a lightweight camp stove.

Gathering Firewood

Fire building requires three types of flammable material—*tinder, kindling,* and *fuelwood*.

Tinder

Tinder is fine, dry material that will burst into flame at the touch of a match. Pine needles, the inner bark of dead branches, weed fluff, dry grasses, and slivers shaved with a knife from a stick all make effective tinder. Gather a double handful.

Kindling

Kindling is material that will burn with a little encouragement. Twigs no thicker than a pencil are the easiest to find. You'll need a small armload.

Fuelwood

Fuelwood is dead and downed wood no thicker than your wrist that you'll use to keep your blaze burning. Since you want to keep the fire small, you almost always can gather what you need without using an ax or saw. Place fuelwood near the fire lay and, if bad weather threatens, protect it with a ground cloth or dining fly.

Limiting the Impact of Gathering Firewood

Gathering tinder, kindling, and fuelwood for a fire is not as simple as picking up the first sticks you find. Standing and downed timber can serve many purposes in an ecosystem, some of them critical to wildlife. The visual impact caused by removing wood also can be a factor in where and how you collect fuel for your fire.

Build campfires only where you can find plenty of dead wood. Avoid scouring every last stick from a campsite by walking a few minutes to areas where wood is more abundant. Use only sticks from the ground of a size that can be broken by hand—don't snap branches off of living or dead trees or strip the bark. On backcountry treks, plan to leave axes, hatchets, and saws at home. For camporees and other frontcountry campouts, consider bringing bundled firewood or bags of charcoal from home. Always be prepared to use a stove instead of a fire.

Laying and Lighting a Fire

Heat rises. That's the secret to successfully building a fire. Take advantage of that fact by placing a handful of tinder on your fire site, then arranging kindling above that and the fuelwood over that. Light the base of the tinder and make sure that your fire gets plenty of air. Flames forming in the tinder

will make their way up into the kindling. As they gain strength, they will ignite the fuelwood, too. That's really all there is to starting a fire, though there are dozens of ways to organize tinder, kindling, and fuelwood into a fire lay. Here are two:

Tepee fire lay

Tepee Fire Lay

Mound plenty of small kindling over a big, loose handful of tinder in the center of your fire site. Arrange several pieces of fuelwood above the kindling to form the shape of a tepee. Leave an opening in the "tepee" to allow air in to the fire. Light the tinder, and the flame should rise through the tinder and crackle up into the kindling and fuelwood above.

Add larger pieces of fuelwood as the flames grow stronger. When the fire is strong enough for the tepee to collapse, use a stick to push the embers into a compact bed.

Lean-to Fire Lay

Push a stick at a 45-degree angle into the fire site, the upper end of the stick pointing into the wind. Place tinder beneath the stick and lean kindling against both sides of the stick. When the kindling is burning well, add fuelwood. Air drawn into the lean-to will help keep the flames going.

Extinguishing a Fire

One of the most important moments in tending a campfire occurs when you are finished using it.

Allow a fire to burn down to ash or very small coals by tossing all partially burned sticks into the fire and letting them burn to ash. Extinguish the fire by dousing the embers with plenty of water. Stir the ashes to moisten them thoroughly. Don't stop until you can *safely* place your hand on the extinguished coals. Remove any litter and scatter unused firewood where you found it.

When a fire ring or other designated fire site is full, or if you have used a fire pan or mound, broadcast cold ashes over a wide area of vegetated ground well away from camp. Return mineral soil to the location from which it was borrowed. Finally, replace any ground cover you disturbed, and do whatever else you can to restore the fire site to the condition in which you found it.

A Final Word

The ability to generate heat can enrich your outings, but with fire comes the responsibility to use it wisely. Do your part by carrying a lightweight stove on all your camping trips and using it whenever an open fire might harm the environment. You will have the convenience of a stove when you need it, the pleasure of an open fire when you want it, and the satisfaction of traveling the backcountry cleanly, responsibly, and well.