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Protecting Your Camp from Bears: Electric Fencing

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Alaska - The Last Frontier - is one of the most incredibly beautiful places on earth. Each year, many people work and recreate in its vast waters and wilderness. I've yet to meet a person, however, that didn't worry, or at least harbor some concerns, regarding bears and bear encounters. Bears exist in nearly every corner of the state and the extremely rare - yet highly publicized - bear maulings remind us just how wild Alaska can be. But bears should prevent no one from being out in the wilderness. What concerns some most, however, is camping. No one wants to be sound asleep in a tent when a curious bear pokes around camp. Nor is there any reason for bears to be able to approach your camp at night. Electric fencing, now lighter and more economical than ever, can dissuade curious bears from approaching your camp, thus allowing you to sleep safely... and soundly.

But does everyone using the backcountry need a fence? I recommend that electric fencing be used primarily for the following situations: 1) long-term field camps (such as used by state and federal agencies to conduct management and research functions), 2) for hunting camps where game meat and trophies (e.g., hides, horns, etc.) may be stored, 3) in locations where bear numbers are known to be high (e.g., Kodiak Island, Alaska Peninsula, etc.), and 4) where problem bears have been known to frequent. One might also justify fencing if its deployment is the only way persons fearful of camping in bear country will go. The bottom line is that the use of electric fencing is up to the user but no bear experts will suggest it should be used by everyone. The vast majority of campers in Alaska have no serious bear problems nor should they have to suddenly be worrying about carrying and using a fence. I wouldn't think to use a fence in a place like Denali National Park... the bear numbers are too few and generally bear-human incidents rare. On the other hand, if I was going to camp along coastal Katmai I wouldn't be without one.

Sometimes people openly ask "are you that afraid of bears that you need a fence?" I turn the question around, however, and ask "are you willing to allow a bear to determine when your trip is over? because that is precisely what will happen if you camp in some areas where bear numbers are high." Look at it this way as well - when I deploy a field camp with upwards of 6-10 tents, a single, curious bear could destroy $4,000 to $5,000 of tents in as little as a half hour should everyone be out conducting research. Bears that destroy tents aren't being aggressive...they're just being...well, bears. They ask questions with their jaws and claws "what's this?" crunch. "what's this" smack. A little Q&A session like that can reduce my field camp to ruin in minutes, putting me out of

business. Worse, the bear may get some sort of reward by probing around like that. All around it is bad business to leave gear unattended in bear country. Yet we often have to do it to get our work done. So I use electric fencing which not only protects my gear but also teaches bears (when they put their nose to the fence) that this place is to be avoided... "Don't come near camps!" is the message powerfully conveyed when a bear gets 5 kilovolts across its nose. As bear trainer Doug Seuss once said "you don't have to teach a bear something twice." In this regard, as long as their are going to be camps in bear country, we need to take a pro-active stance in preventing camp destruction and by training bears to avoid them.

For years the term "electric fence" was synonymous with images of 40-pound chargers, snarls of steel wire, heavy poles, car batteries and heavy steel grounding rods. But recent technological advances have resulted in lightweight, economical, electric fence systems that one should seriously consider purchasing and using. Recently, I camped in an area with a lot of bears.... they were everywhere. Before turning in for the night I counted 35 brown bears in a meadow near camp. It wasn't a matter of if, but when a bear would come poking around camp. Deploying an electric fence around my tent took about 20 minutes. The weight of the entire system (poles, wire, charger, grounding rods) was less than 10 pounds. No, I didn't backpack it into the wilderness.... I'd come by floatplane. And no, the fence wasn't expensive: the entire setup cost less than $100. I didn't worry about curious bears destroying my $600 tent or other gear while I was out and about, and I enjoyed 10 uneventful nights of restful sleep. I am continually amazed at the number of cabins, camps, boat and watercraft that are needlessly destroyed by bears each year.

Nothing is 100% effective but so far in the past ten years I've camped amongst the densest grizzly populations in the world, I've not had a single bear breach the fence. Not that they haven't tried. A couple years ago 5 bears - and one wolf - were deterred by the camp's electric fence during a single 2-week outing. I also used a perimeter alarm system in conjunction with the fence (the alarm is a separate system and I won't discuss it here), so when the alarm went off I knew that a bear had been trying to push through the fence. In a word: electric fences work.

There are many ways to set up electric fences, but for most short-term field camp operations an easily deployed, lightweight fence will be adequate. Let's explore a few basic principles about electric fences.

How do electric fences work?

Electric fences are comprised of three basic components:

- Wires suspended on poles carry an electric charge. This is the "hot," aboveground part of the system.
- An energizer (also known as a charger) pushes power through the fence wire. For safety, most systems deliver power in a series of pulses, usually about one per second. The downtime between pulses allows animals to break free of the fence (a continuous current can cause an animal to "lock on" to the fence due to sustained, involuntary muscular contractions).
- A grounding system, usually a metal rod sunk into the earth and connected to the energizer via a wire. The ground system attracts the charge through the animal and returns the current to the energizer through the ground wire.

Since electricity will only travel through a closed circuit, the fence wire, energizer and ground rod are three parts of a circuit waiting to be closed; when a bear touches the wire, it closes the circuit, and electrical current flows through the bear. Consequently, the bear will feel a shock, really rather a sharp jolt of electricity, which strongly discourages him from touching the fence again. Most bears I've witnessed getting shocked cannot put enough distance between themselves and the fence fast enough. The strength of the shock depends on the energizer's voltage and amperage:

- Voltage, measured in volts (V) or kilovolts (kV), is the force or pressure with which a current flows through the circuit. The higher the voltage, the farther the current can travel through the wire before resistance slows it down; higher voltage also causes a stronger "zap" from the shock.
- Amperage (amps) measures the magnitude, or strength, of the current flowing through the wire. The higher the amperage, the greater the sensation the current will cause when it enters a body.

Consequently, fence chargers are high voltage and extremely low amperage. Although bears are the intended targets of electric fences, anything else that comes in contact with both fence and ground will also complete the circuit. Blades of grass and tree branches will allow a small amount of power to travel from the fence to the ground rod and you should make an effort to keep the fence clear of these power-sappers. A bear may still get a jolt from a fence with some grass leaning up against it but too many grasses can literally short the fence out, rendering it useless. When I set up a camp with boat or plane access I toss a pair of grass clippers in just for the purpose of clearing the fence line.

Do electric fences pose a threat to bears or people?

The current (amperage) flowing through a fence is miniscule and will not injure you or bears. The voltage, however, is high (5-7 kV) and can knock you down due to the involuntary contraction of your muscles from the jolt of electricity. For safety considerations, chargers (or energizers as they are also called) send the charge in pulses, usually one per second. This allows the bear to break free

of the fence. The sting a bear, or person, feels when they touch an electric fence isn't particularly painful but it is unpleasant to the point that it deters future investigation.

How effective are electric fences for deterring curious bears?

Remember, most bears that approach your camp or gear are curious, but alert, as they approach. Once the bear gets jolted it will usually huff, bawl and run quickly away. Over the past decade I have tested many fences in many settings - all of them thick with bears - and have never had an electric fence fail to keep bears out.

How sturdy does the fence have to be?

My experience has shown that you don't need to build a concentration camp-style enclosure. Whether you have 10 wires supported by wooden posts or 2 wires on thin fiberglass wands, the shock is the same strength and it is the shock that deters the bear, not the fence's appearance. I believe that misunderstandings regarding the need for elaborate and stoutly constructed fences have arisen from the fact that there is a big difference between trying to keep livestock in an enclosure and in keeping a bear out. To the best of my knowledge bears cannot jump like a quarter horse (or at least they don't, thank heavens) and so the fence need not be very high. Also, once a bear gets zapped they don't loiter around. The key, then, is to present a charged wire in such a way that a curious bear will nudge it with his nose. The resultant "zap!" on his nose will convince him that there are many other things he'd rather be doing ... elsewhere... right now. Therefore, 2 wires have worked well for me. When using 2 wires I string one about a foot high and the other 3 feet high. I flag the top wire with a small piece of fluorescent flagging midway between poles to encourage the curious bear to nose it, perhaps even bite it, and that takes care of his curiosity. Flagging also keeps bears from walking into an otherwise invisible wire which the bear can easily break.

What are the basic components I'll need for a lightweight, portable fence?

I've put together a table of components that will allow you to build a functional, yet lightweight, fence (see below). You can modify this a number of ways, depending on your ingenuity. For instance, on a recent outing I carried only a palm-sized charger that was powered by 2 D cell batteries (it supposedly will run 2 months on 2 batteries!), a roll of flexible fence wire (plastic polywire that shocks because it has 9 strands of stainless steel wire winding through it), a handful of the plastic zip strips in place of fiberglass poles, some connecting wire to run from the charger to fence and charger to ground, and 2 aluminum tent pegs as ground rods. This set up was very light and worked well. I carried a fence charge tester and it showed that I was getting a solid 4 kV to 5 kV of charge in the wire. I used existing alder bushes for my poles and kept the polywire from grounding out on them by using zip strips. The zip strip went around a sturdy branch through which the taut polywire was strung. The tension of the polywire kept it away from the branch and the non-conducting zip strip held it in place. The system worked well and I'd dumped the weight of the poles. The only downside was that zip strips cannot be reused - you have to cut them off. If you are very patient and good with a knife you can back a zip strip open but it is not time effective. Also, I did not carry the typical steel grounding rod. I've found that as small as tent camp enclosures are, a couple of aluminum

stakes driven into the soil to which the charger is grounded works well. Remember that you're only trying to energize a couple hundred feet of wire - not miles - and hence don't need a heavy grounding rod. You can always test this out for yourself by putting a voltmeter (made especially for fences - a typical voltage 'multimeter' will get fried by this voltage) to test how small of a ground rod you can get by with. The connecting wires I use are automobile sparkplug wires with alligator clips on the ends. Hence, there is no need for to ground the charger to the heavy grounding rods, such as ranchers do.

Fence Components

ITEM	QUANTITY	APPROXIMATE COST
Energizer-charger unit**	1	$40-$120
Connection wires (brown with alligator clips)	2	$6
electric fence wire	1 roll (500 feet)	$5
Electric fence tester	1	$15
Aluminum stakes (for corner anchors)	8	$10
Fiberglas fence posts	20	$15
2 piece galvanized ground rod OR aluminum stakes	1	$6

Also include some fluorescent survey flagging, pieces of nylon cordage for corner post anchors, and a roll of duct tape for securing the posts and ground rod after you complete your use.

**A solar-powered charger will run $120; the battery-powered Pel ® micro charger (about $80) or the Fi-Shock battery-powered unit (model SS-2D) costs $39.00. Both of these latter units are labeled as use "for pets" but you need to remember that curious bears are easily repelled by an electric shock...that's my experience thus far so the heavier "livestock grade" units have been unnecessary.

How much fence wire will I need?

How much wire you will need is entirely dependent upon how large of an enclosure you wish to set up and how many strands of wire go around it. You may recall that the circumference of a circle is equal to the diameter times 3.14. Let's say that you have a single tent and don't want bears to get any closer than 30 feet. If the tent were in the center of a circular fence that is 60 feet across, you would need:

diameter X PI X number of strands of wire

or in this example:

(60 feet)x(3.14)x(2) = 377 feet of wire

That is not a lot of wire, especially if you use the stranded polywire. I should mention why I prefer polywire over steel, or aluminum, wire. Stranded polywire has little or no "memory" and is lightweight. By memory, I mean that it doesn't act like a stretched out Slinky when strung between posts. It acts more like kite string, simply hanging there.

What about insulators for the posts?

I don't use them. We used to haul little screw-on insulators everywhere but found that they really didn't do much. You can sidestep them entirely by putting a couple tight wraps of the fence wire around the post. If that isn't secure enough use a small piece of duct tape to hold the wire in place. Even better - a few companies sell notched posts that hold the wire in place. Inventive persons could notch their own posts by simply grinding 2 small grooves into the fiberglass pole...

I generally anchor the corner posts (assuming you've set up a rectangular enclosure) by either tying off on shrubs or by setting 2 stakes at right angles and anchoring to them. This puts some tension into the fence and keeps it from sagging.

What about getting in and out of the fence enclosure?

You can fool around with gate systems but for short-term deployments it isn't worth the weight and hassle. You can solve the in/out dilemma a number of ways:

1) set one of the top wires just low enough that will a bit of effort you can tip toe over it

2) place the fence such that a natural object (rock or rise in the earth) makes it easy to step upon to get over it

3) place a rock or piece of wood such that you can use it as a stepping stone to get up over the top strand

4) place the charger close enough so that you can reach through the fence (from outside), switch it off, then simply step over by depressing the taunt top wire.

Any other advice regarding fences?

- I would check the fence at least once daily to make sure it is working. I carry a voltage tester made for fences. The cheapest I've found is a very lightweight $3 unit that simply says that the fence is 'hot'. The more expensive models (~$30) actually read off the kilovolt measurement. Those too are fairly lightweight.
- Place the charger inside the enclosure. Bears notice novel objects and if it is outside of the fence it may get munched.
- Use common sense in bear country. Don't camp along high use areas - even if you have a fence. Give bears a chance.

Do not do what some have suggested in the past: bait the fence by hanging sardines or some other attractant. Why would anyone ever want to draw a bear to their camp? Many bears I've watched walk right past our camp seemingly paid no attention to it at all. However, had I had some attractant (other than the small piece of flagging) they may have come up an gotten shocked. Why do that? It puzzles me.

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