

# Electric Fencing for Bears

## A highly effective deterrent



A properly installed electric fence will prevent bears from accessing areas of your property and can be an effective long term solution to preventing bear problems. Electric fencing can be used in many situations to effectively deter bears and other wildlife from various attractants. Effective applications include: landfills and trash cans, apiaries (beehives), gardens, fruit orchards, camps, livestock enclosures, and food storage sheds.

Design, quality of construction, and proper maintenance determine the effectiveness of an electric fence. Electric fences are easily adapted to most applications and can be installed temporarily or permanently. Fences are relatively easy to maintain and economical to build. However, they require routine inspection and maintenance to ensure proper operation and protection capability.

### How does an electric fence work?

Electric fencing provides an electrical shock when an animal comes into contact with the electrically charged wires of the fence. People unfamiliar with electric fencing often are afraid that it will injure, permanently damage, or kill an individual or pet that contacts the fence. **This is not true!** A properly constructed electric fence is safe to people, pets, and bears. For electricity to flow in a system, such as an electric fence, there must be a complete and closed circuit. The electrical current must travel from its source through the circuit and back to the source. This flow only occurs when a charged wire of the fence becomes grounded.

Under normal operating conditions, an electric fence functions as an incomplete or open circuit with repeating pulses of electricity generated by the energizer sent through the charged wires of the fence. When an animal touches a charged wire, it grounds the fence, creating a closed circuit. An electrical pulse travels through the animal and back to the energizer, delivering a shock to the animal. The electric shock is unpleasant but is not lethal. However, if an animal gets caught in a fence for an extended period, it may die of stress.

Vegetation, sticks, fallen trees and non-insulated posts in contact with charged wires can create a partial or totally closed circuit resulting in a reduced electrical charge and an inadequate shock to repel bears that contact charged wires of the fence. Fences should be checked and maintained regularly to address this potential problem.

## **Components of Electric Fencing**

An electric fence is composed of four main elements: a charger, fence posts, wire, and the ground rod.

**Fence Charger** On a small scale electric fence (like that typically needed for bear exclusion), the largest cost is normally the fence charger. A fence charger's job is to send an electrical pulse into the wire of the fence. Chargers with a high-voltage, short duration burst capacity are the best because they are harder to ground out by tall grass and weeds. Additionally, current research recommends approximately 5,000-6,000 volts needed to effectively shock a black bear. Two basic energy sources for chargers are batteries (12-volt automotive type), and household current (110 volt); however solar panels can be added to battery chargers. The advantage of a battery powered or solar charger is that it can be used in a remote location where 110-volt current is not available.

**Fence Posts** When planning an electric fence, it is a good idea to utilize existing fencing in order to save money. If no existing fence is available, posts will need to be placed around the area needing protection. Posts may be wood, metal, plastic, or fiberglass. Wood and metal posts will need to have plastic insulators attached to them which prevent the electric wire from touching the post causing it to ground out. Plastic and fiberglass posts do not need insulators; the wire may be affixed directly to these posts.

**Wire** 12 to 16 gauge wire gauge wire is the most common size range used in electric fencing. Heavier wire (a lower gauge number) is more expensive but carries current with less resistance and is more durable. Barbed wire is good for getting through thick layers of fur. Aluminum wire conducts electricity four times better than steel, and it weighs one-third less than steel wire.

**The Ground Rod** Without grounding, your fence will fail! The ground is an often overlooked, but critical part of an electric fence. Without a good ground, electricity will not flow through the wire. When an animal touches a charged wire, the body of the animal completes the electrical circuit and the animal feels the "shock". The current must travel from the charger through the wire to the animal and then back through the ground to the charger if the animal is to feel the shock. The soil acts as the return "wire" (ground) in the circuit. The ground may be a commercial ground rod or a metal tube or pipe driven six to ten feet in moist soil. Very dry soil can affect the ability to create a good ground and has sometimes been a problem during drought conditions. Pipe may be a good option during drought conditions, because water may be poured down the ground pipe to improve the ground. The area around the fence can be wet down as well to help this effect. Rock salt can be used to surround the ground rod to improve conductivity. Chicken wire can be placed on the ground under the fence where the animal steps to enhance the grounding potential.

## **Setting up your Fence**

Conditions at fence sites will vary and will determine the most effective fence configuration. For protecting smaller areas, a temporary or portable electric mesh fence kit is a potential alternative for storing food, garbage, and other attractants. These fences can be moved or removed easily. Instead of conventional wire you can electrify woven wire, electric netting, or sheep, cattle or hog panels.

The following recommendation will cover most situations where a permanent solution is needed to deter bears. The most effective configuration for most situations is an alternating hot and ground wire fence system.

### **Installation**

Drive corner posts into the ground. Clip, rake, and keep clear any vegetation in an 18-inch wide strip under the fence and apply herbicide. Use a five strand wire fence that is 40 inches high with wire spacing every eight inches. The wire closest to the ground level (the lowest wire) should be a charged or "hot" wire and should be 6 inches from ground level. The second wire should be grounded. The third wire should be hot. The fourth wire should be grounded and the fifth wire should be hot. If using metal or wood posts, insulators must be used to keep the hot wires from grounding out.

Attach and stretch the wire at 8-inch increments starting 6 inches from ground level. A loop of wire should be left on each wire at the first corner post. Drive in posts to the same depth at 8-foot intervals between corner posts. Secure each of the five wires to each of the posts with additional wire. Attach a 12-gauge strand of insulated wire to the positive terminal of the fence charger and attach it to the first, third, and fifth wires of the fence. Attach another 12 gauge insulated wire to the negative terminal of the charger and attach this wire to the ground pipe which has been driven into the ground 6 to 8-feet deep. Attach another 12 gauge insulated wire from the negative terminal of the charger to the second and fourth wires on the fence.

### **Tips to Improve the Effectiveness of Your Electric Fence**

- Check the battery often and make sure terminals on the charger and battery are free of corrosion.
- Make sure hot wires are not being grounded out by sticks, vegetation, broken insulators, etc.
- If fence wires have been broken and repaired, make sure wires are corrosion free where they have been spliced together. Also, tighten the fence at each corner post as wires that have been spliced and are loose make poor connections.
- Be sure to rake vegetation from under and around the outside of the fence as this may act as an insulator.
- To improve the ground around the perimeter of the fence add a piece of 24 inch chicken wire laying on the ground around the outside of the fence. This should be connected to ground.
- During periods of drought pour water down the ground pipe and around the ground pipe to improve the ground. Digging a 6 inch deep 6 inch diameter hole around the ground pipe and back filling with rock salt will also improve the ground. Additional

ground pipes may also be added to portions of the fence farthest from the charger.

- To ensure that the bear solidly contacts the charged portion of the fence, bait like bacon strips, a can of sardines or tin foil with peanut butter may be attached to one of the hot wires. Make sure these do not contact the ground, thus shorting out the fence.
- When protecting a specific structure (like a shed or chicken coop), the fence should be placed 3 to 5 feet away from the structure (rather than on it) so that the bear encounters the fence before reaching the attractant.
- Protect the fence charger from the elements by covering it with a bucket or box
- Place electric fence signs around the perimeter of your fence.

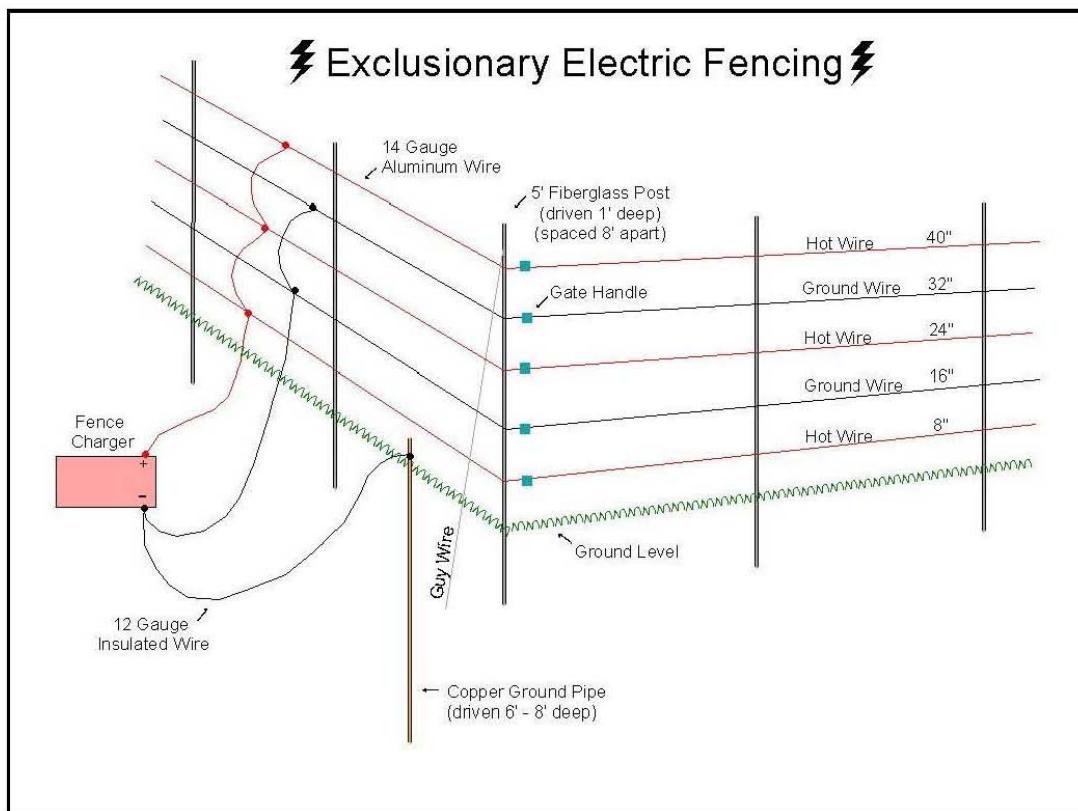


Illustration courtesy of Florida Fish and Wildlife Conservation Commission

### Other Uses for Electricity

Tips and advice for constructing the following can be found at <http://www.lwwf.org/> and by following the link for the 2005 Edition of the Living with Predators Resource Guides.

1. **Electrified unwelcome mat:** Useful for keeping bears away from birdfeeders, porches, doors, dumpsters, storage sheds, etc.
2. **Electrified bird feeder:** Useful for discouraging bears from visiting birdfeeders
3. **Electrified dumpster and garbage cans**

Information on the following can be found at

<http://www.bearsmart.com/managingBears/PassiveConditioning.html>

4. **Nuisance Bear Controller:** For electrifying birdfeeders

## **Contributions to this Article and Other Sources of Information on Electric Fencing**

**Florida Fish and Wildlife Commission** "Electric Fencing for Bears"

**The Get Bear Smart Society** <http://www.bearsmart.com/>

**The Living with Wildlife Foundation** <http://www.lwwf.org/>

**Living with Bears: A Practical Guide to Bear Country**

by Linda Masterson Softcover, 256 pages, published by Pixyjack Press, 2006

**Remember, installing an electric fence is easy and can keep your property free from bear damage**

**Apiary with electric fence**



**Apiary without electric fence**

