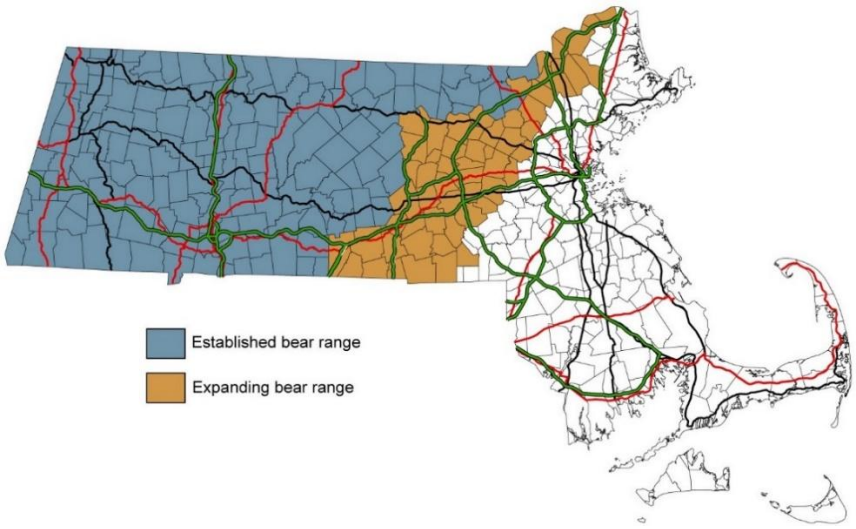
DIVISION OF
FISHERIES & WILDLIFE

Electric fencing guide to protect chicken coops, beehives, and other livestock from black bear damage



Map of black bear range in Massachusetts

Black bears are common in western and central Massachusetts, with their population steadily increasing and spreading eastward. Bears view beehives, chickens, goats, sheep, and other livestock as potential food sources. Proactively protecting livestock with properly installed and maintained electric fencing can prevent damage and loss from bears.

It's important to install an electric fence that is capable of keeping bears out. This guide provides design and installation instructions for a basic single wire electric fence and a welded wire fence. Investing in electric fencing may require an upfront cost, but the potential damage caused by one bear incident could far outweigh the initial investment.

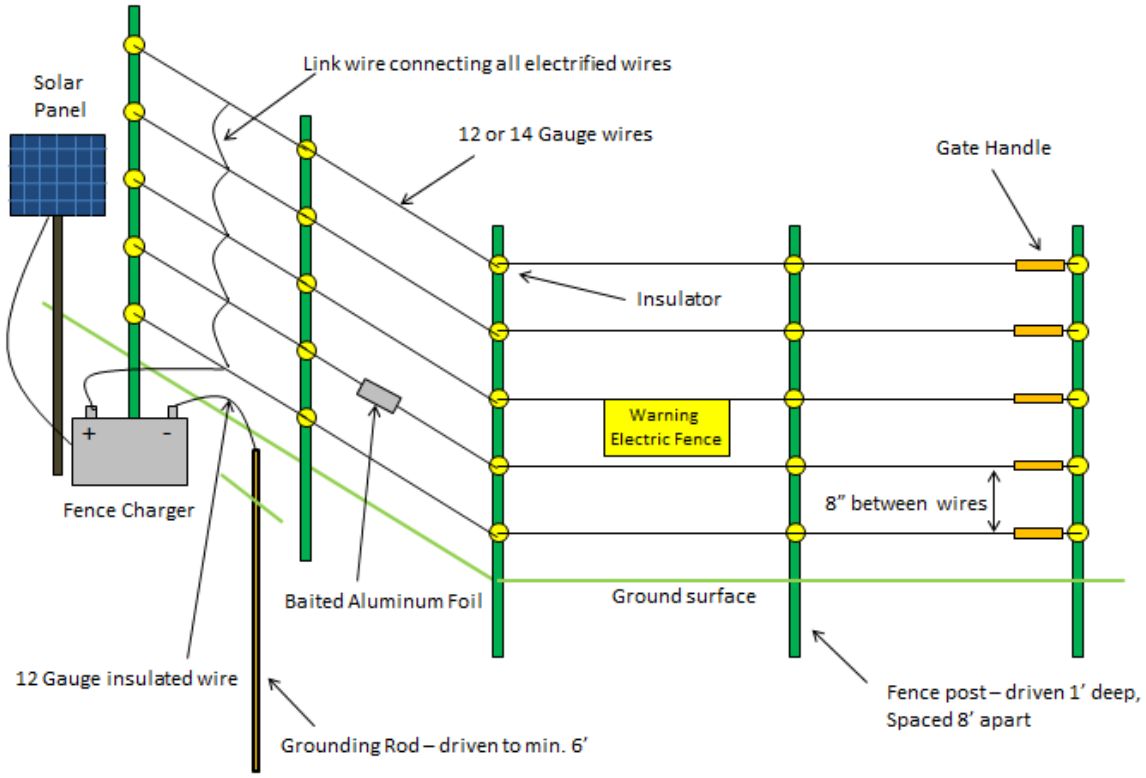
Safety

Properly installed electric fences are safe to use around children, pets, and livestock. Experiencing a shock will cause temporary discomfort for a bear but it will not result in lasting harm. The shock will serve as a valuable lesson for the bear, and it will quickly learn to avoid your fence.

Baiting your electric fence

Bait your fence to draw the bear's sensitive nose into contact with the electrified wires. Wrap aluminum foil tightly around each strand and bait the foil with bacon grease or peanut butter. Freshen bait regularly.

Basic fencing design using single wires



Materials list for single wire design

- Fence charger (A/C or solar) - Minimum of 0.7 joule and 6,000-volt output with a rate of 45 - 60 pulses per minute. Larger fencing projects will require chargers with a higher joule output.
- Power source - A/C power or a 12-volt deep cycle or marine battery and solar panel
- Posts - Pressure treated 4x4s or 5 ft. metal T-posts. One for each corner and 1 for every 8 ft. of fence. Fiberglass or plastic posts can be used but are not as durable and not recommended for permanent setups.
- Post insulators - One for every post multiplied by the number of strands. For example, if you have 10 posts and 5 strands, you will need 50 insulators.
- 12-gauge steel wire or 14-gauge aluminum wire. Use high tensile wire if possible. You will need enough wire for at least 5 strands. For total length, multiply the perimeter of your fence by 5.
- Insulated gate handle - One for every strand
- Insulated 12-gauge wire - Approximately 10 ft. depending on your setup
- 3/4 in. galvanized steel grounding rod, 6.5 ft. in length or longer
- Grounding rod clamp
- Voltage meter
- Warning signs
- Aluminum foil and bait

Installation instructions for single wire design

- Locate your fence in an appropriate location. An open space away from trees, shrubs, and other vegetation that provide cover for bears is ideal.

- Set your fence posts a minimum of 1 ft. into the ground. You should have a post on each corner and one for every 8 ft. of fencing.

- Your fenced area should be large enough to keep 4 ft. of space between the wires and what you are trying to protect. This is especially important for beehives.

- Mow or remove grass and other vegetation in an 18 in. strip centered below where the wires will be positioned. Install weed mat or mulch if desired.

- Attach plastic insulators to the outside face of the fence posts. The bottom insulator should be 6 in. above the ground surface and then spaced every 8 in. above that. Insulators are needed for all wood or metal posts. Wires need to be connected to the insulators, not the posts themselves. Wires that touch the posts will create a short circuit and reduce the effectiveness of the fence.

- Begin attaching wire to the bottom insulator starting at one of the posts where the gate will be located. Leave an extra loop of wire attached to that insulator to hook the gate handle back to when the bottom circuit is completed. Attach the wire to each bottom insulator successively around the exclosure, keeping the wire as tight as possible as you go. Stretch the wire around to the loop at the first insulator and cut the wire. Connect the end of the wire to the insulated gate handle and hook onto wire loop you created at the first post to complete the circuit.

- Connect each successive wire in the same way working your way up to the top of the fence.

- Use a piece of the wire to connect each wire to the wires above and below it.

- Locate your fence charger and any other components inside the fence. This prevents a curious bear from damaging or disconnecting them.

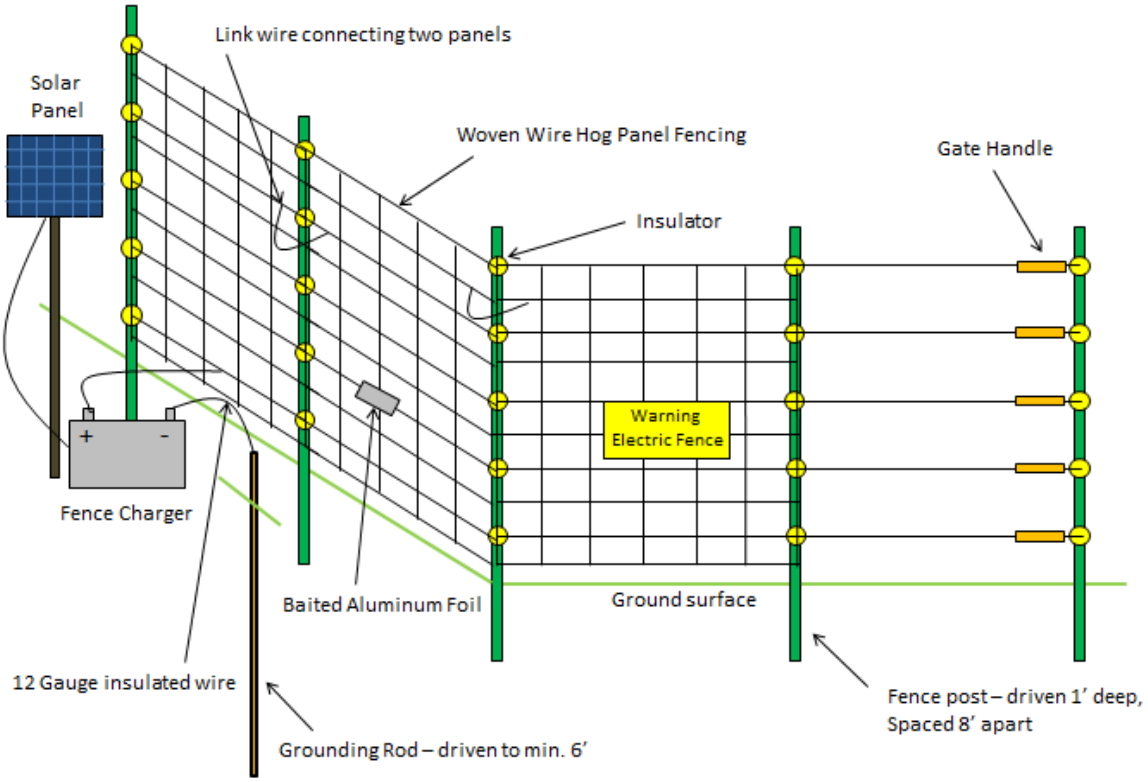
- Connect the bottom wire to the positive terminal of the fence charger using a piece of insulated wire. Now all the wires should be connected together and to the charger.

- Drive the grounding rod a minimum of 6 ft. into the ground. Multiple shorter rods can be used if needed. It should be positioned close to the charger.

- Attach the clamp to the top of the grounding rod and connect to the negative terminal on the charger using a piece of insulated wire.
- Hang electric fence warning signs on each side of the fence.
- Place your baited aluminum foil on the wires, at least one on each side of the fence on the middle strand.
- Connect the charger to either the A/C power source or to the battery and solar panel.
- Test each wire of the fence to make sure it is hot and carrying a 6,000-volt charge.

More effective fencing design using welded wire panels or "hog panels"

Using welded wire panels or rolled livestock fencing can improve the effectiveness of the exclosure as it provides both a physical and electrical barrier. This is the recommended design to use. Installation of this fence design is the same as for the single wire design except that you connect the fencing or panels to the post insulators then to each other using 12-gauge electric fencing wire. The fence panels should not be directly touching the fence posts.



Temporary fencing

For beekeepers deploying hives to non-permanent locations, like farm fields or orchards, temporary electric net fencing can be used. These fences are not as durable as fence designs using metal or wood posts and metal wire. Consider using extra fence posts and attempt to get the wires or net as tight as possible. If you bring your hives to the same location each year, build a fence with metal T-posts and wires that can be reconnected to a charger and power source each year rather than using net fencing.

Tips to make your electric fence as effective as possible

- Bait the wires of the fence to draw the bear's sensitive nose into contact with the electrified wires. Thick fur elsewhere on the body can insulate a bear from receiving a shock. Wrap a piece of aluminum foil tightly around each strand to ensure good contact. Bait the foil with bacon grease or peanut butter. Bait wires on every side of the exclosure and freshen regularly.
- A/C power sources are recommended as they provide a constant and reliable electrical output.
- Check the output of your fence with a voltage meter regularly. Each wire should read about 6,000 volts. If the voltage output is low or varies significantly, you may have a short.
- Build a large enough fence to keep 4 ft. between the electrified wires and whatever you are protecting. This is to prevent bears from reaching through the fence.
- If you are using a solar powered fence charger, make sure it's suitable for northeast weather and that it provides enough energy to keep the battery charged.
- Maintain grass and other vegetation under the bottom wire and around the fence to prevent electrical shorts. Mowing, herbicide, a weed mat, or mulch can be used to achieve this.
- In dry or rocky soils, install multiple grounding rods spaced 5–10 ft. apart or add grounding aprons. For a grounding apron, lay a 3 ft. wide strip of chicken wire or hog panel on the ground in front of the fence. The bear is "grounded" when it steps on the apron and touches the fence. Do not attach the grounding apron to the fence, only attach a wire from the energizer's grounding outlet to the grounding apron.
- Conductivity improves with damp soils. During dry periods, keep the ground around the grounding rod moist. This can be done by placing a 5-gallon bucket of water with a small hole in the bottom next to the grounding rod. Water will slowly leak out of the bucket into the ground. Place a lid on the bucket to prevent attracting insects or a potential drowning hazard.
- Large fences surrounding extensive areas will require more powerful chargers and additional grounding rods, 1 grounding rod per joule of charger output.
- Using high tensile wire and adding tensioning springs will increase the durability of your fence, especially for long term permanent fences.

Photos of alternative electric fencing design for chicken coops

Design and photo credit: Mike Gerulaitis

Assistance

For assistance, contact your local MassWildlife District Office or MassWildlife Field Headquarters.

- MassWildlife Field Headquarters, Westborough, 508-389-6359
- Western District, Dalton, 413-684-1646
- Connecticut River Valley District, Belchertown, 413-323-7632
- Central District, West Boylston, 508-835-3607
- Northeast District, Ayer, 978-772-2145
- Southeast District, Bourne, 508-759-3406

Resources from the Montana Fish Wildlife & Parks, Virginia Department of Game & Inland Fisheries, and Florida Fish and Wildlife Conservation Commission were used to create this guide.