Electric Fencing to Control Deer and Elk on Montana's Farms and Ranches

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Elk and deer contribute to Montana's economy through increased tourism and hunter expenditures for equipment, fuel and food during the hunting season. Tourism is Montana's second largest industry, contributing $1.4 billion to Montana's economy in 1996. Economists have estimated the value of each deer harvested in the United States to be $1,250, based on hunter expenditures in local areas.

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However, damage by elk and deer is expensive. Big game forage consumption costs southwest Montana landowners an average of $5,616 each year. Montana landowners also pay for grazing and trampling damage done by elk and deer to crops, gardens, timber, rangelands, fences and water systems. Several methods to control deer and elk have been used with varying levels of success. Repellants such as periodic explosions and odors can be effective for limited periods, but are not long-term solutions. Exclusion, although expensive, is usually the most effective method to protect large areas such as fields.

Benefits Versus Costs

Before a landowner decides to control elk and deer in an area, he or she should evaluate the value added to the land as a result of the protection compared to the cost of protection. This benefit/cost ratio should be greater than one before it is worth protecting an area. For example, if elk damage $1,000 worth of alfalfa in a field, and it costs $900 to build a fence to exclude the elk, the benefit/cost ratio is 1,000/900 or 1.11. The benefits are higher than the costs, so it is worth protecting the alfalfa, especially when the benefits are spread over several years.

Fencing to Exclude Elk and Deer from Croplands

Although repellants protect crops for short periods of time, fences are the most effective protection over the long-term. Several types of fences are available to exclude elk and deer from croplands. Landowners have to consider the cost of constructing and maintaining the fence as well as the effectiveness of the fence. Seven-foot woven wire fences have proven to keep elk and deer out for up to 30 years, but they are expensive to construct (Table 1). Barbed wire fences are less expensive to construct, but are usually less effective and require more maintenance. Electric fences are relatively inexpensive to construct and will effectively exclude elk and deer if constructed properly. However, they have a higher maintenance requirement than a woven wire fence.

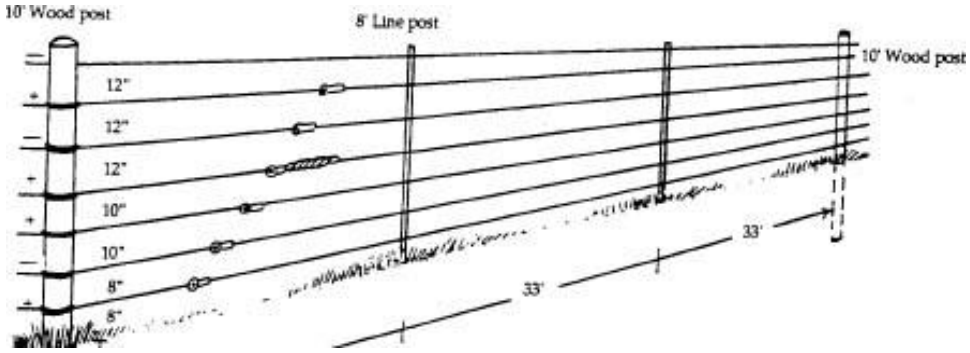
Constructing an Effective Permanent Electric Fence

Electric fences are psychological barriers rather than physiological barriers. Whole herds of elk and deer can be repelled by an electric fence when one animal is shocked. Others in the herd see the reaction to pain and identify the electric fence as a threat. For electric fences to be effective psychological barriers, they must consistently impose a perceived threat.

Construction

- Use high voltage, high tensile 8-wire electric fences to repel both elk and deer.
- If only elk are a problem, 7 wires will be sufficient.
- The fence should be about 6 feet high.
- The bottom 3 wires should be spaced 8 inches apart.
- Space the other wires 10-12 inches apart. Every other wire should be a ground wire.
- See Figure 1 for a general idea of the fence construction.

Figure 1. Electric Fences are a practical way to exclude deer and elk from high value crops of pastures.



Voltage

At least 4,000 volts must be continuously maintained in the fence using a high quality fence charger. Because the hollow hair of deer and elk acts as an insulator, 4,000 volts are required to provide sufficient shock. (See Cautions.) Once the fence is constructed, periodically check the voltage with an electric fence tester.

Table 1: Effectiveness and cost of various fence types*

Construction Fence	Expected Cost/mi.	Life	Effectiveness
8-foot woven wire	$4787/mi.	30 years	Excellent
8-foot 10-wire, barbed	$4027/mi.	30 years	Good
8-wire perm. elect.	$4000-$5950/mi.	30 years	Excellent
2-wire temp. elect.	$1310-$1685/mi.	5-10 years	Moderate

*Labor is not included in cost estimates. $283 for a solar-powered electric charger is included in the electric fence estimates. Chargers generally vary in price from $100 to $475.
Grounding Systems

A good ground will ensure that the voltage is high enough to repel elk and deer. Plan to use four ground rods, buried six feet apart. Pound 6-foot galvanized rods 5 feet into the ground. Galvanized pipe will provide a good ground, but be sure to cap the top so rainwater does not fill the pipe. If rocky soil prevents driving a ground rod, bury the rod horizontally as deeply as possible and connect insulated ground wires from the fence to it.

Charging Fences Immediately

Deer and elk will constantly test a fence, so if they find they can penetrate it one time, an electric fence loses its effectiveness. The fences should always be charged. A common mistake is to turn off the electricity during the off-season. This makes the fence ineffective even when it is recharged because the deer and elk have learned they can penetrate it. It is imperative that the fence is charged as soon as any portion is completed. Even if only 100 yards are built in a day and wildlife could easily walk around a fence, charge that 100-yard segment.

Visibility and Vegetation Issues

Because the fence is a repellant, it is important that elk and deer can see it. Use polytape or shiny metal reflectors on the wire to provide visibility and attract the curiosity of deer and elk. Polytape comes in a variety of colors, but studies show white provides the most contrast so it is the most visible. Expect to replace polytape every 3-5 years. If the fence crosses through heavy vegetation, plan to clear a 10-15 foot buffer outside the fence so elk and deer will see it. On steep slopes, the buffer should be wider.

Vegetation that touches the fence may divert some of the voltage. If feasible, plan to mow vegetation under the fence. If mowing is not feasible, plan another option for controlling vegetation that may short out the fence. Pull grass by hand, cut shrubs with a machete and trim trees with a chain saw. Herbicides also control vegetation well.

Preparing the Fence

Hot wires should be initially coated with peanut butter and molasses. This mixture attracts elk and deer and ensures that the first contact with the fence will be with the tongue or nose instead of the body insulated by hair. To coat wires with the mixture, combine the peanut butter and molasses to the consistency of thick paint, then use a mop glove to spread the mixture along the wires.

Charger Considerations

Electric fence chargers can be solar- or battery-powered, or use an AC current. AC current chargers are the most reliable and least expensive, but a hard-wire system is not always feasible because many areas are not near electric power sources. Deep-cycle battery-powered chargers and combination solar/battery powered chargers are good alternatives when main power is not available. Two or more chargers might be more effective if large areas are to be fenced. When designing the electric fence, buy a low-impedance charger with enough power to compensate for stray vegetation or other possible shorts.

Chargers should be located as near the fence as possible. Mount a charger to a wooden post or other stable fixture. Face solar panels towards the south at an angle that faces the sun. A solar-powered charger needs a minimum of 4-5 hours of sunlight each day so it can charge the battery. Cloudy days usually will provide enough sunlight to energize a fence, but the battery must be charged so the fence will be energized at night.
Cautions

Modern high quality fence chargers normally do not pose a significant hazard to humans. Because they give out pulses of electricity they do not present the dangers of the high amperage, continuous current chargers of many years ago. Nevertheless, use common

sense when placing your electric fence. A 4,000-volt charge of electricity is very unpleasant and could be dangerous to certain individuals. Inexpensive signs are available and should be used as a precaution.

Effective Temporary Electric Fences

Two-strand, 17-gauge temporary electric fences have proven effective under moderate deer pressure. The principles behind temporary electric fences are the same as the principles of permanent electric fences. The fence is a psychological barrier rather than a physical barrier. It is important to install this type of fence prior to the time the deer or elk start using the area. Elk and deer must be able to see the fence and be conditioned to avoid it. Temporary fences are less expensive to construct than permanent fences, but require maintenance more often. They are a good option for areas that have heavy snowfall or other conditions that cause seasonal grounding or maintenance problems.

Construction

To construct a temporary fence:

- Suspend the hot wire (+) about 36 inches high and then ground wire (-) about 18 inches high.
- Plastic or fiberglass rods are convenient temporary posts. Place them 30-60 feet apart.
- Use wooden posts or T-posts with insulators to support the corners.
- Wrap aluminum foil "flags" on the hot wire at 20-50 foot intervals.
- Coat the hot wire and "flags" with peanut butter and molasses.
- Keep the fence clear from vegetation that will short out the electric current.
- Maintain a clear buffer on the outside of the fence so elk and deer will see it.

Extending Fence Height

Constructing a 72-inch high fence usually results in having to buy 8-foot T-posts for the line and 8 to 10-foot posts for the corners. One way to save money on the T-posts is to use existing T-posts for the bottom 48 inches and add a 3/8-inch fiberglass rod for the top 2 feet. To support the fiberglass rod, use a brand of plastic insulator that snaps onto T-posts and has a plastic pin to retain the wire. Remove the pin, drill the holes out to 3/8 inch and insert the fiberglass rod in the holes to extend your T-post as shown in Figure 2.

Figure 2. Using drilled out insulators, a T-post 4 feet high can be extended to 6 feet in height

The fiberglass rod costs about a dollar as compared to over three dollars for an 8-foot T-post. If you are using wood posts, drill a 3/8-inch hole in the top of the post. Insert the rebar or fiberglass rod in the hole to extend the height of the post.

Protecting Haystacks from Elk and Deer

Figure 3. When the ground is frozen, rebar or fiberglass rods can be used to hold electric fence wires.

Elk and deer are notorious for eating out of haystacks, especially during extremely hard winters. Haystacks can be protected with electric fence even if the ground is frozen. Instead of using t-posts, steel rebar or fiberglass rods can be poked horizontally into the haystack to hold the wires in place (Figure 3). These rods are sturdy enough to hold the wires out away from the hay. Insulators can be attached to rebar so the wires do not ground out. Be sure to keep a 12 - 15 foot open border around the outside of the fence to make it easy for the animals to see the wire.