

Fencing Guidelines for Wildlife

Revised Version

Habitat Extension Bulletin

No. 53

Big game animals—deer, pronghorn, elk, moose, bear—seen freely roaming the mountainsides, prairie, national parks and forests, and other terrain are integral to Wyoming's scenery. While fences that limit access and movement of big game may be necessary to protect crops and livestock, they can impede seasonal migration as well as daily movements to food, cover, and water

needed for survival. This bulletin discusses the effects of electric and traditional fences on wildlife. It represents a major revision of the original written by Roger Wilson in 1995.

Recommendations are given on the best types of fences for containing livestock while either excluding wildlife or allowing passage of big game animals. A summary of fence types and their primary purpose is included as Appendix A following the Conclusion Section of this bulletin.

FENCES COMPATIBLE WITH BIG GAME PASSAGE: Traditional Fence Designs

Before building a fence, ask yourself "Is a fence necessary?" If a fence must be built, then several factors need to be considered: the type of livestock being contained, the species of big game present, their abundance, the occurrence



Mule deer buck having little trouble negotiating a fence during the fall.

of daily and/or seasonal animal movement and the presence of young animals. The location of the fence may also be critical to the well-being of animals present.

Fences Primarily on Deer and Pronghorn Range

Pasture Fences: The height of a barbed or woven-wire fence on deer range should not exceed 42 inches. The space between the top 2 strands should be a minimum of 10 inches, but a 12-inch space is preferred. This top space is very important to deer because of the manner in which they jump fences. Whitetails and mule deer draw their legs under their bodies as they leap a fence. If one or both hind legs fail to clear the top wire, the legs may catch between the top two wires as the deer continues over the

fence. The wires twist tightly, entangling the lower portion of the leg or legs, resulting in serious injury and often death.

Some pronghorn are capable of jumping fences of 42 inches or more, but pronghorn prefer to go under the bottom strand of wire. This preference is the key to allowing pronghorn to pass through a fence.

To allow passage of deer and pronghorn on cattle ranges, a 4-Wire Cattle Fence¹ having three barbed wires, the top wire 42 inches high, and a smooth bottom wire 16 inches above the ground is recommended (Fig. 2). If compatible with other uses, an 18 inch smooth bottom wire is preferred.

Where deer and pronghorn share the range with domestic sheep, a 4-Wire Sheep Fence² with a top wire no higher than 32 inches and a smooth bottom wire at least 10 inches above the ground is suggested. If both cattle and sheep graze in the pasture a 4-Wire Sheep/Cattle Fence³ may be constructed. On this fence the top wire may be raised to 38 inches as long as there is at least 10" between the top two wires and the bottom smooth wire height of 10 inches is maintained.

Woven wire fences severely impede pronghorn movements. If pronghorn are the primary big game species in the area, woven wire fences should not be used. If however, deer are the primary big game species in an area and pronghorn only occasionally use the range, a Woven Wire Sheep Fence⁴ with a total height not to exceed 38 inches, using 26 inch woven wire and 2 strands of barbed wire above the woven wire, 10 inches apart, is acceptable.

Highway Right-of-Way Fences: The Wyoming Department of Transportation (WYDOT) has fence standards for right-of-way fences. Minimum WYDOT fence

heights are based upon internal operating policy 19-4 which establishes a minimum fence height of 45 inches. Landowners adjacent to a Wyoming highway can have considerable influence on the type of fence constructed.

To allow deer and pronghorn movement across a highway, WYDOT fence standard Type E, 4-Wire Fence⁵ is recommended. This fence has a total height of 45 inches with wire spacing from the ground up of 16-25-33-45. The bottom strand should be smooth wire.

In areas where domestic sheep graze, 5 strands of barbed wire (Type G Fence⁶) or 26 inch woven and 2 strands of barbed wire above the woven wire, (Type C Fence⁷), are often used, but not necessarily needed. When combined with good management practices and a herder, 4-Wire Type E⁵ has been demonstrated in Southeastern Wyoming to provide good containment of domestic sheep.

Let-down Fences or Extra Gates: Deep snow in the winter can hamper the ability of a big game animal to cross a fence that during any other time of the year may not present a problem. Therefore, in areas of important wildlife crossings, let-down fences⁸ or extra gate openings are recommended.

Both barbed and woven wire let-down



Mule deer doe and fawns have some difficulty negotiating a fence during winter.

fences can be constructed. Line posts may be wooden or steel, but wooden posts are more durable where there is heavy snow. Line braces are necessary at least every 1/4 mile, but seldom less than every 100 feet. Topography and the characteristics of big game migration routes dictate the length of let-down fence sections.

For both types of let-down fences, 2 stays are needed between fence posts spaced 16.5 feet apart. For woven wire let-down fences, it is recommended that there be shorter sections between line brace posts and that a ratchet type tightener be installed for each section. With both the barbed and woven wire let-down fences, wire loops at the top and bottom of the line posts support those stays positioned at the line posts. To lay down the fence, the wire loops are lifted over the top of the stays, the stay is lifted out of the bottom loop, and the fence laid flat on the ground. Figure 1 illustrates a portion of barbed wire let-down fence.

A simple alternative to a let-down fence is to design new fences or retrofit existing fences with extra gates. Installation of double gates in big game travel corridors and at fence corners that are left open when livestock are not present can be an effective means to facilitate wildlife passage. As with let down fences, it is imperative that a reliable person is assigned the responsibility of opening and closing the gates at specific times to be certain that the benefit to wildlife is realized.

If let-down fences or extra gates are installed, they should be located where big game can become accustomed to them. Preferably the

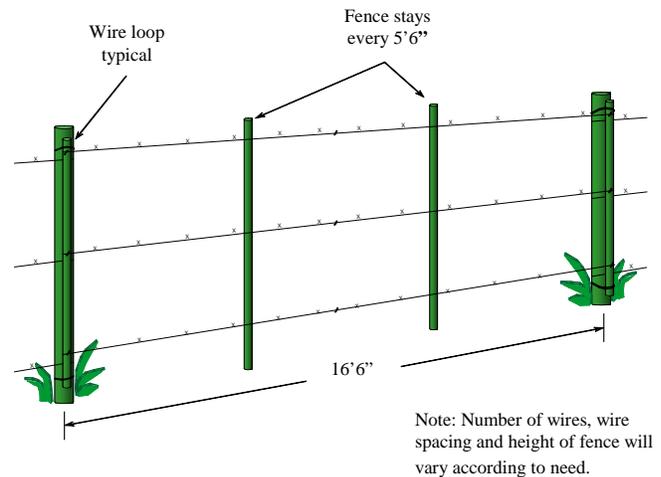


Figure 1. Let-down barbed wire fence.

fence should be let down or the gates opened prior to the arrival of big game into the area. Obviously, livestock management must be timed so that livestock are absent during the season when the fence is down. If fawns are numerous, the openings should be maintained from June 1 to September 1 to allow their passage. For spring, fall, or winter big game movements, local observations will best dictate when the fence is let-down or gates are opened.

Fences Primarily on Elk and Moose Range

Most adult elk and moose are capable of jumping over standard pasture or highway right-of-way fences; however, calves may have difficulty getting through woven wire fences or barbed wire fences with narrow wire spacing. To reduce fence maintenance, a wooden top rail is recommended in areas of frequent crossing.

This top rail is visible to big game animals even in poor light and can withstand repeated contact of hind legs and hooves.

There are several ways of attaching top rails. The most reliable and preferred method of the two described here is to lag bolt the rail to the side of the posts (Fig. 3a). A less preferred method is to notch and nail the rail to the top of the post as shown in Figure 3b. Wooden posts should

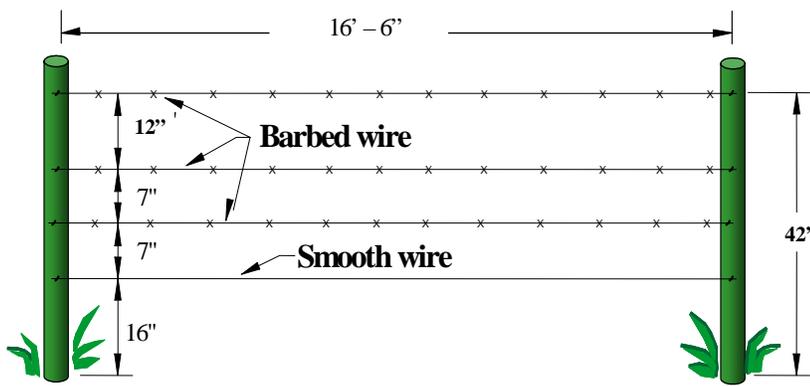


Figure 2. 4-wire cattle fence.

not be more than 14 feet apart and rails should be at least 4 inches in diameter.

On areas where cattle or horses are grazed and elk densities are low and/or where elk crossing is infrequent, a 4-Wire Cattle Fence¹ having three barbed wires, the top wire 42 inches high, and a smooth bottom wire 16 inches above the ground is recommended (Fig. 2).

In high density elk areas or at locations of frequent elk crossing, a 2-Wire Cattle Fence⁹ with the bottom wire 16 inches above the ground and a top rail no higher than 38 inches above the ground is recommended as shown in figures 3a and 3b.

On elk winter ranges, where elk crossing is frequent, a 3-Wire Elk Winter Range Fence¹⁰ is acceptable, with spacing from the ground up of 10-18-27 and a top wooden rail not over 38

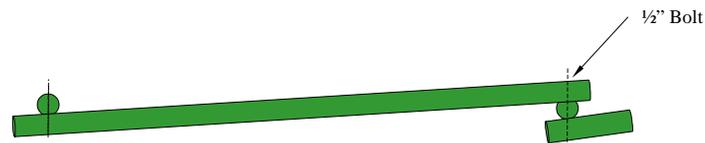
inches. This fence is acceptable on winter ranges because by November, calf elk are able to jump 38 inch high fences.

In areas of frequent elk crossing during one or more seasons of the year, let-down fences or extra gates as described for deer and pronghorn can be substituted for rail-topped fences. When let down, fences should be placed flat to the ground to avoid elk entanglement in the wires.

Highway Right-of-Way Fences: For elk movement across highways, WYDOT Type E⁵, 4 strand barbed wire fence is the least restrictive. A top rail is recommended in areas of frequent elk movement, although none of the WYDOT standard fences include a top rail.

FENCES COMPATIBLE WITH BIG GAME PASSAGE: Electric Fence Designs

The key to successfully containing or excluding any animal with electric fence is the design. Design characteristics such as number of wires, wire spacing, post spacing, post type, the use of stays, and arrangement of hot and ground wires are all important factors to consider when designing and building an electric fence to contain one animal, but let another animal easily pass. The design, and resulting ability of a fence to target and transfer a painful shock to an animal, will determine if it is ultimately effective. For example, a 10-inch spacing between a hot and a ground wire on a three-wire fence is designed for a domestic cow to contact both wires at the same time with its head. Doing so will transfer a more painful shock than touching just the hot wire. If a deer fawn goes between the wires at the same fence, 10 inches is usually enough space for the animal to get its head through the wires without touching both wires at the same time. And, unless the fawn touches the hot wire with its wet nose or ears, it will not likely be shocked. Narrow this spacing a couple of inches and the fence is more of a barrier to big game species. Increase the spacing by a few inches and the fence will become less effective at containing cattle or bison. Unlike barbed wire, high-tensile electric wire does not bind and



Plan View

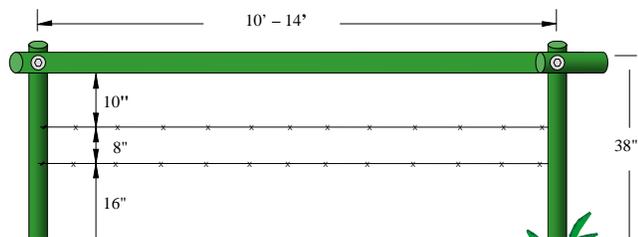


Figure 3a.

Note: Top rails are 4-inch diameter and notched at each end.

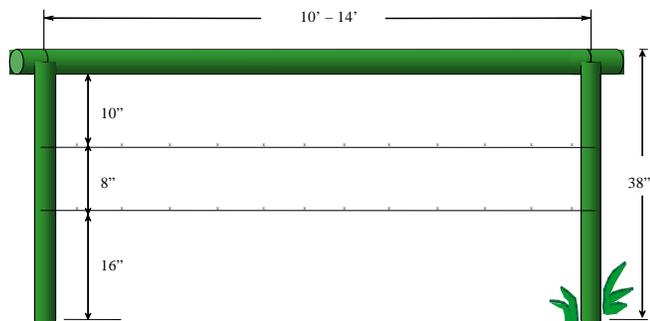


Figure 3b. Pole-top fence.

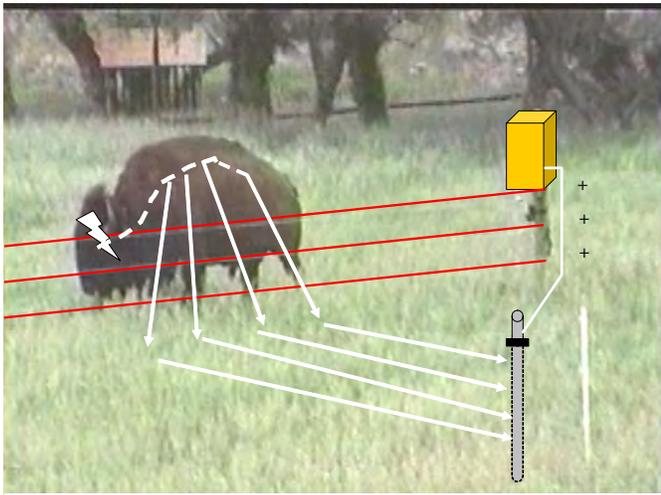


Figure 4. Earth return system.

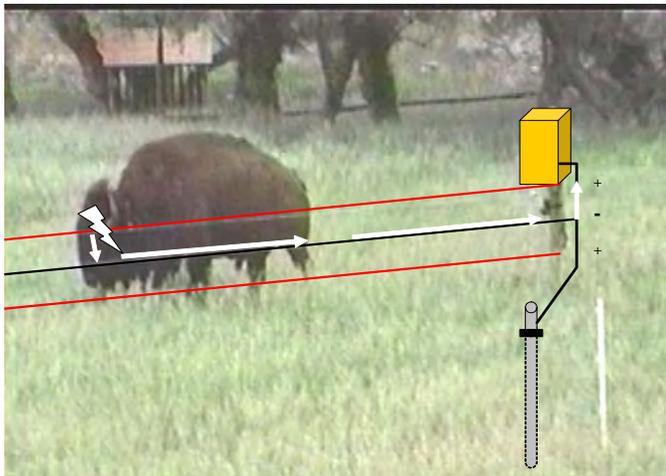


Figure 5. Wire return system.

catch when twisted. For this reason, and because electric fences are generally more flexible than traditional fences, the recommended 12 inches between top wires to minimize big game entanglement is not necessary.

An electric fence is designed more to act as a mental barrier rather than a physical barrier. In general, animals will avoid contact with electric fence wires once they have received a shock. If the animal cannot traverse a fence without receiving a shock, the fence will contain all but the most determined individuals. In order for an animal to receive a shock, it has to complete an electrical circuit. There are two ways in which this can occur: 1) Earth return:

where an animal contacts a hot wire and the charge travels through the animal's body and into the soil through its feet and back to the energizer to complete the circuit (Fig. 4) or 2) wire return: where an animal contacts both a hot and a ground wire and the current travels from the hot wire through the animal and back to the ground wire and energizer to complete the circuit (Fig. 5). The earth return system works well in areas with high soil moisture, but not so well in dry soils. Wire return systems work much better in dry soils and is generally better for soil moisture conditions that exist in Wyoming.

Electric Fences on Deer, Elk, or Pronghorn Ranges

*Three-Wire Electric Fence*¹¹: Properly constructed and maintained three-wire electric fence (Fig. 6) will effectively contain cattle or bison, yet is relatively easy for both young and adult deer, elk, or pronghorn to traverse. The 3-wire electric fence is comprised of a hot-ground-hot wire configuration with spacing of 22-32-42 inches. Line posts are 0.74-inch – 1-inch diameter x 60 inch tall solid fiberglass spaced at 50 foot intervals. All pronghorn and most deer will easily cross under the 22-inch bottom wire while the majority of the elk will jump the fence.

*Two-wire electric fence*¹²: A two-wire electrified fence (Fig. 7) is comprised of a ground wire at 20 inches and a “hot” wire at 30 inches. All fences should use 0.74-inch – 1-inch diameter x 48-inch tall solid fiberglass line posts spaced at 50-foot – 60-foot intervals. Two wire electric fences generally provide good containment of cattle and are easily traversed by deer and elk, but are difficult for pronghorn to negotiate. If pronghorn frequent the area, a 3-wire design is recommended instead. Two-wire electric fence has not been tested for bison or domestic sheep containment.

*Four-Wire Electric Fence*¹³: This design (Fig. 8) is comprised of a hot-ground-hot-hot wire configuration with spacing of 22-32-42-52 inches. Line posts are .74-inch – 1-inch diameter x 72-inch tall solid fiberglass spaced at approximately 50-foot intervals. Four-wire electric

fence will provide excellent control of cattle or bison but has not been proven to provide better containment than the three-wire electric fence design. Pronghorn and deer can successfully traverse four-wire electric fence, but it is difficult for elk to traverse. If elk frequently use the area, this fence design should be avoided. Limited direct observations of cow moose with calves also indicate they have a hard time traversing four-wire electric fence, but are able to traverse the shorter three-wire design.

Electric Fences for Sheep Containment

Sheep can be contained by electric fences, but designs needed to contain sheep generally require a wire spacing of eight inches or less and are therefore restrictive to pronghorn and possibly deer fawns and elk calves. The two-, three-, and four-wire designs presented in this bulletin have not been tested against sheep. A design that will contain sheep, but still allow wildlife, especially pronghorn, to pass with relative ease has not been identified.

FENCES THAT EXCLUDE WILDLIFE

Traditional Fence Designs

*Eight-Foot Woven Wire*¹⁴: Deer, elk and moose damage to gardens, young shelterbelts and hay stacks can be prevented with an eight-foot woven and smooth wire fence. This fence should be constructed with a bottom course of 47-inch woven wire, a top course of 26-inch woven wire and two strands of smooth wire above the woven wire (Fig. 9).

Pronghorn prefer to go under fences. The key to excluding pronghorn is a fence constructed to prevent them from going under the

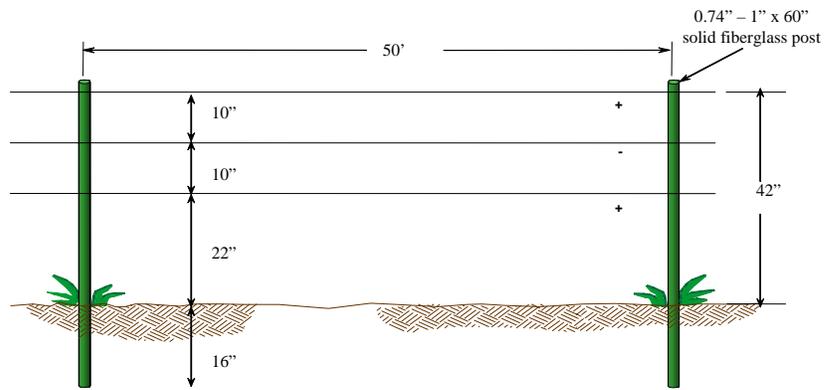


Figure 6. 3-wire electric fence.

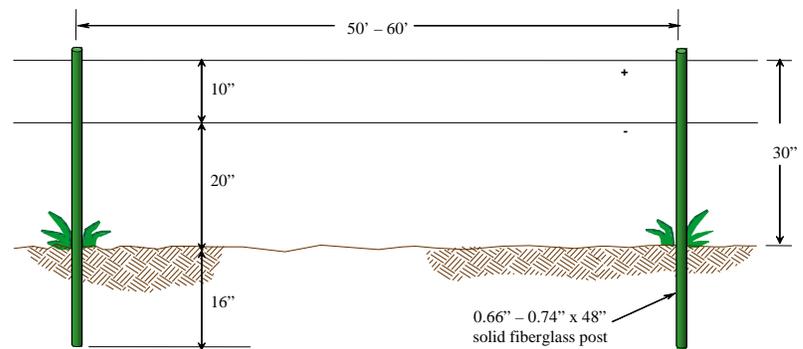


Figure 7. 2-wire electric fence.

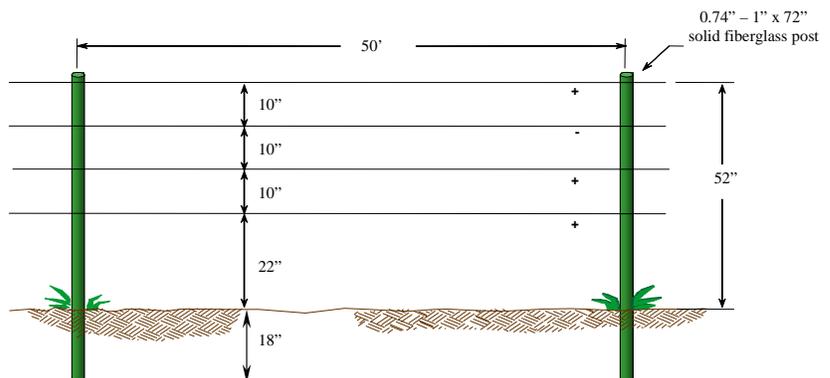


Figure 8. 4-wire electric fence.

fence, such as a fence of 32-48 inch woven wire and 1-3 strands of barbed wire above the woven wire¹⁵.

FENCES THAT EXCLUDE WILDLIFE

Electric Fence Designs

Electric Fences to Exclude Deer

*Eight-Wire Slant*¹⁶: Slant fence has been used for many years to protect orchards and nursery crops, but the original designs were nearly as expensive to build as standard eight-foot woven wire fence. Now with fiberglass posts and high-tensile electrified wire, the slant fence (Fig. 10) can be built for a reasonable cost and is very effective. Deer, pronghorn, elk, and bears can all be controlled with electric slant fence; but the fence is primarily designed to exclude mule and white-tailed deer.



Fences can keep wildlife from crossing highways.

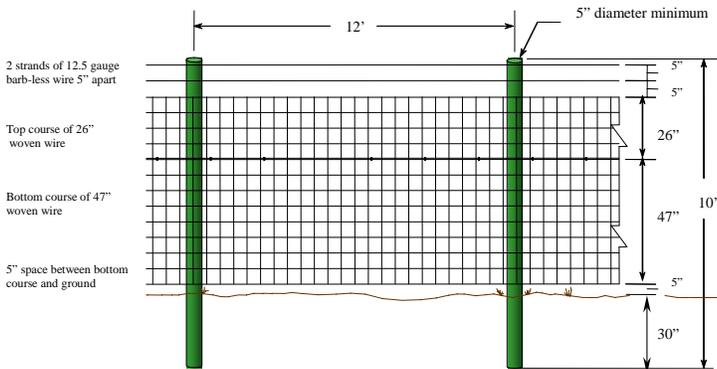


Figure 9. Eight-foot woven wire fence.

Figure 9. 8-foot woven wire fence.

*3-D fence*¹⁷: This fence design (Fig. 11) costs less than eight-wire slant fence and can be constructed in a short amount of time. It has been very successful at excluding white-tailed deer from orchards, tree farms, and vegetable gardens in many places throughout the United States. It has not been tested thoroughly in Wyoming against mule deer; however it has been tried in the Bighorn Basin around vegetable gardens and has worked very well. It is unknown whether or not this fence will effectively exclude other species. The basic principle behind this fence design is similar to eight-wire slant in that deer are not comfortable jumping a fence that has both height and depth. Depending on your goals, this fence can be constructed with high-tensile wire (permanent

fence) or with poly-rope or tape (temporary).

*Fifteen-Wire fence*¹⁸: When properly constructed and maintained, a fifteen-wire electric fence (Fig. 12) will exclude all but the most determined coyotes, bears, wolves, deer, elk, moose, and pronghorn. A fence of this magnitude is generally not needed, but has been used to exclude predators from small calving or lambing pastures and to exclude wildlife and livestock from commercial and private airport runways.

Electric Fences to Exclude Black and Grizzly Bear from Bee Hives¹⁹

Bears occasionally cause serious damage and economic loss when they get into bee hives.

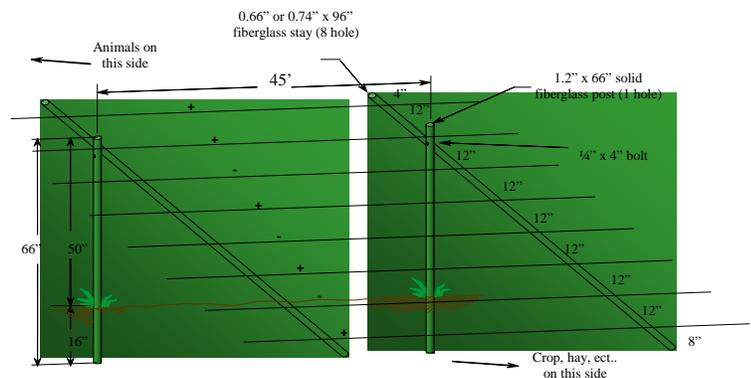


Figure 10. 8-wire slant electric fence.

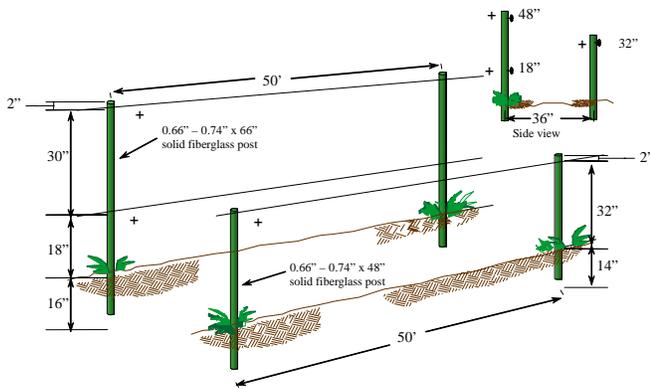


Figure 11. 3-D electric fence.

Many different five- and six-wire electric fence designs have been used with varying degrees of success. The design however, that has the most success in Wyoming combines a permanent

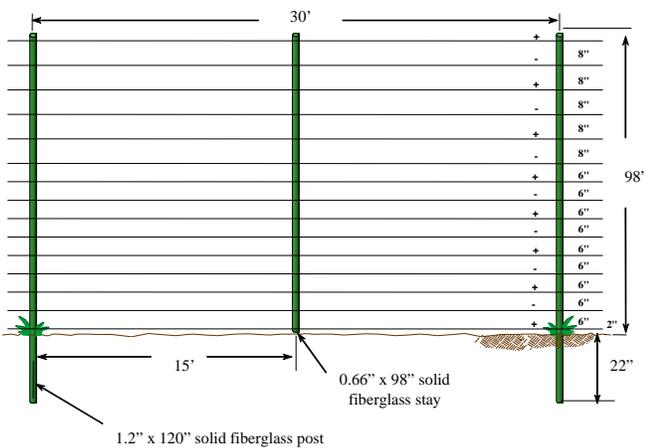


Figure 12. 15-wire electric boundary fence.

three-wire electric fence with a physical barrier fence. The three-wire electric fence is constructed with all hot wires spaced at 10-20-30 inches; a permanent fence made of 48-inch hog panels, chain-link fence, or corral panels is then placed 12 inches to the inside of the electric fence.

Electric Fences to Exclude Coyotes and Dogs²⁰

Often electric fences are used to keep

coyotes and dogs away from sheep, goats and poultry flocks. Various five to eight wire fences with alternating hot and ground wires have been successful. Also, woven wire fences with two or three electrified wires attached to insulated horizontal supports a few inches out from the woven wire fence are effective in excluding predators.

ELECTRIC FENCE CONSTRUCTION RECOMMENDATIONS

If not constructed and maintained properly, electric fence will not function as intended and will eventually fail. The following detailed recommendations are included to help the reader construct a well built fence that will operate properly and last for many years.

End and Corner Bracing: Standard H-braces can be used for electric fence construction and are ideal for 4-wire designs. However, a bed-log design (Fig. 13) is better suited for use with two- and three-wire fences and is cheaper to construct than an H-brace. On H-brace construction, electrified wires have to be insulated with nail on plastic insulators where they may contact the outside brace post. On all main corner posts and on wood posts used where the fence line changes direction, wires should be insulated to the inside of the direction change using bull-nose porcelain insulators. Wire should be threaded through the insulator when constructed and allowed to move freely for tightening and flexibility purposes. Plastic insulators of similar design may be used, but they will need replaced more often.

Line Posts and Spacing: Line posts should be solid pre-drilled fiberglass with a diameter between 0.66 inch and 1.2 inch, depending on design and purpose. If holes need to be drilled or re-drilled to the correct spacing, it can be done with a standard power drill and 1/4-inch high-speed drill bit. Steel or wood posts should not be used as line posts because they are not flexible and reducing the flexibility of the fence reduces its ability to allow wildlife passage. For the same reason, post spacing should stay con-

sistent with fence design recommendations

Attaching Wire to Fiberglass Line Posts:

Wires should be connected to line posts and stays using manufactured wire clips instead of threading the wire through each individual post. The fence will be much easier to maintain in the future if wire clips are used in the initial construction.

Gates: Electric fences do not require the use of special gates. Any gate used on standard barbed or woven wire fences can be used with electric fencing. In fact, electrified spring gates should be avoided because they are often a point of failure and can easily become tangled and unusable.

On all gate openings, specially insulated electric fence wire should be buried to carry the electric charge from one side of the opening to the other. On wire-return-ground systems another insulated wire to return the ground to the energizer via the grounded fence wire, should be buried across the gate opening as well. Household electrical cable should never be used because it is made to carry a maximum of 440 volts. Indeed, all copper wire should be avoided because connecting the copper wire to the galvanized steel fence wire will cause electrolysis and increased maintenance.

Wire Type: Fences should be constructed with high tensile, 12.5 gauge Class III galvanized wire with a tensile strength of 170,000 PSI and breaking strength of 1308 PSI. Similar galvanized wire with a tensile strength of 200,000 PSI may also be used, but can be more expensive, harder to work with, and does not necessarily reduce future maintenance costs. The 170,000 PSI wire is adequate and arguably more desirable in most electric fencing situations, including bison fence.

Polywire or tape of any kind is not intended for permanent fence construction and should be avoided unless used for a short period (one month or less) on a temporary or movable fence.

Wire Tension: Proper wire tension is also extremely important. Fence wires should be tightened to approximately 150 PSI with no visible sag between posts.

Most people over tighten high-tensile electric fences figuring that a tighter fence will contain their cattle or bison better. In reality a fence that is too tight is more likely to break than a fence that is properly tensioned. The name “high-tensile” electric fence can mislead people into believing the name is synonymous with “high tension” fences. The “high-tensile” refers to a

high breaking strength, but also to a harder, more brittle wire that is easily broken if tightly bent or kinked.

Grounding: **The number one cause of electric fence failure is improper grounding!** It is extremely important to make sure the fence is grounded properly. Always follow fence energizer manufacturer recommendations for proper grounding techniques. When in doubt, add an additional grounding rod to the system. If possible locate ground rods at the end and beginning of every fence and periodically in between. Always place grounding rods in moist or wet soils when possible.

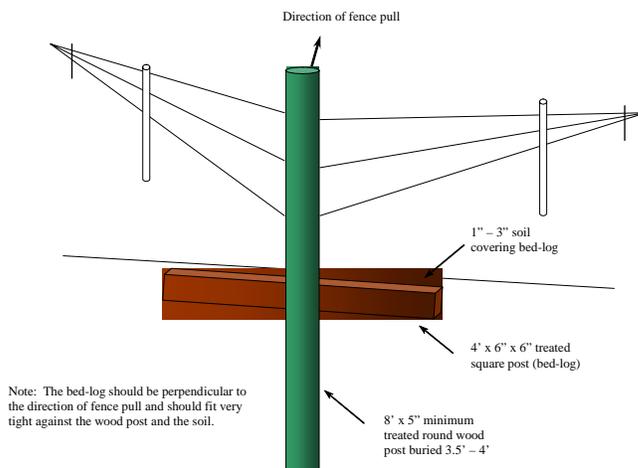


Figure 13. Bed-log brace design.

CONCLUSION

The abundance of wildlife and our many opportunities to enjoy it, yearlong, are among the unique aspects of Wyoming. As stewards of the land, we have an obligation to use the land with the least adverse effects upon the soil, the water, and the wildlife, for our neighbors, ourselves, and generations to come. This bulletin is intended to aid landowners in attaining this goal with respect to big game animals and domestic livestock.



Pronghorn crossing a fence.

Some Additional Informational Sources on Fencing for Wildlife:

Huygens, O.C. and H. Hayashi. 1999. Using electric fences to reduce Asiatic black bear depredation in Nagano prefecture, central Japan. *Wildlife Society Bulletin* 27(4):959-964.

Karhu, R.R. and S.H. Anderson. 2002. Evaluation of high tensile electric fence designs on big game movements and livestock containment. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie, Wyoming. 31pp.

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Palmer, W.L., J.M. Payne, R.G. Wingard, J.L. George. 1985. A practical fence to reduce deer damage. *Wildlife Society Bulletin* 13 (3):240-245.

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Wyoming Game and Fish Commission. 1999. *Fencing Policy No. VII I*. Issue Date: 12/07/99. Standard Specifications and Contract Documents for Fence Maintenance Contracts. Wyo. Game and Fish Department, Services Division.

Appendix A: Summary of wildlife fence designs recommended based on primary purpose and species of wildlife present.

	Wildlife	Fence Design and Wire Spacing (bw=barbed wire, sw=smooth wire) (Allow Big Game Passage)	Primary Purpose
	Traditional Designs		
1	Deer, pronghorn, elk, moose	4-Wire Cattle Fence (16" sw, 23" bw, 30" bw, 42" bw) (see Figure 2)	Deer, pronghorn, elk or moose range w/cattle and/or horses
2	Deer, pronghorn	4-Wire Sheep Fence (10" sw, 17" bw, 24" bw, 32" bw)	Deer and Pronghorn range w/sheep
3	Deer, pronghorn	4-Wire Sheep/Cattle fence (10" sw, 18" bw, 26" bw, 38" bw)	Deer and Pronghorn range w/cattle and sheep
4	Deer	Woven Wire Sheep Fence (26" ww, 28" bw, 38" bw)	Deer range with sheep
5	Deer, pronghorn, elk, moose	WYDOT* Type E (16" sw, 25" bw, 33" bw, 45" bw)	WYDOT* standard fence w/cattle and/or horses
6	Deer, pronghorn	WYDOT* Type G (6"bw, 14" bw, 24" bw, 36" bw, 48" bw)	WYDOT* standard fence w/sheep (often used but not recommended)
7	Deer, pronghorn	WYDOT* Type C (26" woven wire, 33" bw, 45" bw)	WYDOT* standard fence w/sheep (often used but not recommended)
8	Deer, pronghorn, elk, moose	Barbed and/or woven wire let-down fence sections (see Figure 1)	Frequent big game crossing areas
9	Deer, pronghorn, elk, moose	2-Wire Cattle Fence with Pole Top (16" bw, 24" bw, 38" wood pole). (see Figures 3a and 3b)	Deer, pronghorn, elk or moose range w/cattle and/or horses
10	Elk, moose	3-Wire Elk Winter Range Fence (10" bw, 18" bw, 27" bw, 38" pole top)	Elk winter range and moose range w/cattle, sheep, and/or horses
	Electric Designs		
11	Deer, elk, pronghorn, moose	3-Wire Electric Fence (22", 32", 42" hot-ground-hot) (see Figure 6)	Allow deer, elk, pronghorn, or moose passage while containing cattle or bison
12	Deer, elk, moose	2-Wire Electric Fence (20", 30", ground-hot) (see Figure 7)	Allow deer, elk or moose passage while containing cattle
13	Deer, pronghorn	4-Wire Electric Fence (22", 32", 42", 52", hot-ground-hot-hot) (see Figure 8)	Allow deer and pronghorn passage while containing cattle or bison.
	(Exclude Big Game or Predators)		
	Traditional Designs		
14	Deer, elk, moose	8' Woven- 2 strands smooth, 2 courses of woven wire (see Figure 9)	Protect gardens, young trees, stored crops
15	Pronghorn	32" to 48" woven wire, 1 to 3 strands barbed wire	Protect stored crops, small fields
	Electric Designs		
16	Deer	8-Wire Slant Electric Fence (see Figure 10)	Protect stored crops
17	Deer	3-D Electric Fence (see Figure 11)	Protect gardens, young trees, stored crops
18	Most medium or large terrestrial species	15-Wire Electric Fence (see Figure 12)	Protect nurseries, high value crops, airport runways
19	Black bear, grizzly bear	Electric/physical barrier combination (3-wire electric, 20", 30", 40" all hot with physical fence 12" to the inside)	Protect beehives
20	Deer, black bear, coyotes, dogs	5 to 8-Wire Electric Fence with alternating hot-ground wires	Protect trees, gardens, small fields, beehives, sheep, goats, poultry

*WYDOT is Wyoming Department of Transportation. We only recommend WYDOT designs when the fence will function as a state highway right-of-way fence and must follow WYDOT fencing policy that requires a minimum fence height of 45".

The original bulletin was written by Roger Wilson of the Wyoming Game and Fish Department through the Wyoming Cooperative Fish and Wildlife Research Unit.

This publication is one in a series of Habitat Extension Bulletins produced by the Wyoming Game and Fish Department. Call (307) 777-4600 for additional information or assistance.

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