

# Reducing Deer Damage to Forest Crops

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There can be widespread damage to crops in agriculture, Christmas tree plantations, and forest regeneration due to deer browsing and buck rubbing. We can accept the damage or attempt to control it by: modifying the habitat, managing the herd size and location, applying repellants, or erecting physical or psychological barriers. We have found fencing to be the only effective method under our control for reducing deer damage. Fence installation and maintenance is expensive and only economically feasible for valuable crops such as strawberries, Christmas trees, research plantings, and high-value forest crops like oaks. There are a variety of fence designs in use. Some of these in Delta County are described below.

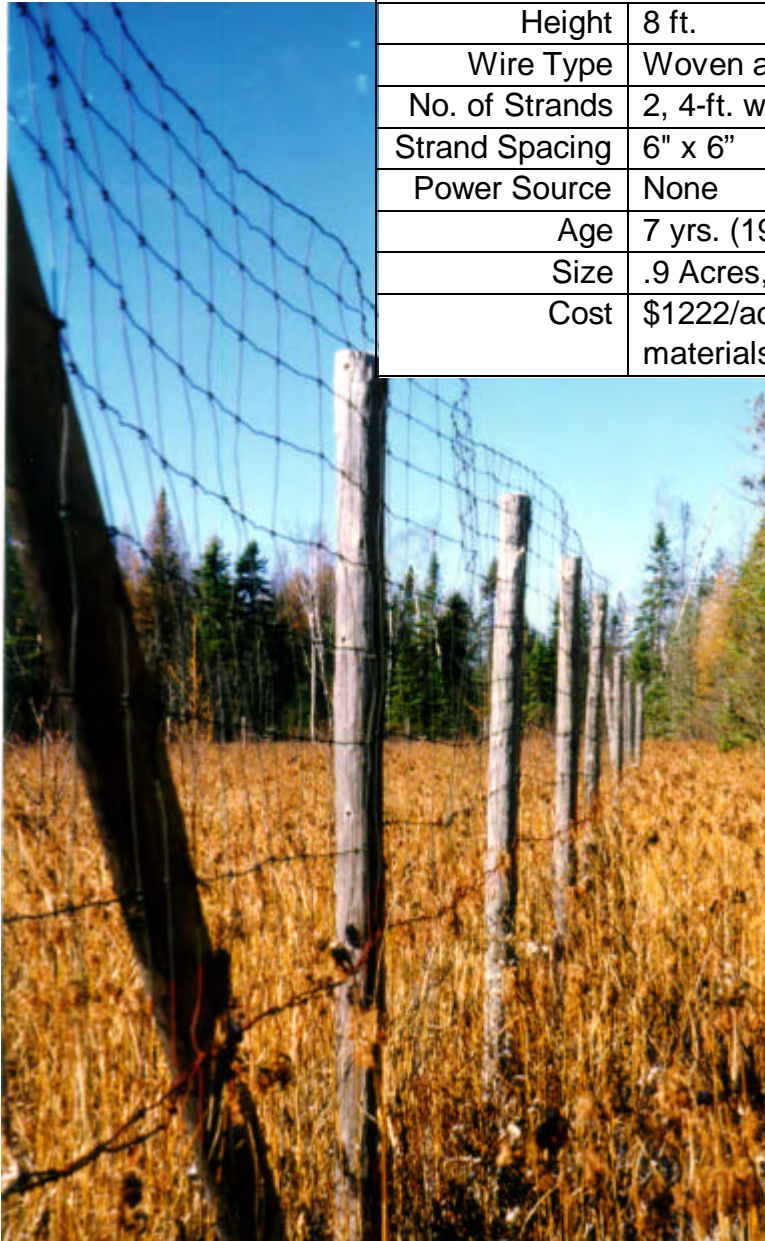
**Mesh** or woven wire is the most expensive fence to install and can be difficult to repair. A tree falling on high-tensile mesh fence causes more extensive damage than on a high tensile stranded electric fence. A properly installed mesh fence can be a true impenetrable barrier to deer. Its installed cost of \$4.00 to \$6.00 per foot makes it economical only for high value crops under extreme deer pressure.

**High-tensile electric** fences will exclude most deer and efficiently control deer damage if installed and maintained properly. There have been variations of this fence in existence in Pennsylvania for the last 17 years. As of January 1998 the Bureau of Forestry in Pennsylvania has 226 operational deer fences protecting 9,666 acres of hardwood regeneration areas. This amounts to 245 miles of fence. The Pennsylvania experience has shown that electric fences in the forest cost \$.89/ft.- \$2.03/ft. to install and average about \$1.18/ft. They are easy to repair, but are costly to monitor and maintain. The average maintenance cost for their electric fences in 1996 was \$30/acre/year. After about 5 years the regenerating areas develop more desirable deer food, and the deer become less intimidated by the psychological barrier. Eventually the fence's effectiveness is reduced, especially under very high deer densities. The materials are typically removed from the forest and salvaged after about 5 years. The fences described here in Delta County are 6' to 8' high and use 10 to 15 wires compared to the Pennsylvania fences which are typically 4' to 5' high using 5,6, or 7 wires.

**Polytape** fences are portable, inexpensive, and easy to install and remove. They have a much shorter life expectancy (5 to 7 years) than the high tensile mesh or high tensile electric fences (25 to 30 years). Often the small posts spaced about 20-ft. apart support 1 to 3 strands of polytape, and are installed as 2 parallel fences several feet apart around a perimeter. This 3-D fence with the tape fluttering in the breeze creates quite a visual display and helps to deter the deer from jumping over it or crawling under it. The polytape psychological barrier is considered temporary. Material for a polytape fence cost \$.50/ft. to \$1.20/ft. and can be reused several times.

# 8 FT. WIRE MESH FENCE IN A SWAMP

Fence Specifications	
Height	8 ft.
Wire Type	Woven annealed
No. of Strands	2, 4-ft. wide rolls
Strand Spacing	6" x 6"
Power Source	None
Age	7 yrs. (1990)
Size	.9 Acres, 1040 ft. perimeter
Cost	\$1222/acre, \$1.05/ft. materials only



This fence was built in a cleared cedar swamp during the summer of 1990. Two-inch pilot holes were drilled at each post location with a 2-man auger. 12'-long cedar posts were then driven 4' into the muck with the hand operated post drivers, pictured at right. Building by hand was the only option on this site during the growing season because of soft ground conditions.



# 10.5 FT. WIRE MESH FENCE IN A WOODLOT



Fence is build tight to the ground

The four strands of high tensile wire at the top absorb the shock of falling limbs and trees and are easily repaired.



**Mead**  
Publishing Paper Division  
**Research and Demonstration Area**  
Several harvesting methods are being tested in this area to evaluate both natural and artificial regeneration. Numerous studies will be established within this area during 1997 and 1998.  
For more information contact:  
Marshall Gilbert or Kurt Sauerman at (906) 786-1660

## Fence Specifications

Height	10.5 ft.
Wire Type	High Tensile Tightlock Mesh Fence w/4 Strands on Top
No. of Strands	Mesh w/20 horizontal strands vertical stay wires every 6 "
Strand Spacing	Mesh varies from 3" at bottom to 7 " at top
Power	None (barrier fence)
Age	1 yr. (1997)
Size	33 acres
Cost	Approximately \$4.50 / ft.
Special Features	Site had very thin soil layer over bedrock (difficult for post installation)

Mesh wire fences are the most expensive but are highly effective exclosures. This one adds four strands of smooth wire on top and presents a truly formidable barrier. This high tensile wire mesh is extremely durable. Care must be taken to prevent spaces below the fence where deer can crawl under. 8 ft. high tensile mesh is difficult to install and repair, and a 20 foot wide cleared path around the fence perimeter is recommended for crew and equipment.

## 8-WIRE ELECTRIC FENCE IN A SWAMP

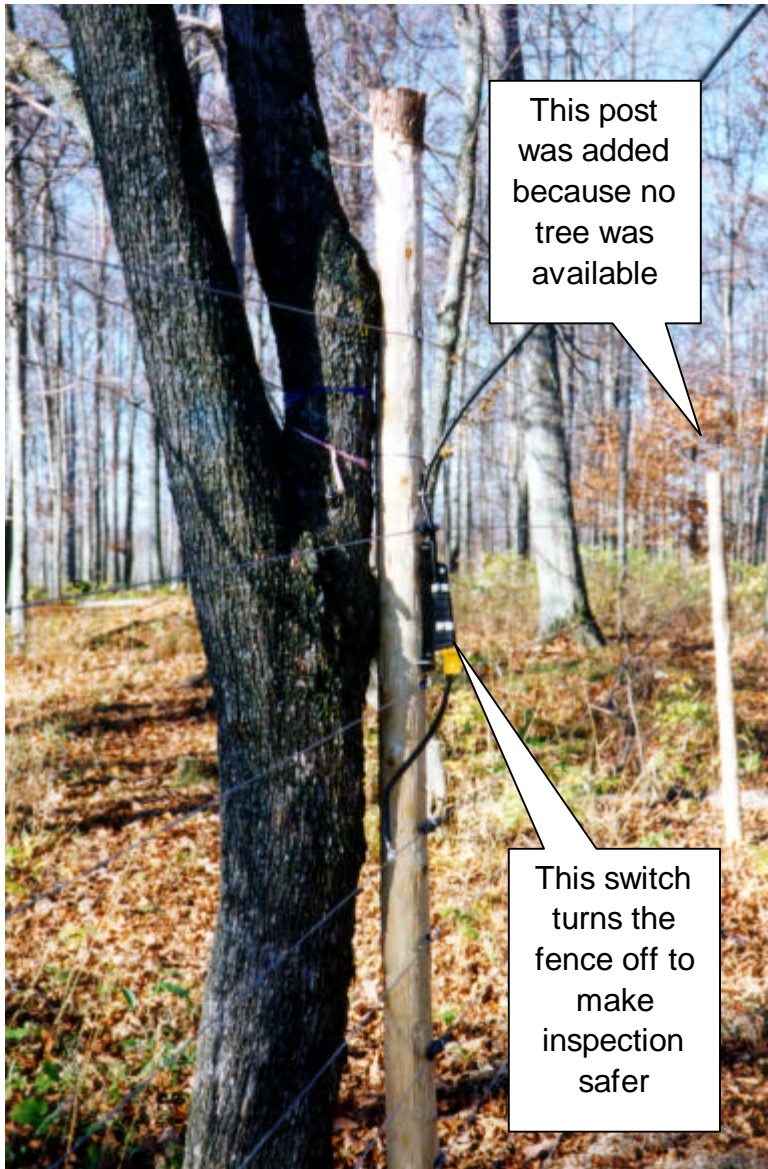


Fence Specifications	
Height	6.5 ft.
Wire Type	High tensile
No. of Strands	8, Alternating 4 Hot and 4 Ground wires
Strand Spacing	8" -10" between wires
Power Source	Deep cycle batteries
Age	6 yrs. (1992)
Size	25 Acres, 4400 ft. perimeter
Cost	\$368/acre, \$2.15/ ft.

In the winter of 1992 a bulldozer cleared a 12 foot wide strip through the swamp around the perimeter of the area to be fenced. This strip allows for equipment and crew to build, inspect, and maintain the fence. It also encourages the deer to go around rather than through the fence. Trees and limbs falling on the wires and vegetation growing up through the wires are a constant problem for any electric fence but especially in a remote swamp site. The fence line requires diligent regular monitoring and the batteries and energizer need to be checked routinely – especially after any wind, snow, ice, or lightning storm.



# 10-WIRE ELECTRIC FENCE IN A WOODLOT



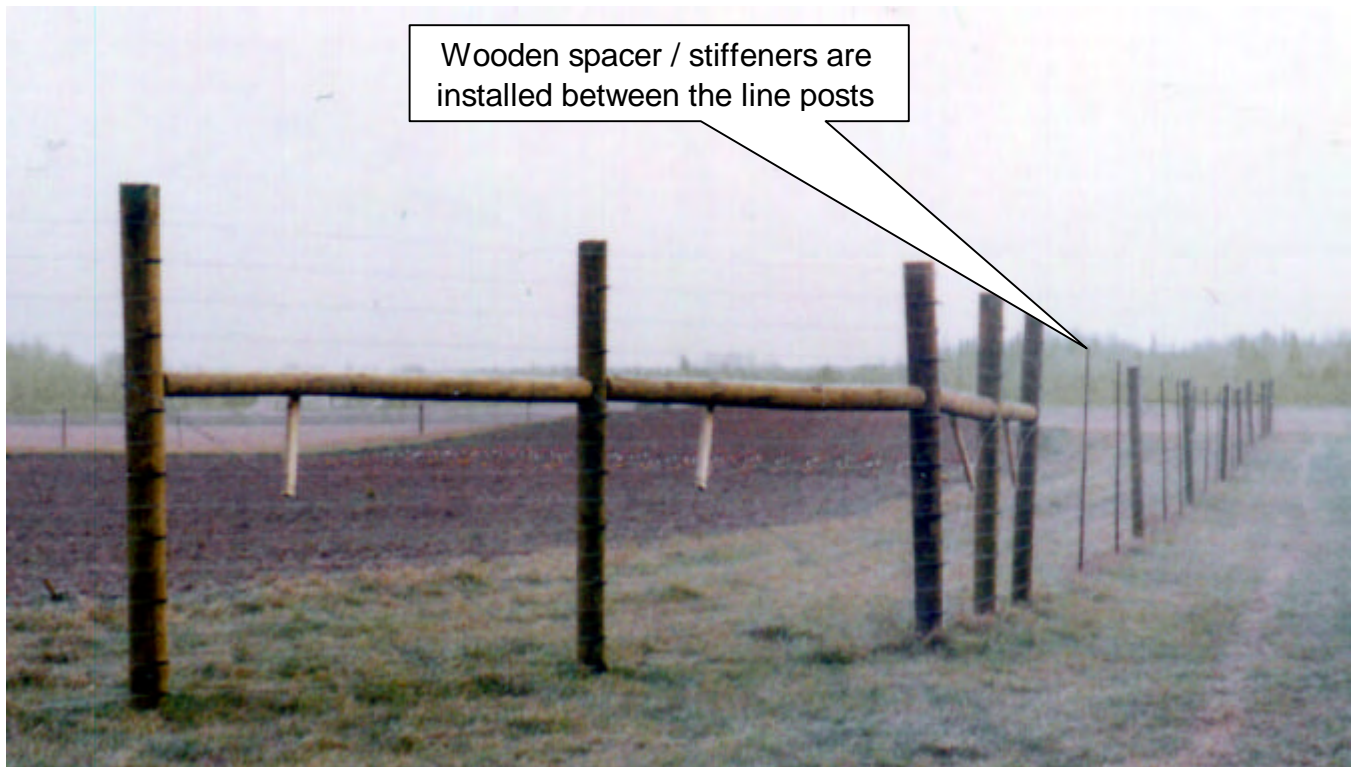
Fence Specifications	
Height	6 ft.
Wire Type	High tensile smooth wire
No. of Strands	10, Alternating 5 Hot and 5 Grounds
Strand Spacing	7" between wires
Power Source	110 volt energizer
Age	6 yrs (1992)
Size	3 fences, 4-acres each, 2000 ft. perimeters
Cost	Approximately \$2.00/ ft.
Special Features	Small posts used against trees

This fence is installed in an upland hardwood stand without clearing special access lanes. The fence is mainly supported by trees growing along the perimeter but a few posts were set into the ground wherever necessary. The 10 wires are mounted on small, inexpensive cedar poles at each tree to prevent the tree from growing over the wires. This happens in as little as 2 years in a thinned stand. These poles are fastened to the trees with long pole barn nails or wire ties. CCA treated 2 x 4s have been used for this purpose elsewhere.

We found that keeping all the wires on the same side of the line trees makes inspection and maintenance of the fence much easier. Herbicides are used to keep vegetation away from the fence.

Although this fence is in the upland, the same techniques could be used in the lowland.

# 15-WIRE ELECTRIC FENCE IN A FIELD



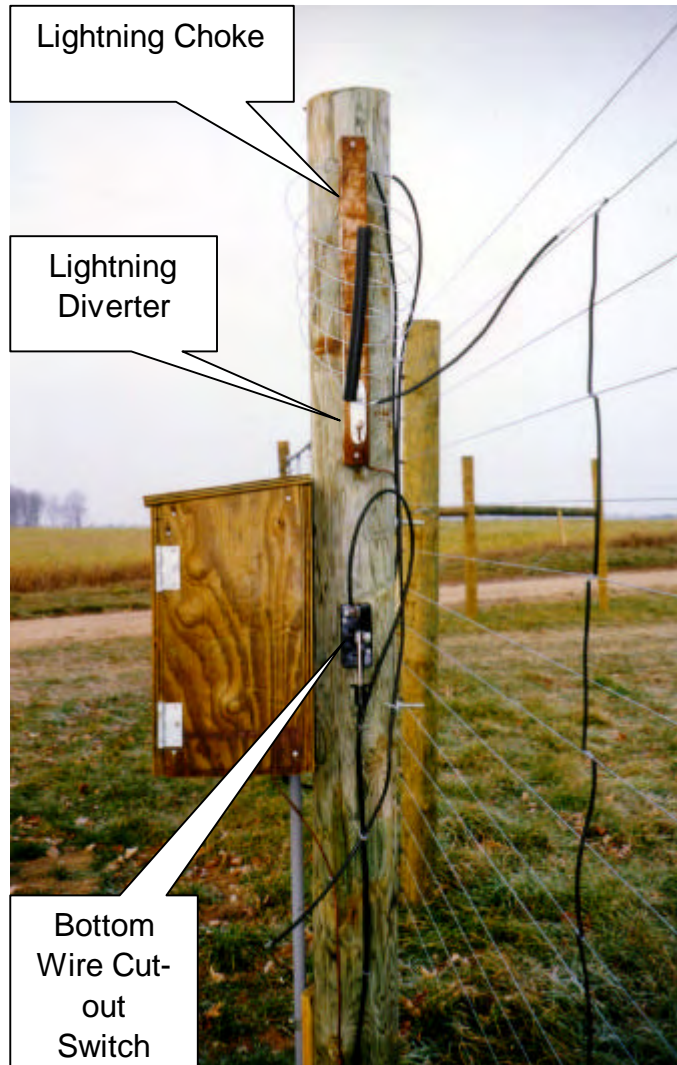
This high tensile electric fence is 8' tall and uses 15 wires on CCA-treated line posts. Line posts are spaced about 60' apart. Creosote-treated wooden spacer / stiffeners are installed every 20' between the line posts. This prevents the wires from wrapping around each other and stiffens the fence to make it difficult for deer to dive between the wires.

The wires are 6" apart at the bottom and 8" apart near the top. 8 of the wires are energized, carrying about 10,000 volts. 7 ground wires alternate with the hot strands so that deer that jump through the fence will be assured of getting a good shock.

<b>Fence Specifications</b>	
Height	8 ft.
Wire Type	High tensile smooth
No. of Strands	15, Alternating 8 Hot and 7 Grounds
Strand Spacing	6" at Bottom, 8" at the Top
Power Source	110 Volt energizer
Age	1 Yr (1997)
Size	21 Acres
Cost	about \$2.70 / ft.
Special Features	Tightly spaced alternating hot and ground wires with spacers every 20 ft.



# ELECTRIC FENCE ENERGIZERS



This is an electric fence energizer installation using a 110 volt ac power source. Energizers that operate on line voltage require less attention than those powered by batteries, but can be more costly to install if power is not available close-by. This energizer maintains about 10,000 volts of power in the fence. It is well grounded and protected against lightning strikes.



This is an installation of an energizer that uses two deep cycle marine batteries for power. They are buried in the ground to prevent them from freezing in the winter. The solar panel charges the batteries during sunny days. The near vertical installation of this panel keeps snow, leaves, debris, and bird droppings from blocking the sun. This type of power supply was chosen because the site is remote. Battery powered fences are also usefull for temporary fence installations.

The solar panel in this picture was eventually stolen. The fence continued to operate well if the batteries were manually recharged on 2-3 week intervals.

## 3-D POLYTAPE ELECTRIC FENCE IN A FIELD



This is an example of a simple “polytape” fence design. The three dimensional structure along with the high visibility of the “wires” combine to get the deer’s attention and deter them from entering. This fence has no energizer, and that will greatly reduce its effectiveness – it is a prime candidate for a battery powered energizer.

The perimeter is composed of two parallel fence lines separated by a 3-foot wide lane. The inner fence line has two polytape strands; one at 8" and another at 44" above the ground. The outer fence line has one polytape strand at 32" above the ground. Inexpensive 4-foot tall metal posts, spaced at 25-foot intervals support the polytape. No special corners need to be built for this type of fence. It can easily be erected or removed by one person and requires no special equipment to construct or maintain. This makes it a great choice for temporary applications.

Fence Specifications	
Height	44 "
Wire Type	Polytape
No. of Strands	3
Strand Spacing	26 Inches
Power Source	None applied
Age	1 yr. (1997)
Size	3.5 Acres
Cost	About \$.50/ ft. materials
Special Features	Quick and Portable



## 3-D POLYTAPE & STRANDED WIRE ELECTRIC FENCE

This landscaping hedge will eventually grow into an attractive barrier



The slanted posts clear the shrubs, confuse the deer, and are still easy to work around

This fence incorporates both polytape and high tensile wire on slanting posts to produce a confusing display. All of the strands are energized, and the bottom wire can be switched on or off. Springs spaced about every 200 feet hold the high tensile stranded wire tight. The top strand of polytape on each fence is loose enough to move in the breeze, which startles the deer.

The polytape has 5 small strands of stainless steel wire embedded in it to carry the shock of the energizer. The small slanted cedar posts are spaced about 30 feet apart. The slight angle of about 20 degrees allows a standard tractor mower deck to mow close to the fences.

<b>Fence Specifications</b>	
Height	4 ft.
Fence Spacing	2.5 ft. apart @ base, 5 ft. apart @ top
Wire Type	High tensile stranded, polytape
No. of Strands	8 High tensile, 2 polytape
Strand Spacing	6" Bottom, 8"-10" wire & polytape
Power Source	110 Volt ac energizer
Age	3 Yr. (1995)
Size	1200 ft. long
Cost	\$1.20 / ft. for materials
Special Features	Landscaping hedge row between two parallel fence lines