

Cacapon Institute
Suggested Revisions to USDA-CREP Tree Planting Protocols
in Areas with High Concentrations of White-tailed Deer.
September 4, 2007 **Revised** August 18, 2010

Forested riparian buffers are tree lined corridors alongside streams and rivers that reduce the flow of pollution moving from the land into the water. People are planting thousands of miles of buffers to protect the Chesapeake Bay and its rivers and streams, many of these miles with funding through the USDA-CREP program. However, it is not the number of trees *planted* but the number of trees we *grow* that will restore our forests and protect our waters.

Unfortunately, where deer are abundant young trees are often damaged by deer browsing; Cacapon Institute's (CI) surveys show more than 90% can be severely impacted by browse. We are currently testing a relatively low cost defense using temporary electric fencing materials. Results are promising (<http://www.cacaponinstitute.org/WVPTS/deerfence.htm>). This approach, or other electric fence approaches such as the 3 wire offset fence, have the potential to dramatically increase survival of riparian plantings in high deer-density areas – at a reasonable cost.

We suggest the CREP committee consider adopting the following tree planting/protection protocol for implementation in areas with high deer densities, except in areas where the public has regular access to the site and liability issues would be a problem. The intent of the fence is to protect the planting area for a sufficient time (3-5 years) until the trees have reached a height where deer are not a major threat.

General Guidelines

This practice assumes that riparian plantings are the standard 35 foot width. The literature indicates that deer fence success is reduced as enclosures become larger.

Tree tubes are not installed to protect trees from deer browse. Protection may be necessary to prevent rodent damage, particularly if the planting area is not routinely mowed by the landowner. CI suggests the use of 1-2' tree tubes, with inexpensive ½" x 4' bamboo stakes used to both support the tube and mark the location of each plant.

Temporary electric fencing should be installed, according to CI's 2-wire perimeter design (see below), the New Hampshire 3 wire offset fence, or a similar design. Unless the landowner is interested in maintaining a permanent fence (as will be necessary for development of a natural understory and natural tree recruitment), this fence should be installed using temporary fencing supplies to reduce costs.

The voltage on the completed fence, clear of weeds, properly installed without shorts to ground, must exceed 5000 volts. If it does not, first try installing additional ground rods per the energizer manufacturer's instructions. If that does not work, consider breaking the fence into several sections that are independently energized.

A low wire (6"-12" high) may be installed for the purpose of improving the path to ground and increasing the likelihood that deer will be shocked. However, if installed, this wire will be a maintenance problem both in terms of weed control and collecting flood debris.

When the fence is first installed, training the deer to the fence using peanut butter on aluminum foil wrapped around the hot wire will certainly not hurt prospects for success.

The fence wires must never be up without being energized.

Long fence installations (500' and greater) must incorporate gaps in the fenced enclosure that allow deer shock free passage across the width of the buffer. These gaps should be situated at locations where deer trails are observed. If there is an area with numerous deer trails, the fence designer may consider initially building a more robust fence in that area, with two hot wires (at ~20" and 30"), a ground wire at 6"-12", and fence baiting to ensure that deer are quickly conditioned to avoid the new condition on the ground.

If the fence is installed in the vicinity of other electric fence(s), expect the deer to be more acclimated to being shocked and more difficult to control. Additional wires (vertical and/or horizontal) may be needed to accomplish an acceptable level of control.

Do not use a farm's perimeter fence as the source of electricity unless: a) the voltage on that fence always exceeds 5000 V; b) the fence is known to be well maintained clear of weeds and shorts. Insufficient voltage will insure failure.

If a source of 120 volt AC power is readily available, consider buying a plug-in energizer instead of a solar energizer. They are less expensive, and able to put a higher voltage on the fence.

Take voltage measurements in the morning when dew is still on the grass. This is the time of day when any shorts will have the greatest effect on fence voltage, and the best indicator of the voltage that will likely be on the fence during the nighttime. Always use a digital voltage meter to test the fence.

If the area is known to flood frequently, the fence energizer should be installed above the typical observed flood elevation.

If the area is known to flood frequently, the landowner might consider respooling the fence wires before a likely flood event, and reinstalling the wire after the flood waters recede. That will reduce the issue of either cleaning flood debris from the fence, or removing that wire and installing new wire.

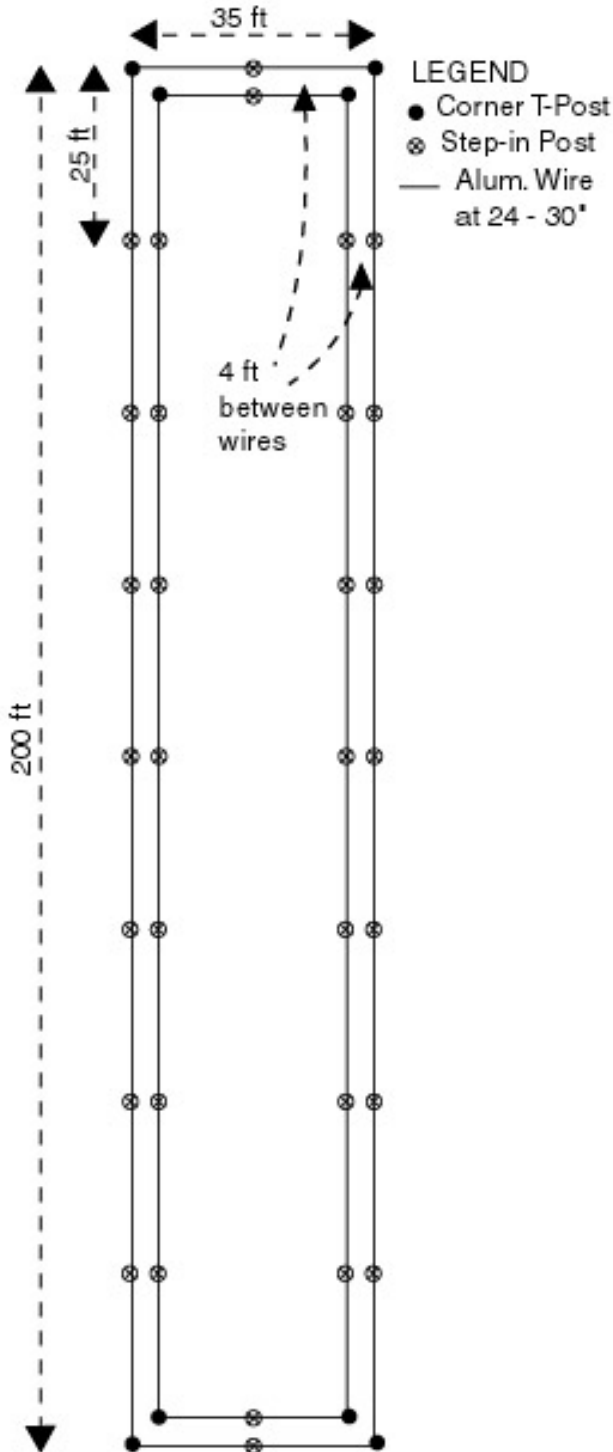
The costs of every planting should include the labor to check the fence periodically for breaks (especially in the first few weeks after installation), and to clear the fence of weeds as needed during the growing season. It is much easier to clear a fence before the weeds and grass are high enough to be a problem; one person can weed-eat a 600 foot long enclosure in about two hours under optimal conditions. We suggest setting a three month clearing schedule, starting in middle to late June, and sticking to it. Three visits should be sufficient

in all but the wettest years. Certain plants, like jewelweed, can grow very quickly in wet areas and may require additional attention.

The cost of this fence maintenance for 5 years should be considered a component cost of installation. Maintenance could be performed either by the landowner as part of their match or by the contractor. The planting is not complete until the trees grow, and maintenance is necessary for that to happen.

Cacapon Institute Deer Fence Design

Cacapon Institute Deer Fence Design (200 foot fenced enclosure example)



Supplies

1. I mostly use the Solartrol 6 charger for sites around or less than 600-700' long. These units are very reliable and capable of putting out sufficient voltage. **Charge 5 days in the sun prior to being hooked up.** Longer fence installations may need a larger charger, or multiple chargers for different sections.
2. 3 x 6' or 8' ground rods, plus ground rod clamps
3. 25' underground hookup wire for electric fence
4. I use 5' metal T-posts for all the fence "anchor points (ends and bends), with the energizer mounted on a board strapped to one T-post. Consider an 8' treated post for this purpose if flooding is an issue. I installed one a month ago at an Opequon planting after we went 6' under in floods in both January and March.
5. Step-in posts. I like the Geotek 3/8" step-in fiberglass posts sold by Tractor Supply, the ones with the built in wire clips. They are inexpensive when purchased in bulk (~\$1.50 or less), they will last very well, and the clips won't pull off the posts like detachable clips can when deer run through.
6. 14 gauge Aluminum fence wire, comes in 1400' rolls. Aluminum carries voltage better than steel, and 14 gage is strong enough that it doesn't break when deer run through it.
7. MaxFlex F580 Fast Fence Tighteners are very useful for tightening fence and quite inexpensive.
<https://secure.terranova.net/maxflex/orderform.htm>
8. Corner post insulators, like Dare # 1388-10, to dead-end wires at corner posts. T-post insulators for connecting wire to posts at bends.
9. Splice by twisting wires to save cost.

Sample Bill of Materials

Electric Fence supplies

Project: Example for 200' enclosure

Date Installed: n/a

Item	Unit Price	Qty	Extended Price
Solartrol 6 charger	\$ 199.99	1	\$ 199.99
Dare Plastic Corner Insulator (10pk)	\$ 0.30	8	\$ 2.39
5' T-post	\$ 4.19	8	\$ 33.52
4' stepin post each	\$ 1.79	32	\$ 57.28
Al Wire, 14 ga, 1320', Tractor Supply	\$ 0.03	1000	\$ 28.78
Hi Tensile Hookup wire (50 ft)	\$ 0.26	10	\$ 2.60
Gate handle, plastic	\$ 1.49	2	\$ 2.98
MaxFlex fence tighteners	\$ 0.90	4	\$ 3.60
Ground rod 5/8 x 6' galv	\$ 12.99	2	\$ 25.98
Ground rod clamp	\$ 2.49	2	\$ 4.98
Misc (screws, nails, etc)			
		TOTAL	\$ 362.10

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