

# How to thin a woodlot with pasture in mind

By Brett Chedzoy

Silvopastures can be developed from either of two directions: adding trees in to the pasture, or pasture in to the trees. The tips and tricks for establishing young trees in sod environments full of herbivores is a tale unto itself, so for now we'll focus on adding pasture to the trees.

As I noted in the January edition of *Graze*, the process for creating silvopastures that produce both quality timber and quality forages can be described in three steps.

Step 1 is to reduce the stocking of the trees and shrubs enough to allow sunlight to reach the soil surface. Step 2 is to create the conditions necessary for the establishment of grasses and forbs. And once these forage plants are established, Step 3 is to manage the system in a way that encourages the growth of the desirable plants while discouraging the growth of not-so-desirables (brambles, invasive plants and the like).

Easy, right? Well, there's enough here that this article will concentrate entirely on Step 1. We'll leave the other steps for future articles.

The process of reducing stocking (of trees and bushes, not animals) in wooded areas is known in forestry as "thinning". Thinning strives to reduce competition to a predetermined level while providing more sunlight to the "best" trees and shrubs growing in a given area. In silvopastures, ample sunlight must also be allowed to reach the ground level to sustain productive forage growth.

## *Two general ways to thin*

There are two ways in which thinning can be implemented to accomplish these objectives. The first, crop tree release, can be thought of as weeding around the tomato plants in the garden.

The tomato plants are the trees that meet certain desirable criteria such as species, vigor, diameter, crown class, form and other indicators of good growth and quality.

If a bird's-eye view of a tree's crown is pictured as four quadrants, in silvopastures the crop trees should be released from the competition of inferior trees growing at the same height on three or four of these quadrants.

Two crop trees can still be touching crowns, but competing trees should be removed from their other sides. The increased exposure to sunlight and the ability to expand their crowns horizontally will lead to increased growth and value appreciation, greater vigor to resist stress factors, and a boost in seed production — the latter being especially important if mast is utilized as part of livestock diets.

Crop Tree Management (CTM) was developed in the 1980s by the U.S. Forest Service to simplify the concepts of forest thinning for woodland owners. A free copy of "Crop Tree Management in Eastern Hardwoods" can be found via internet search, and is a must-read for do-it-yourselfers.

There is one twist to CTM in achieving silvopasture objectives: you must thin from the main canopy all the way to the ground. In most cases, the lower strata are comprised of smaller-diameter, slower-growing "suppressed" trees (the runts) and undesirable shrubs that intercept precious sunlight.

Foresters use fancy terminology like "junk" for these trees and shrubs. They need to be removed to provide space and sunlight for the forages you intend your stock to graze.

The second thinning method is Basal Area Control (BAC), which strives to reduce (tree) stocking to a target level rather than simply cutting all the ugly trees or making an eyeball estimate of what "looks about right".

Stocking in forested areas can be thought of as the amount of wood per acre. It's a good indicator of density (competition) and canopy porosity (the amount of sunlight intercepted by plants without reaching the soil surface). Simple

instruments (angle gauge, prism) available from any forestry supply company can be used to quickly and accurately measure the amount of stocking as expressed in “basal area per acre”.

Basal area is the surface area of all tree stems at 4.5 feet above the ground. This value can then be compared to a “stocking chart” to determine if a given stand of trees is “overstocked”, “fully stocked” or stocked to some percentage of full stocking. Whether you’re managing for timber production or silvopasture, the recommended stocking level is roughly half of the “full stocking” value.

While fully stocked stands maximize wood volume per acre, the growth per tree is compromised due to heavy competition, and relatively little sunlight penetrates the dense canopy. When the stocking is reduced to leave the best half of the trees, the growth of both trees and forages is optimized.

A 50% reduction in stocking can also be thought of as 50% open canopy. As with the CTM system, in silvopastures the basal area thinning must be implemented to the ground level.

Whether we use CTM or BAC to guide the thinning process, keep in mind that good forestry pays.

## ***Do not cherry pick***

Cherry-picking the money trees in the initial thinning, known as high-grading, will severely depress the future value and productivity of the timber resource.

Proper thinning always seeks to “leave the best and cut the rest,” though some of the higher-value trees may initially be culled due to overcrowding (too many “good” trees in one spot) or health and defect issues.

Excess trees and shrubs can be culled using any of the below methods.

**Girdling:** This involves mechanical, thermal or chemical severing of the cambium layer directly beneath the bark. The most common method is to cut one or two shallow rings around the trunk at waist height with a chainsaw. It’s a safe and fast way to cull larger trees, especially those with limited salvage value.

Girdled trees can be left to die in place and slowly return to the soil. Girdling does not work well for trees and shrubs with deep bark inclusions, and some species may need several years to die. Invasive shrubs often re-sprout from beneath the girdle, so treatment with an approved herbicide may be necessary.

**Poisoning:** This employs injection of an approved herbicide through wounds created in the trunk. The herbicide label must permit the species, treatment method and dose. Wounds can include frill cuts (downward chop marks with a hatchet or machete), drilled holes or partial chainsaw girdles. Results are directly proportional to getting enough active ingredient into the plant’s vascular system. Like girdling, the treated trees can be left standing. Poisoning works well for applications where girdling does not, especially for invasive shrubs with a propensity to re-sprout, or in clonal species that sprout from the root system when the main trunk is damaged.

**Felling:** You’re severing the trunk with a chainsaw or brush saw and leaving the tree in place. Coppicing (stump sprouting) is common with felled hardwood trees, which can become a temporary source of browse. Slash (woody debris) management can become an issue, and felling is typically slower and more hazardous work than girdling or poisoning. Chainsaw safety and efficiency training is highly recommended.

**Mulching:** Also known as mastication, mowing, chipping and flailing, this involves the use of specialized cutting heads and machinery to reduce trees and shrubs to chips and chunks. The “instant gratification” effect is high, but so is the cost per acre. Mulching works best in areas with high densities of small-diameter stems. A heavy mulch layer can hamper forage establishment, and the small, sharp stumps left behind can be hazardous to hooves and rubber tires.

**Harvesting:** Felled trees are being utilized rather than left in the woods. You can make firewood yourself, or you can hire professional loggers and foresters to accomplish the thinning objectives while selling timber at a profit. The initial thinning to create silvopasture usually requires harvesting a large volume of low-value trees.

## ***Consider a forester***

The services of a consulting forester can be invaluable for these situations and any type of thinning, as such an investment is typically repaid numerous times over with the results that person will help you achieve.

We’ve used all of the above on our farm to develop wooded areas into silvopasture. We’ve also tried excavation with heavy equipment. In hindsight, excavation was the least preferable method because it was difficult to work around the crop trees and caused excessive soil disturbance.

The resulting brush piles had to be burned to avoid creating islands where stock could not reach to browse invasive species.

In 2015 we contracted with a logging crew that specialized in harvesting low-grade (pulpwood) timber. This allowed us to thoroughly cull most of the remaining firewood-quality trees and provide the sunlight needed to grow forages.

As part of the contract, the loggers were also required to cut or smash down the many small stems of hemlock, beech, hop hornbeam and invasive shrubs that filled the understory. Portions of merchantable trees down to four inches in diameter were removed and trucked off-site.

### ***Pile what's left***

To the extent possible, the remaining slash was consolidated into piles through directional felling and pushing with skidder and dozer blades. This was done to minimize impediments for grazing animals.

We traded away about \$30/acre, or 10% of the net timber value (what was paid to us), in exchange for this additional work. By comparison, mulching the small stems as a separate treatment would have cost about 10 times as much. Mulching would have looked prettier, but it would have left us with little profit from the timber harvest.

Much of the finer-diameter slash has started to decay — especially where it was crushed down close to the soil surface. A “whole-tree” harvest would have been ideal to minimize slash, but the lack of markets for chips in our area made it infeasible.

An alternative we're currently experimenting with on another large (170-acre) silvopasture thinning currently in progress is to build windrows from the slash in designated areas.

Such “slash walls” are starting to be utilized by foresters to exclude deer from regenerating areas. At an average of 10-foot high and twice as wide, these utilize large amounts of slash and cost about the same as other fencing options. Slash walls in silvopasture areas also enhance wildlife habitat.

For more information on slash walls, see recent posts on Cornell University's [www.silvopasture.ning.com](http://www.silvopasture.ning.com) forum.