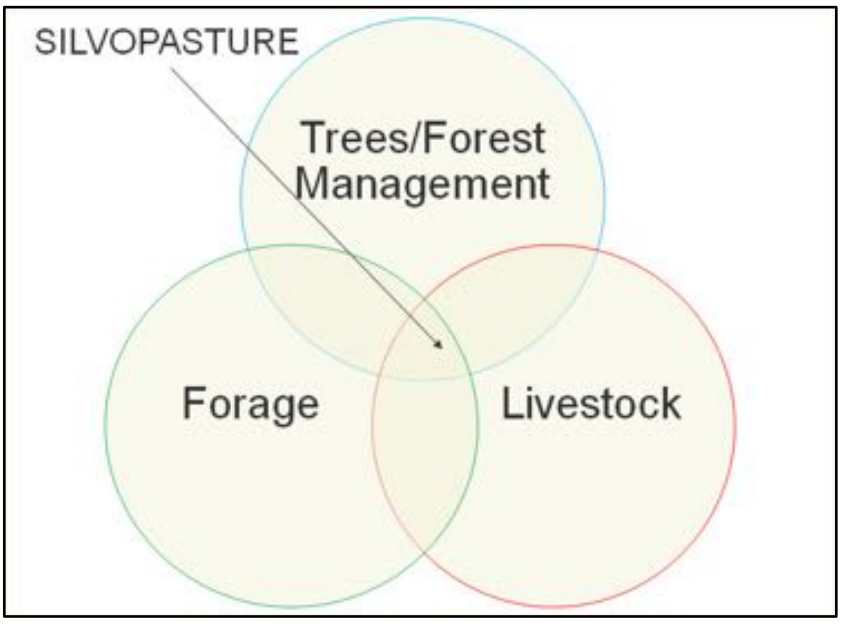
The last PowerPoint slide shown by Kate was on shade tolerance of grasses and legumes to show which ones can be used in seeding forests that have been thinned to provide enough sunlight to reach the forest floor to grow shade tolerant forages. Orchardgrass ranked second to reed canarygrass, but is the best shade tolerant pasture grass of the two from a management standpoint. Smooth bromegrass was a bit of a surprise, but perhaps does alright in diffuse shade. On the legume side, most of the legumes grown in the Northeast are not very shade tolerant except for crownvetch. Perhaps some of the wild vetches are similar in shade tolerance that have naturalized in some New England pastures. Kura clover has not fared well in getting established here. The next 3 clovers below Kura clover are adapted to warmer climates than exist in the Northeast.

She also recommended *Silvopasture Guide* by Joe Orefice.

The second speaker in this session was **Jeff Jourdain**, consultant forester of Jourdain Forest Management, from Becket, MA. The title of his presentation was "Experiences Establishing Silvopasture from a Forest". This is the most common pathway for developing a silvopasture in the Northeast. Most farms here can be forestland rich and pastureland poor. Some of the forestland may be mostly stocked with low-value trees. Silvopasture can be used to open up the canopy to grow grazable grass while culling out the low-quality trees and keeping the better quality trees.

Jeff started out his presentation from a forester's perspective: Long history of being trained that livestock and forests do not mix. "Domestic grazing animals not only retard natural reproduction but compact the soil by trampling, injure natural cover, and expose the surface to erosion." "Grazing injury is a distinct threat to forest management and must be considered with other destructive factors in any protection plans." (Introduction to Forestry, Sharpe et al 1976.)



This is an old mantra that still holds true if silvopasture management is not followed with the guidance of a forester and a logger that can be trusted to do thinning and removal of slash well so as to do the least harm to the soil and remaining trees. A professional forester is key as they can better recognize the trees that are merchantable or not. They also know how much basal area should remain behind to grow grass well and release the merchantable trees from unwanted competition from invasives and low-value trees. As Kate said, Jeff reiterated to be

realistic in how many acres you want to convert to silvopasture as it is scalable. If things go well, more acreage can be included later if site conditions allow it and you wish to have more. Silvopasture requires follow-through to ensure that it remains productive for both trees and forage growth. More thinning is likely to be needed to keep the basal area within guidelines (so that canopy openness remains about the same with time). Silvopasture requires patience as forage productivity may take some time. Long-time forests may have very acidic soils that are detrimental to good forage production. Liming the area to lessen soil acidity likely will be required.

In the diagram above, silvopasture works well when forest management, forage management, and livestock management are all considered equally important on silvopasture acres. Notice the three overlap in a small portion of each. The forest will be thinned to a less dense stand that if it were only managed for trees. Forage production will be less in silvopasture than an open pasture even though its quality might improve due to influence of shade cooling the climate the forage is growing in. Livestock production in turn would be higher (higher stocking rate) if it were open pasture and perhaps some other means of shade, if needed, were available.

The forestry must be sound. No resource is managed to the detriment of the others.

So how do we go from these three forest situations (a grazed forest with no understory, an ungrazed forest with a heavy understory, and a mixed hardwood-softwood forest) shown above to get to a silvopasture shown in the picture below:

Angus cattle in a silvopasture - dense pasture in a young, open tree stand

Its starts with a plan. What do we have to work with? Identify the forest resource. Hardwood? Softwood? Volumes? Stocking (trees) levels? Then, Where is it? How do we get to it? And as importantly – You need to identify your goals and objectives. The planning stage and the implementation must meet your goals. And of course – SOUND FORESTRY. Leave the best quality trees!

One of the parts of planning is putting the 'team' together. Find a forester you can work with and a logger who you can work with. Both have expertise in areas most landowners have little know-how and experience in.

Establishing silvopastures takes care, planning, and management. More management than running livestock on open pasture as you need to look out for the trees as well as the grass. This may require longer rest periods between grazing events and perhaps different seasonal grazing and rest strategies depending how weather events, tree species, and forage species affect them. You will also need: Dedication, investment, time, patience, and most of all **Reasonable Expectations**.

Jeff gave some examples of scale of silvopasture operations. Scalable – ½ acre to???? There is a 170-acre cut going on in NY. Mill River Farm – New Marlborough, MA 3 acres. Silvopasture for goats using hardwood bolts for shitake. Prairie Whale Restaurant – Great Barrington, MA 6-acre

silvopasture for pigs for the restaurant. These projects just do not have enough volume to justify a large commercial operation.

Identify trees to be cut and as importantly which trees to be left. Trees with blue spray paint on them are to be removed.

So, we know what we have for a resource , we have a suitable plan as to what and how much we need to cut, and we have identified the trees to cut or leave. Now how do we get the trees out of the woods? Starting with equipment needs - Depends on where you are located, markets, and landowner goals and objectives. If you are in an area where whole tree harvesting is carried out, this will leave you with one of the 'cleanest' sites for a silvopasture. Chipping is common in Central Mass [Quabbin area], portions of NH, and ME. VT? It is not common in Western Mass or the remainder of southern New England. Some of the equipment is shown below.

Feller-Buncher in operation

Skidder for removing logs and slash

Chipping is a highly efficient way to get rid of small diameter and low value wood products. It can also be marketable. See picture below where a skidder is hauling slash to a chipper.

Skidders come in different sizes and configurations. A grapple skidder is a large machine. It windrows or stockpiles tree tops and is efficient and cost-effective. Anticipate 6 to 8 slash piles on 30 acres.

Farm tractor logging is an option. Fit equipment to the size of the operation. Tractor uses a front-end loader and a fork-lift on the back. More labor intensive but utilizes farm machinery more completely and saves on hired labor and equipment.

You are looking to get as 'clean' a site as possible to allow for the movement of livestock. Avoid stony sites unless you plan to remove surface stones as well. If you are seeding it for silvopasture, this allows grass seed to come in contact with soil for better germination. A 3-point hitch spin broadcast seeder is called for using a small tractor or use a hand spinner in really tight areas. See newly seeded site at the left. Not much room to get in between and around closer spaced trees.

Another concern for harvesting/utilizing sunlight is the midstory/understory. Low shade is often harder to work with than high shade. Since it is understocked forest to begin with, cull rate is going to be low. Some trees will have to remain even if not of high quality until canopy gets denser and needs to be opened up more to grow grass well by culling a few more poor quality trees.

Follow-through is important. Without follow through you end up with……Well, an incomplete project.

Now for some not so positive experiences:

This photo shows a silvopasture site about 2 years after cutting. No grazing, no fencing. This area was cut hard to remove hemlock affected by hemlock woolly adelgid (HWA). It was not seeded to grass. Heavy pin cherry seedling and regrowth has occurred with other volunteer woody undergrowth present. This site would be difficult and expensive to restore to seed to a forage mixture. Follow-through did not occur.

Similar situation here. Not only was the site not seeded after thinning tree stand and removing slash, there is not enough livestock (goats) placed on the site for them to browse enough to keep up with the growth rate of the ferns and other browse on the site. Understory is redeveloping. No interior fencing to confine goats to small areas which would help increase stock density to at least clean-up portions of the whole silvopasture. Then, seed heavily browsed areas as goats are moved to a new area.

Establishment of forage/grasses should be immediately after harvesting cull trees and slash. Wintertime harvest is ideal so that the silvopasture site can be seeded in early spring. Site disturbance has the most exposed soil right after harvest, and there is the least amount of understory competition available. Since stumps are left, quick regrowth from those stumps can occur since there is a big root reserve to make them explode. Some seedlings are sure to survive and seeds/acorns of trees are going to spring to life too as more sunlight reaches the forest floor.

In Jeff's closing remarks, he quotes three sentences: "Thinning wooded areas to adequately open the forest canopy is the single most important factor to develop and sustain a productive silvopasture" [Chedzoy & Smallidge]. "Whether thinning for silvopasture or for 'traditional' forestry – forest management is predominantly light management" [Smallidge]. Brett Chedzoy of Cornell Cooperative Extension and Angus Glen Farm recommends starting small. As he puts it 'Better a small train wreck than a big train wreck'.

Jeff then gave this additional tip in getting forage seed out on silvopasture. Use hay with live

seeds of desirable forages (Not mulch hay quality). You can place round bales on undesirable plants/invasives to smother or destroy them with hoof action by feeding livestock.

Cattle feeding on two round bales placed on late winter silvopasture site. Both are set close to bramble patches.

Round bale feeding site in early spring on silvopasture

The hay bale feeding area enriches the soil with waste hay organic matter. Livestock waste will be concentrated around this feeding area to feed grass growing around it. As the season progresses, any hay seeds left in the waste hay will germinate readily as the waste hay retains moisture in the soil below it. Once the seeds sprout, they will have abundant moisture and nutrients to grow quickly.