

Silvopasture Establishment 381

Farm Bill Program\Participant

Farm Bill Program\Contract

Purpose:

Silvopasture is an agroforestry practice that establishes a combination of trees or shrubs and compatible grasses or legumes on the same acreage to provide forage for livestock, produce wood products, increase carbon sequestration, improve water quality, improve soil quality, reduce erosion, enhance wildlife habitat, and provide shade for livestock.

Acres to be treated: _____

Purpose (check all that apply)	
<input type="checkbox"/> Produce forage for livestock	<input type="checkbox"/> Produce shade for livestock
<input type="checkbox"/> Produce wood products	<input type="checkbox"/> Improve wildlife habitat
<input type="checkbox"/> Reduce erosion	<input type="checkbox"/> Improve water and soil quality
<input type="checkbox"/> Increase carbon sequestration	<input type="checkbox"/> Enhance renewable energy production
<input type="checkbox"/> Reduce fire hazard	<input type="checkbox"/> Other

Establishment

Land where silvopasture establishment applies includes: 1) pasture where trees or shrubs can be added; 2) forests where forages can be added; 3) land on which neither the desired trees nor forages exist in sufficient quantity or quality to meet the land user’s objectives.

- Where trees will be added to existing pasture, site preparation should be based on existing vegetation and soil conditions. Refer to the Forest Site Preparation and Tree Planting job sheets for more specific information. Trees should be planted at the recommended spacing and density shown in (Table 1).
- For existing forests being converted to silvopasture, thin and/or prune, if needed, existing trees to reduce canopy cover sufficient for forage establishment and adequate growth. Generally, canopy cover of about 25-50 percent for warm season grasses, and about 35-60 percent for cool season grasses, is recommended (Table 2). The lower end of the canopy range should be the target early in the grass establishment phase. Over time the canopy percent will increase moving the trees to the high end of their range and this can be an indicator that it is time to thin again. This is a good basic recommendation but because tree and forage species vary adjustments will need to be made for optimum tree and forage production. Consult with NRCS, Texas Forest Service foresters, or private consulting foresters for further assistance.
- Refer to the Forage and Biomass Planting Guide (TX 512) sheet for more specific information on forage establishment.

Considerations

Plan your alleys to exceed the maximum width of equipment to be used in management.

Use only viable, high quality, and adapted seedlings, and plant at a time and manner to insure survival and growth. Select the forage species best suited for the site and for the targeted livestock.

Livestock grazing should be deferred until the average height of the trees' terminal bud exceeds the browsing height of the livestock and the trees are of sufficient size to resist breakage. Hay or silage can be harvested during this period.

Locate facilities for water, minerals, or supplemental feed to encourage uniform grazing.

Rows should be oriented in an east-west orientation where feasible and practical to allow maximum sunlight onto grass strips. However, if field orientation or width makes it impractical orient the rows to best fit the field.

Prune trees to increase light to the forage plants, improve equipment access and to improve the quality of wood being produced in the trees. Use tree/shrub pruning (660) for information of pruning specifications.

Wildlife should be considered when selecting tree or shrub species. Species diversity, including use of native grass species, shrubs or forbs in the under story should be considered to meet the needs of the target wildlife species. Even a few wildlife trees can be beneficial.

If the area is currently in pasture or cropland and the goal is to establish a silvopasture system, plan to plant a minimum of 100 trees per acre up to a maximum of 400 hundred trees per acre. There are lots of choices to be made including the tree spacing, width of alleys and types of trees.

Silvopasture Establishment (from a pasture to a silvopasture)	Minimum	Maximum
Trees per acre	100	400

Table 1. The number of trees per acre needed to be planted for silvopasture establishment based upon a single row of trees or two rows of trees, then the alley followed by the single or two rows of trees.

Single-Row of trees between Alleys			Double-Row Trees between Alleys						
Alley Width	Trees in row spacing	No. trees per acre	Trees in row spacing	Row Spacing between trees					
				8ft	10 ft	12 ft.			
20 ft	8 ft	272		Trees per acre					
	10 ft	218	10 ft	311		290		272	
30 ft	8 ft	182	8 ft	287		272		258	
	10 ft	145	10 ft	229		218		208	
40 ft	8 ft	136	8 ft	227		218		209	
	10 ft	109	10 ft	182		174		167	

Forages Information					
Planting Date:					
Species of forage(s):	In-Row, Broadcast or drilled:	Rate (lbs/ac)	Alley width (ft)	Acres: ¹	Total pounds needed for practice:
1					
2					
3					

¹Multiply the alley width times length and divide by 43,560 to obtain acres per alley. Multiply acres per alley times the number of alleys.

Planting Date:					
Species of trees:	Kind of stock ¹ :	Average distance between trees (ft)	Total number of trees per acre: ²	Total number of acres:	Total number of trees needed for practice:
1					
2					
3					
4					
5					

¹Bareroot, Container, cuttings; ²Adjusted for width of maintenance equipment (see Table 1).

For establishing trees/shrubs follow the Tree and Shrub Establishment (612) guidelines.

For establishing forages follow the Forage and Biomass Planting (512) guidelines.

Apply nutrients as needed for establishment, forage production and to maintain plant vigor. Refer to Nutrient Management Standard 590 for further guidance.

Tree planting stock that is dormant may be stored temporarily in a cooler or protected area.

Site Preparation

Remove debris, smooth lands surface as needed and control competing vegetation to allow enough sunlight for grass or tree planting. Follow Tree/Shrub Site Prep 490 guidelines

Planting Methods

For container and bareroot stock, plant stock to a depth even with the root collar in holes deep and wide enough to fully extend the roots. For longleaf pine be sure the terminal bud is above the ground. Pack the soil firmly around each plant. Follow Tree/Shrub Establishment 612 guidelines

Operation and Maintenance

Inspect silvopasture components periodically and protect from damage so proper function is maintained. Continue control of competing vegetation to allow proper establishment.

Silvopasture Establishment (from a forest to a silvopasture)	Minimum Basal Area	Maximum Basal Area
Basal Area (sq. ft.)	25 BA	50 BA

When converting an existing forest stand to a silvopasture, there are many considerations that need to be made. The first is how to reduce the current level of trees per acre down to a level that will allow forages to become established. If the trees are large enough for a commercial thinning the stand can be adjusted using either an even distribution system or an alley system.

1) Even Distribution System (*Selection Thinning*)

The even distribution system utilizes a more intensive tree selection method when thinning the stand. Travel corridors are cut within the stand, say every fifth row or 50 feet apart and trees are thinned selectively in between, leaving the best trees with good form. This system results in a more natural appearance with trees evenly spaced across the landscape. This system will require more time and care to be used in marking the stand for thinning.

2) Alley System (*Row Thinning*)

The alley system utilizes row thinning with some tree selection within the remaining rows. Specific trees do not have to be marked for removal so the thinning operation proceeds rapidly once the pattern of row removal is established. This system is more advantageous to traditional farming equipment. The current stand does not necessarily have to be a plantation to use this system.

If the trees are not merchantable, trees can be reduced by cutting them down or by pushing the trees down with a dozer. Pushing the trees down is easier using an alley system. There are photos at the end of this job sheet.

Management Considerations

Competing vegetation should be controlled before the forages are planted. Use forest stand improvement (666) as the guide for this treatment.

Establish forages according to Forage and Biomass Planting (512) guidelines.

Apply nutrients as needed for establishment, forage production and to maintain plant vigor. Refer to Nutrient Management Standard 590 for further guidance.

Inspect trees and shrubs periodically and protect from adverse impacts including insects, diseases or competing vegetation. The trees or shrubs will also be protected from fire and damage from livestock and wildlife.

Forest landowners should always consider seeking professional assistance when preparing to harvest timber. The Texas Forest Service foresters or a private consulting forester can provide assistance to the landowner in preparing their trees for sale.

****Payment will be made upon completion of the planting operation and post-operation check-out by NRCS personnel, an approved Technical Service Provider or the Texas Forest Service.**

NRCS, Texas
Nov 2012

Layout – Existing Forest

<u>Even Distribution System</u>	<u>Alley System</u>
Current Basal Area of existing trees (ft ²)	Current Basal Area of existing trees (ft ²)
Spacing between existing trees (ft):	Alley width (ft):
Desired spacing between trees (ft):	Number of tree rows between alleys:
Basal Area of residual stand (ft ²):	Basal Area of residual stand (ft ²):
Forage – species to establish:	Forage – species to establish:

Trees needed per acre after thinning at two residual basal areas 25 & 50 sq ft per acre.

Average DBH	6"	8"	10"	12"	14"	16"	18"	20"
Trees/ac BA 50	255	143	92	64	47	36	28	23
Trees/ac BA 25	127	72	46	32	23	18	14	11

Forages Information

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1					
2					
3					

¹Multiply the alley width times length and divide by 43,560 to obtain acres per alley. Multiple acres per alley times the number of alleys.

Participant ****Please READ****

I understand the requirements of the practice and my questions concerning the practice have been answered. I further understand that a failure to adhere to the above requirements may jeopardize any and all payments.

Participant Signature

Date

NRCS personnel

Date

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NRCS, Texas
Nov 2012

Hazards

For **slash** pine areas, Annosus Root Rot (ARR) is a widespread disease caused by the fungus *Heterobasidion annosum*, formerly called *Fomes annosus*. A high hazard site is one on which annosus root rot can reasonably be expected to cause mortality and growth loss of a value greater than the cost of prevention. The most consistent and easily used indicator of high hazard sites is well-drained, **sandy** soil to a depth of at least 12". These soils consist of 70% or more sand. Organic soils and soils with indicators of poor internal or external drainage are a low hazard.

For high hazard sites the following recommendations should be followed:

- 1.) Use a no till method when establishing grass in an established tree stand. Heavy disking can damage the tree roots and spread the disease to residual crop trees.
- 2.) When thinning, treat stumps with borax by sprinkling evenly across the cut stump surface. This prevents the spores of *H. annosum* from infecting the stump and spreading via the root system to neighboring trees.



Pine stand before treatment.



Pine stand converted to silvopasture, 30' alleys leaving 2 rows of pines. Pushed with a dozer.



Pine stand thinned with forages planted (selection).



Pine stand thinned to 2 tree rows with 30' alleys between the tree rows, forages planted.