



Silvopasture Establishment

for a typical southern
pine system

Alabama Job Sheet No. AL 381A
Rev. 8/2006



Definition

Silvopasture - An agroforestry application establishing 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.

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. When the canopy percent increases over time the high end of the range 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, Alabama Forestry Commission foresters, or private consulting foresters for further assistance.

Refer to the Pasture Planting Guide (AL 512) sheet for more specific information on forage establishment.

Considerations

Tree spacing should 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.

Place tree rows on or near the contour when water erosion is a concern, and use other supporting practices as needed for erosion control.

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. This may require some adjustment in management to improve light distribution for forage.

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. This species diversity will also help to avoid loss of function due to species-specific pests. Native warm season grasses such as eastern gamagrass, switchgrass, indiangrass, little bluestem or big bluestem can provide both wildlife benefits and high quality forage for livestock.

Two Types of Management Systems:

When converting an existing forest stand to a silvopasture, two types of systems are recommended, each with their own advantages and disadvantages.

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.

For a first thinning, selection thinning is often difficult because of limited machinery access among small closely spaced trees.

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. If the landowner's emphasis is more towards forage production and less towards timber and wildlife this system should be considered.

Management

Forage and forest management will follow Prescribed Grazing 528 and Forest Stand Improvement 666 standards.

Replant when plant survival is inadequate to meet practice objectives.

Competing vegetation should be controlled until the trees are established.

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

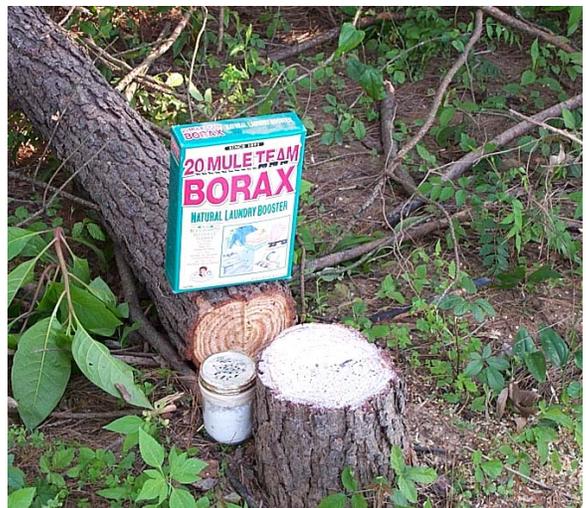
Inspect trees and shrubs periodically and protect from adverse impacts including insects, diseases or competing vegetation. The trees or shrubs will also be protected from fire and damage from livestock and wildlife.

Hazards

Annosus Root Rot (ARR) is a widespread disease caused by the fungus *Heterobasidion annosum*, formerly called *Fomes annosus*. In Alabama stands with annosus root rot can be found from north of the Tennessee River to the Gulf of Mexico. In this statewide range it is possible for any pine or stand of pines to have annosus root rot, but vigorous stands on suitable sites may suffer less damage. 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. The soil types in Alabama have been classified as to High or Low hazard for ARR.

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. This prevents the spores of *H. annosum* from infecting the stump.



Minimum Criteria

Silvopasture Establishment (from a pasture to a silvopasture)	Minimum	Maximum
Trees per acre	100	400
Silvopasture Establishment (from a forest to a silvopasture)		
Basal Area (sq. ft.)	25	Must get the stand below 50 BA over 5 years or 2 thinnings

Forest landowners should always consider seeking professional assistance when preparing to harvest timber. A consultant forester can determine the amount and actual value of the timber. Planning and supervising any logging operation requires experience and expertise of a consultant forester or a very knowledgeable landowner.

Additional information

Table 1

SILVOPASTURE – TREES PER ACRE

<i>SINGLE-ROW SET</i>				<i>DOUBLE-ROW SET</i>								
<i>ALLEY</i>		tree to tree		tree to tree								
<i>WIDTH</i>		in row		in row			<i>ROW</i>	<i>SPACING</i>				
		spacing		spacing								
				6ft			8ft		10ft		12ft	
15 FT		8ft	363	8ft								
		10ft	290	10ft			378		348		322	
20 FT		6ft	363									
		8ft	272	8ft			388		363		340	
		10ft	218	10ft	335		311		290		272	
30 FT		6ft	242	6ft			382		363		345	
		8ft	182	8ft	303		287		272		258	
		10ft	145	10ft	242		229		218		207	
40 FT		6ft	182	6ft	315		303		290		279	
		8ft	136	8ft	237		227		218		209	
		10ft	109	10ft	189		182		174		167	

Silvopasture Establishment – Work Sheet

Landowner _____ Field number _____

Purpose (check all that apply)	
<input type="checkbox"/> Forage for livestock	<input type="checkbox"/> Provide shade for livestock
<input type="checkbox"/> Produce high quality sawtimber	<input type="checkbox"/> Enhance wildlife habitat
<input type="checkbox"/> Increase carbon sequestration	<input type="checkbox"/> Reduce erosion
<input type="checkbox"/> Improve water quality	<input type="checkbox"/> Improve aesthetics on the property

Layout – Existing Pasture	
<u>Even Distribution System</u>	<u>Alley System</u>
Plant to plant spacing (ft):	Alley width (ft):
	Number of rows per set:
	Row and plant to plant spacing (ft):
	Cultivated strip width – around new planting (ft):
	Tree/shrub set orientations: ___ Contour; ___ North/South, East/West, ___ Other (specify _____)

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

Woody Plant Materials Information – Even Distribution System					
Planting Date:					
Species of trees:	Kind of stock ¹ :	Average distance between trees (ft)	Total number of trees per acre:	Total number of acres:	Total number of trees needed for practice:
1					
2					
3					
4					
5					

¹BA=aroot, COntainer.; include size, caliper, height, and age as applicable. ²Adjusted for width of maintenance equipment.

Woody Plant Materials Information – Alley System					
Planting Date:					
Species of trees:	Kind of stock ¹ :	Distance between Plants within row (ft)	Row width (ft):	Alley width (ft):	Total number of trees needed for practice:
1					
2					
3					

Forages Information					
Planting Date:					
Species of grass:	In-Row, Broadcast or drilled:	Rate (lbs/ac)	Area treated (Ac.):	Alley width (ft):	Total pounds needed for practice:
1					
2					
3					

Temporary Storage Instructions

Planting stock that is dormant may be stored temporarily in a cooler or protected area. For stock that is expected to begin growth before planting, dig a V-shaped trench (heeling-in-bed) sufficiently deep and bury seedlings so that all roots are covered by soil. Pack the soil firmly and water thoroughly. Additional requirements:

Site Preparation

Remove debris smooth lands surface as needed and control competing vegetation to allow enough sunlight for grass or tree planting. Additional requirements:

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 shallow planting is advised. Pack the soil firmly around each plant. Additional requirements:

Operation and Maintenance

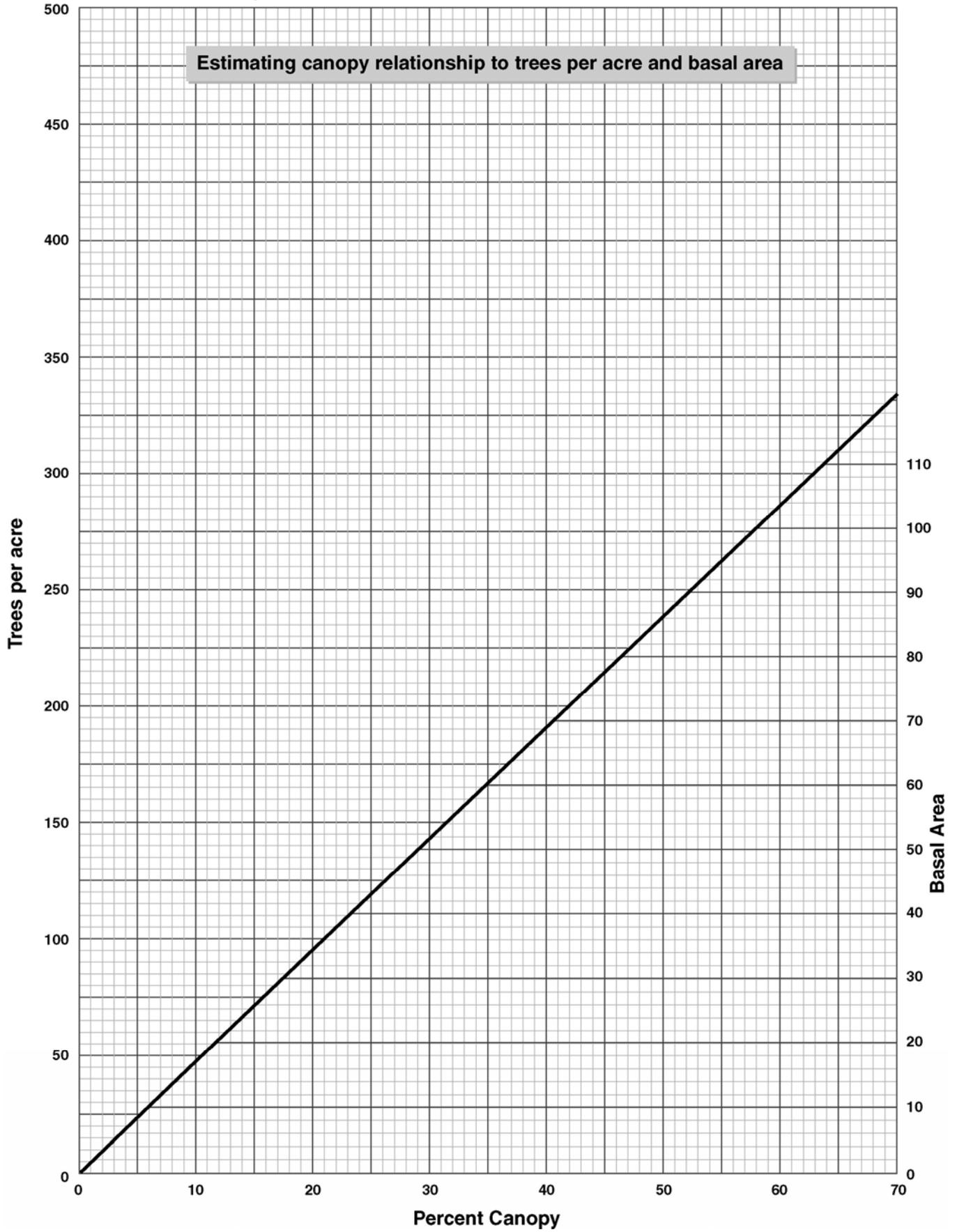
Inspect silvopasture components periodically and protect from damage so proper function is maintained. Continue control of competing vegetation to allow proper establishment. Additional requirements:

Percent Canopy Graph

Table 2

8 inch diameter Loblolly Pine

Measurements Good for Alabama

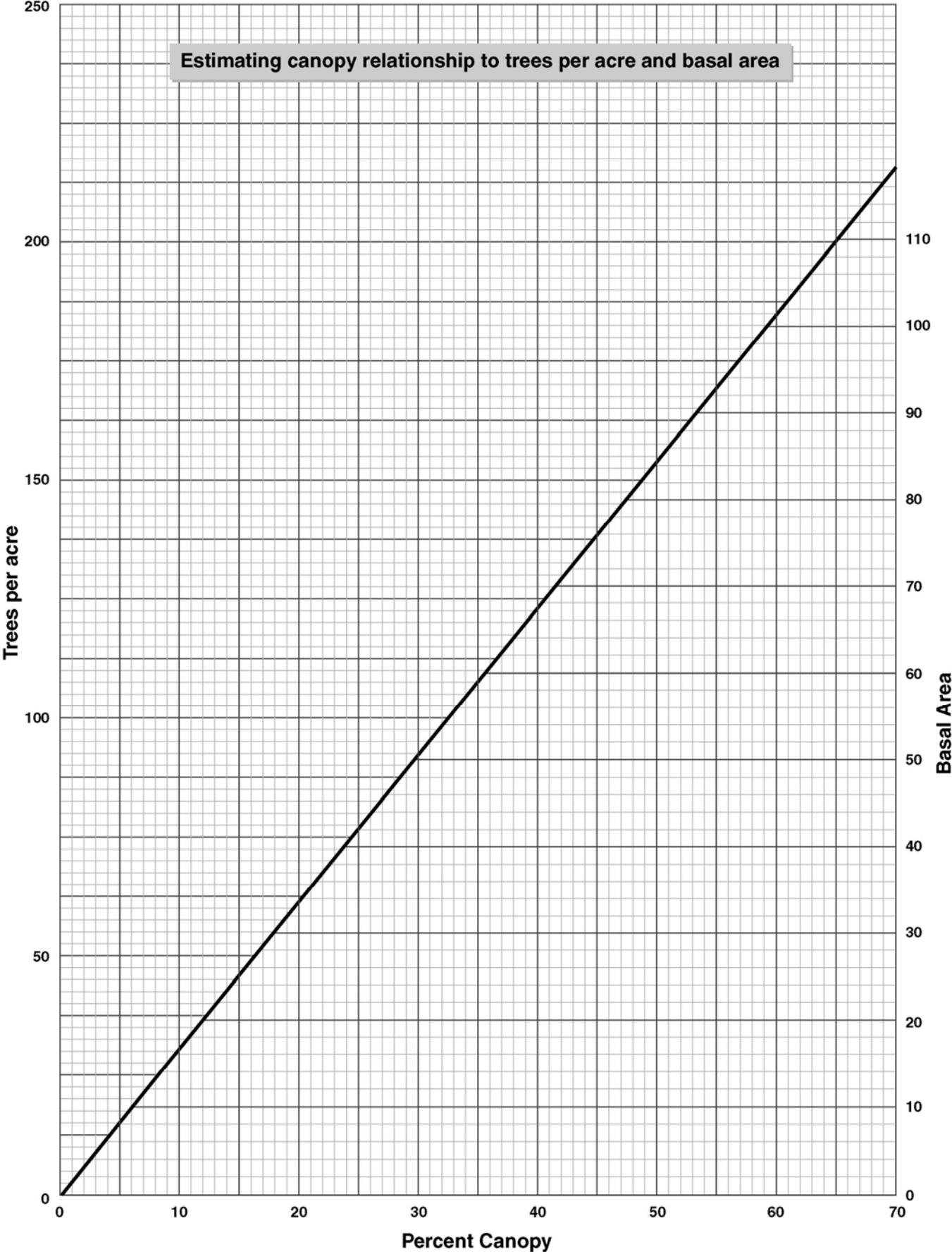


Percent Canopy Graph

10 inch diameter Lobolly Pine

Measurements Good for Alabama

Estimating canopy relationship to trees per acre and basal area



Percent Canopy Graph

12 inch diameter Loblolly Pine

Measurements Good for Alabama

