

**NATURAL RESOURCES CONSERVATION SERVICE  
KENTUCKY CONSERVATION PRACTICE STANDARD**

**SILVOPASTURE ESTABLISHMENT**

(Ac.)

CODE 381

**DEFINITION**

An agroforestry application establishing a combination of trees or shrubs and compatible forages on the same acreage.

**PURPOSE**

- Provide forage for livestock and the production of wood products.
- Reduce erosion.
- Enhance wildlife habitat.
- Provide shade for livestock.

**CONDITIONS WHERE PRACTICE APPLIES**

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

This practice may be applied on any area that is suitable for the desired plants.

**CRITERIA**

**General Criteria Applicable to All Purposes**

Tree species must be adapted to the site and compatible with planned livestock management. White pine, Loblolly pine, Black walnut, Black Locust, and Pecan typically have "open" crowns that are more conducive to productive understory than other species that are adapted in Kentucky.

Forage species must be adapted to the site and compatible with the planned management of the site.

Where trees will be added to existing pasture, site preparation should be based on existing vegetation and soil conditions. (See Forest Site Preparation Standard 490.) When using pesticides follow label recommendations and Pest Management Standard 595.

Only viable, high quality, and adapted planting stock will be used.

The planting shall be done at a time and manner to insure survival and growth of selected species. Spring plantings for bare-root seedlings can begin when the ground is no longer frozen and as soon as planting stock is available. Spring planting usually terminates in western Kentucky by April 15 and in eastern Kentucky by May 1. Fall planting may be done after hardwoods have lost their leaves and on into winter as weather and ground conditions permit. Fall and winter planted stock is subject to frost heaving and winter kill.

**Additional Criteria to Provide Forage for Livestock and the Production of Forest.**

The forage species must be identified as suitable for the targeted livestock.

Livestock grazing shall be deferred until the average height and diameter of the trees is sufficient to resist breakage or until suitable use exclusion measures for the protection of the woody plants are established. Hay or silage may be harvested during this period.

Tree density at planting should be approximately 200 to 400 per acre for conifers, or 100 per acre for Black walnut, Black locust, or Pecan. The tree species must be adapted for the site on which Silvopasture is being established. Throughout the rotation, trees will be thinned in order to maintain understory/overstory balance

that accomplishes the producer's goals. It is likely that at the end of the rotation, tree densities will be a little as 35 to 50 per acre for conifers and 15 to 35 for hardwoods, depending on site potential, species, and other factors. Generally, the lower tree densities optimize forage production and the higher densities optimize timber production. See the Operation and Maintenance section of this standard for more information regarding tree density.

#### **Additional Criteria to Reduce Erosion**

Place linear woody plantings on or near the contour when water erosion is a concern.

#### **Additional Criteria to Enhance Wildlife Habitat**

Establish forage species and understory shrubs that will provide forage, browse, seed, cover, or nesting habitat for the wildlife species of concern.

### **CONSIDERATIONS**

Failure to maintain adequate forage for livestock may result in excessive tree damage and/or loss.

Location and distribution of facilities for water, minerals, or supplemental feed should be such that livestock are not encouraged to over-utilize areas of silvopasture.

If grazing does not maintain reduced fuel loads, prescribed burning should be considered providing the woody plants are fire-adapted and will not be damaged.

Where water erosion is a hazard, it should be controlled by supporting practices.

Wildlife should be considered when selecting tree or shrub species. Species diversity, including use of native species, should be considered.

Consideration should be given to adverse offsite effects.

### **PLANS AND SPECIFICATIONS**

Specifications for applying this practice shall be prepared for each site and appropriately recorded.

### **OPERATION AND MAINTENANCE**

The following actions shall be carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance):

- Forage and forest management will follow Prescribed Grazing 528 and Forest Stand Improvement 666 Standards. Tree canopy should be managed for 25-45 percent canopy for warm season grasses and 30-50 percent canopy for cool season grasses. This requires thinning at varied intervals depending on site productivity to keep the canopy within the desired range.
- Tree limbs will need to be pruned in order to maintain viable, marketable timber stock. Conifers will need to be pruned when trees reach 15 to 20 feet tall and/or the diameter of the tree reaches 5 inches at a height of 6 inches above the ground. Conifers will need follow-up pruning up to the desired harvest height (probably 18-32 feet) where the trunk diameter is greater than 4 inches, but never more than one-half of the total crown. Maintain live crown equal to one-third of the tree height. Hardwood trees will need pruning to achieve the desired canopy type (multi-branched is generally preferred for nut production, single stem for lumber, etc) throughout the rotation.
- Replanting will be required when plant survival is inadequate to meet practice and client objectives.
- Competing vegetation will be controlled until the trees are established.
- Periodic applications of nutrients may be needed for establishment 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 wildfire and damage from livestock and wildlife.

**REFERENCES**

Bendfeldt, E.S., etal. 2001. Establishing trees in an Appalachian silvopasture: response to shelters, grass control, mulch, and fertilization. *Agroforestry Systems*. 53:291-295.

Burner, D.M. 2003. Influence of alley crop environment on orchardgrass and tall fescue herbage. *Agron. J.* 95: 1163-1171.

Lehmkuhler, J.W., etal. 2003. Tree protection methods during the silvopastoral-system establishment in Midwestern USA: cattle performance and tree damage. *Agroforestry Systems* 59: 35-42.