

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

SILVOPASTURE ESTABLISHMENT

(Acre)

CODE 381



Silvopasture field day at Univ. Florida, IFAS, North Florida Res. and Education Center, Quincy, FL.

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.
- Increase carbon sequestration.
- Improve water quality.
- Reduce erosion.
- Enhance wildlife habitat.
- Reduce fire hazard.
- Provide shade for livestock.

CONDITIONS WHERE PRACTICE APPLIES

Situations where silvopasture establishment applies include: 1) pasture where trees or shrubs can be added; 2) forest where forages can be added; or 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/shrub species used must be adapted to the site and compatible with planned livestock management. The forage species or combination of species selected also must be adapted to the site and compatible with the planned management of the site. See Florida NRCS Conservation Practice Standards

Tree/Shrub Establishment, Code 612, and Pasture and Hay Planting, Code 512, for more information.

Do not plant any species found on the Florida Dep. of Agriculture and Consumer Services or the Florida Dep. of Environmental Protection noxious or prohibited weed lists. Additionally, do not plant any species listed as a Category 1 invasive species by the Florida Exotic Pest Plant Council (see FOTG Section I [f] [4]).

Where trees will be added to existing pasture, base site preparation on existing vegetation and soil conditions. See Florida NRCS Conservation Practice Standard Forest Site Preparation Standard, Code 490. Trees will be planted at the recommended tree density. See Florida NRCS Conservation Practice Standard Tree/Shrub Establishment, Code 612, and accompanying guidance.

For existing forests remove a sufficient number of trees and/or prune existing trees to allow adequate light penetration for forage establishment. Establish forage species in accordance with Florida NRCS Conservation Practice Standards Pasture and Hayland Planting, Code 512, or Range Planting, Code 550.

When using pesticides follow label recommendations and Florida NRCS Conservation Practice Standard Pest Management, Code 595.

Use only viable, high quality, and adapted planting stock or seed for both forest/shrub and forage establishment.

Base time and manner of planting on what best ensures establishment and growth of the selected species. Specify what constitutes successful establishment, e.g., minimum percent ground/canopy cover, percent survival, stand density, etc., before application.

Tree/shrub spacing needs to exceed width of equipment to be used in management. See Florida NRCS Conservation Practice Standard Tree/Shrub Establishment, Code 612, and accompanying guidance for more information on spacing.

Impact to cultural resources, wetlands, and Federal and State protected species needs to be avoided or minimized to the extent practical during planning, design, and implementation of

this conservation practice in accordance with established National and Florida NRCS policy; General Manual (GM) Title 420-Part 401, Title 450-Part 401, and Title 190-Parts 410.22 and 410.26; National Planning Procedures Handbook (NPPH) FL Supplements to Parts 600.1 and 600.6; National Cultural Resources Procedures Handbook (NCRPH); and The National Environmental Compliance Handbook (NECH)

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

The forage species used must be suitable for the targeted livestock and local site conditions. See Florida NRCS Conservation Practice Standard Pasture and Hay Planting, Code 512, for more information.

Defer livestock grazing until the average height of the tree's/shrub's terminal bud(s) exceeds the browsing height of the livestock, the tree/shrub is of sufficient size to resist breakage, or until suitable use exclusion measures for the protection of the woody plants are established. A forage crop (hay, silage, etc.) may be harvested during this period.

Plant trees at an appropriate density to allow acceptable forage production and wood products. See Florida NRCS Conservation Practice Standard Tree/ Shrub Establishment, Code 612, and accompanying guidance for more information.

The tree or shrub species used must have potential to produce an agroforestry product. See Florida NRCS Conservation Practice Standard Tree/ Shrub Establishment, Code 612, and accompanying guidance.

Additional Criteria to Increase Carbon Sequestration

For optimal carbon sequestration, select plants that have higher rates of sequestration and are adapted to the site to assure strong health and vigor.

Plant and manage the appropriate stocking rate for the site to maximize biomass production.

Additional Criteria to Improve Water Quality

Favor trees, shrubs, and forages that have growth characteristics conducive to high nutrient uptake.

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. For additional information, refer to Florida NRCS Conservation Practice Standard Wildlife Upland Habitat Management, Code 645, and accompanying guidance.

CONSIDERATIONS

Failure to maintain adequate forage for livestock and a proper mineral ration for animal health may result in excessive tree damage and/or loss.

Locate and distribute water, minerals, or supplemental feed facilities to prevent livestock from over-utilizing areas of silvopasture.

Orient tree/shrub rows in an east-west orientation where feasible and practical to allow maximum sunlight onto grass strips.

If grazing does not adequately reduce fuel loads, utilize Florida NRCS Conservation Practice Standard Prescribed Burning, Code 338, providing the woody plants are fire-adapted and will not be damaged.

Where water erosion is a problem, control it with supporting practices.

Consider wildlife needs when selecting tree or shrub species. Consider species diversity, including use of native species.

Minimize adverse offsite effects.

Select plants with root systems that have a minimal impact on crop growth when this practice is incorporated into cropping systems.

PLANS AND SPECIFICATIONS

Prepare specifications for applying this practice for each site and record specifications using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation. The following elements need to be addressed in the plan, as applicable, to meet the intended purpose:

- Site preparation
- Fertilizer application
- Seedbed/planting bed preparation (if needed, e.g., high water table soils)
- Methods and time of seeding/planting
- Selection of tree/shrub species and their row arrangement to be established
- Source of seed/plants and seed lot quality analysis for seed-established species
- Rates of seeding/planting materials to be applied
- Protection of plantings in accordance to Florida NRCS Conservation Practice Standard Use Exclusion, Code 472.
- When appropriate, develop a prescribed grazing plan in accordance to Florida NRCS Conservation Practice Standard Prescribed Grazing, Code 528

OPERATION AND MAINTENANCE

To insure that this practice functions as intended throughout its expected life, carry out the following actions, which include normal repetitive activities in the application and use of the practice (operation) and repair and upkeep of the practice (maintenance):

- Use forage and forest management practices that follow Florida NRCS Conservation Practice Standards Prescribed Grazing, Code 528, and Forest Stand Improvement, Code 666.
- Replant when plant survival is inadequate to meet practice and client objectives.
- Control competing vegetation until the trees are established.
- Periodic applications of nutrients may be needed for establishment and to maintain plant vigor. Refer to Florida NRCS Conservation Practice Standard Nutrient Management, Code 590, for further guidance.
- Inspect trees and shrubs periodically and protect from adverse impacts including insects, diseases, or competing vegetation. Protect the trees or shrubs from wildfire and damage from livestock and wildlife.

REFERENCES

- Bendfeldt, E.S., et al. 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.
- Byrd, N.A., and C.E. Lewis. 1983. Managing pine trees and bahiagrass for timber and cattle production. USDA Forest Service, General Report R8-GR 2.
- Clason, T.R. 1996. Timber-pasture management enhances productivity of loblolly pine plantations. *Louisiana Agriculture* 39(2): 14-16.
- Clason, T.R. and S.H. Sharrow. 2000. Silvopastoral practices. Ch. 5 in *North American Agroforestry: An Integrated Science and Practice*. American Society of Agronomy, Madison, WI.
- Clason, T.R. 1995. Economic implications of silvopastures on southern pine plantations. Louisiana Agricultural Experiment Station, in *Agroforestry Systems* 29:227-238.
- Clason, T.R. 1999. Silvopastoral practices sustain timber and forage production in commercial loblolly pine plantations of northwest Louisiana USA. *Agroforestry Systems* 44: 293-303.
- Clason, T.R. and J.L. Robinson. 2000. From a pasture to a silvopasture system. USDA, NAC. *Agroforestry Note* 22.
- Clason, T.R. and J.L. Robinson. 2000. From a pine forest to a silvopasture system. USDA NAC *Agroforestry Note* 18.
- Cutter, B.E., K. Hunt and J.D. Haywood. 1999. Tree/wood quality in slash pine following long-term cattle grazing. *Agroforestry Systems* 44:305-312.
- Fike, J.H., et al. 2004. Considerations for establishing and managing silvopastures. *Plant Management Network*. 1-12.
- Lehmkuhler, J.W., et al. 2003. Tree protection methods during the silvopastoral-system establishment in Midwestern USA: cattle performance and tree damage. *Agroforestry Systems* 59: 35-42.
- Lewis, C.E., et al. 1983. Integration of pines, pastures and cattle in south Georgia, USA. *Agroforestry Systems*. 1:277-297.
- Sharrow, S.H. and I. Syed. 2004. Carbon and nitrogen storage in agroforests, tree plantations and pastures in western Oregon, USA. *Agroforestry Systems* 60:123-130.