

**NATURAL RESOURCES CONSERVATION SERVICE  
MONTANA 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**

- To provide forage for livestock and the production of wood products.
- To increase carbon sequestration.
- To improve water quality.
- To reduce erosion.
- To enhance wildlife habitat.
- To reduce fire hazard.
- To 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.

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

**Tree and forage species must be suited and adapted to the soils, climate and purpose.**

**See the Montana Field Office Technical Guide (FOTG), Section II, Conservation Tree/Shrub Suitability Group (CTSG) for a detailed listing of species suited for various soils and climatic conditions.**

Where trees will be added to existing pasture, site preparation should be based on existing vegetation and soil conditions (see the conservation practice standard for Forest Site Preparation (490).

Trees will be planted at the recommended tree density (see the conservation practice standard for Tree and Shrub Establishment [612]).

For existing forests **and plantations** remove a sufficient number of trees and/or prune existing trees to allow adequate light penetration for forage establishment **and silvopasture use**.

Establishment of forage species will be in accordance with Pasture and Hayland Planting conservation practice standard (512) or Range Planting (550).

When using pesticides, follow label recommendations and the conservation practice standard for Pest Management (595).

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

The planting shall be done at a time and manner to insure survival and growth of selected species.

Tree/shrub spacing needs to exceed width of equipment to be used in management.

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

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

**NRCS, MT  
March 2005**

**Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard contact the Natural Resources Conservation Service.**

**NOTE:** This type of font (AaBbCcDdEe 123..) indicates NRCS National Standards.  
This type of font (AaBbCcDdEe 123..) indicates Montana Supplement.

Livestock grazing shall be deferred until the average height of the tree's terminal bud exceeds the browsing height of the livestock or 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 **mechanically** harvested during this period.

Plant trees at an appropriate density to allow acceptable forage production and wood products.

The tree or shrub species must have potential to produce forest products.

#### **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.

**Incorporate adequate conservation buffers if a water source (stream, pond, etc.) is present.**

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

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

**Water erosion and/or runoff from melting snow will be controlled by supporting practices.**

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

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

For additional guidance refer to Wildlife Upland Habitat Management Standard (645).

#### **Additional Criteria to Provide Shade for Livestock**

**Trees should be uniformly spaced for even shade distribution.**

## **CONSIDERATIONS**

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

Rows or **plantings** should be oriented in an east-west orientation where feasible and practical to allow maximum sunlight onto grass strips.

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.

Wildlife **needs** should be considered when selecting tree, shrub **and forage** species. Species diversity, including use of native species, should be considered.

Consideration should be given to adverse offsite effects.

Plants established in cropping systems should have root systems that have minimal impact on crop growth.

## **PLANS AND SPECIFICATIONS**

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, technical notes and narrative statements in the conservation plan, or other acceptable documentation.

**As a minimum, the Silvopasture Establishment practice will have the following components in its plan and specifications:**

- **A narrative that describes the producer's goals and objectives. Identify why the practice is needed and feasible.**
- **An environmental assessment of the planned practice that includes the potential impacts on soil, water, animals, plants, air and humans.**
- **An alternatives narrative that identifies and describes several methods that could be used to address the resource issue. Also identifying the producer selected method.**
- **The Montana Silvopasture Establishment practice job sheet and specification.**
- **Plan map and soil map of site with location of practice on the map.**
- **Operations and maintenance instructions.**

## OPERATION AND MAINTENANCE

The following actions shall be carried out to ensure 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):

- 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.
- **Restrict access by livestock when soils are at or above field capacity (saturated soil conditions).**
- Forage and forest management will follow Prescribed Grazing (528) and Forest Stand Improvement (666) standards.
- Competing vegetation will be controlled until the trees are established.
- Replanting will be required when plant survival **or canopy cover** is inadequate to meet practice and client objectives.
- Periodic applications of nutrients may be needed for establishment and to maintain plant vigor.
- Refer to the conservation practice standard for Nutrient Management (590) for further guidance.
- Inspect trees and shrubs periodically and protect from adverse impacts including insects, diseases, **livestock grazing**, or competing vegetation.
- Trees or shrubs will also be protected from wildfire and damage from livestock and wildlife.
- **Maintain a 25 – 35% canopy cover for optimal forage production and livestock use.**

- **Tree pruning may be needed to adjust light levels, improve wood products, or provide adequate space for machinery. Follow Tree/Shrub Pruning practice (660).**

## REFERENCES

- Byrd, Nathan A., Lewis, Clifford E. 1983. "Managing Pine Trees and Bahiagrass for Timber and Cattle Production" USDA Forest Service, General Report R8-GR 2. Pp. 1-9.
- 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. 1996. "Timber-Pasture Management Enhances Productivity of Loblolly Pine Plantations." *Louisiana Agriculture* 39(2): 14-16.
- Clason, T.R. 1995. "Economic Implications of Silvopastures on Southern Pine Plantations." Louisiana Agricultural Experiment Station, in *Agroforestry Systems* 29:227-238.
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- Clason, T.R. and J.L. Robinson. 2000. "From a Pasture to a Silvopasture System." USDA NAC *Agroforestry Note* 22. Pp. 1-4.
- Clason, T. R. and S. H. Sharrow. 2000. "Silvopastoral Practices" Chapter 5 in *North American Agroforestry: An Integrated Science and Practice*. American Society of Agronomy, Madison, WI. Pp. 119-148.
- Lewis, Clifford E.; etal. 1983. "Integration of Pines, Pastures, and Cattle in South Georgia, USA"; *Agroforestry Systems*. 1:277-297.