

**FOR NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**FORAGE AND BIOMASS PLANTING**

(Ac.)

**CODE 512**

**DEFINITION**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production.

**PURPOSE**

- Improve or maintain livestock nutrition and/or health.
- Provide or increase forage supply during periods of low forage production.
- Reduce soil erosion.
- Improve soil and water quality.
- Produce feedstock for Biofuel or energy production.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to all lands suitable to the establishment of annual, biennial, or perennial species for forage or biomass production. This practice does not apply to the establishment of annually planted and harvested food, fiber, or oilseed crops. Forage and biomass planting is generally not recommended in MRLA 42 ([Texas MLRA Map](#)), unless irrigation is available to insure establishment and production.

**CRITERIA**

**General Criteria Applicable to All Purposes**

Select plant species and their cultivars based on:

- Climatic conditions, such as annual precipitation and its distribution, growing season length, temperature extremes and the USDA Plant Hardiness Zone.
- Soil condition and landscape position attributes such as; pH, available water holding capacity, aspect, slope, drainage class, fertility level, salinity, depth, flooding and ponding, and levels of phytotoxic elements that may be present.
- Resistance to disease and insects common to the site or location.

Specified seeding/plant material rates, methods of planting and date of planting shall be consistent with documented guidance cited by plant materials program, research institutions or agency demonstration trials for achieving satisfactory establishment. See [Appendix 1](#) for seeding/planting rates, dates and adaptation.

The application of a dead litter cover, where seeded, will follow the guidance in [Appendix 2](#).

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State Office](#) or visit the [Field Office Technical Guide](#).

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Seeding rates will be calculated as pure live seed (PLS), unless otherwise noted. The germination test used to determine PLS is valid for 9 months after the end of the month the test was made.

A prepared seedbed will be firmed mechanically or by rainfall prior to planting. A quick field method of estimating seedbed firmness is to check the depth of a footprint. If the print sinks into the seedbed much over the depth of a shoe sole, the seedbed is too loose and should be packed (or repacked) prior to seeding. Plant to proper depth, ensuring seed or sprig will contact soil moisture uniformly and provide a medium that does not restrict or allow roots to become dry. Refer to Texas Plant Materials Technical Note: Seedbed Preparation ([TX-PM-10-7](#)).

Prepared seedbeds shall be reasonably free of competing vegetation.

All seed and planting materials shall meet state quality standards. Rules and statutes pertaining to seed quality in Texas can be found in Chapters 9, 10, 61, 62, and 64 of the Texas Agricultural Code. Refer to Texas Department of Agriculture website at [www.agr.state.tx.us](http://www.agr.state.tx.us) under the Laws/Regulations Section.

Do not plant federal, state, or locally listed noxious species. Refer to [EFOTG Section II E10 – Invasive Species](#).

Application of plant nutrients and/or soil amendments for establishment purposes will be based on current soil test and in accordance with the Nutrient Management Standard 590.

When planting legumes, use pre-inoculated seed or inoculate with the proper viable strain of Rhizobia bacteria. Refer to "[Nitrogen Fixation](#)" at Texas Agrilife Research & Extension Center at Stephenville.

Exclude livestock until the plants are well established.

[Appendix 3](#), *Criteria for Determining Adequacy of Established Perennial Grass Stands*, will be used to determine that a satisfactory stand of perennial grass has been established.

#### **Additional Criteria for Improving or Maintaining Livestock Nutrition and/or Health**

Use forage species that will meet the desired level of nutrition (quantity and quality) for the kind and class of the livestock to be fed.

Forage species planted as mixtures will exhibit similar palatability to avoid selective grazing.

#### **Additional Criteria for Providing or Increasing Forage Supply During Periods of Low Forage Production**

Select plants that will produce forage for use during periods when other on-farm/ranch forage does not meet livestock needs. Forage species selected shall balance or help balance the dry matter demand of the animals for the desired period of time. Cool-season and/or warm-season annuals can be used to supplement primary perennial forage as part of an ongoing forage program or in years when drought, pest, or other natural or man-made disaster reduces the primary forage production. Refer to [Appendix 1](#) for seeding rates, dates and adaptation of annual forage plants.

#### **Additional Criteria for Reducing Erosion and Improving Water Quality.**

Ground cover and root mass must be sufficient to protect the soil from wind and water erosion.

#### **Additional Criteria for Producing Feedstocks for Biofuel or Energy Production**

Select plants that provide adequate kinds and amount of plant materials needed. For Switchgrass refer to "[Planting and Managing Switchgrass as a Biomass Energy Crop](#)", National Plant Material Technical Note No. 3. For Biofuel production refer to Texas Plant Materials Technical Note: Potential Plants for Biofuel in Texas ([TX-PM-11-01](#)).

### **CONSIDERATIONS**

Establish persistent species that can tolerate close grazing and trampling in areas where animals congregate such as around water sources, mineral or feeding locations.

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Drilling is the preferred seeding method. Drills used for grass and legume planting should have depth bands, a seed box for small seed, good seed box agitators to prevent bridging, double disc furrow openers and good packer wheels, broadcasting reduces the chance of successful plantings but is permissible where other methods are not available. Broadcasting is suitable for establishment of perennial grass and /or legume species on cultivated, weed free seedbed only. Cultipacking or rolling following broadcast seeding is usually necessary to insure good seed contact with the soil. Refer to Texas Plant Materials Technical Note: Calibrating a Seed Drill For Conservation Planting ([TX-PM-10-04](#)).

Broadcast over-seeding or sod seeding of annual grass and /or legume species is suitable on sod that has been grazed or mowed to a height of 2 inches or less.

Fertilizer needs to be appropriately placed and timed to be effective. When phosphorus and/or potassium rates are very low to moderate the recommended amounts of these nutrients should be incorporated as part of the final seed bed preparation. When competing vegetation is expected to be a problem, all or part of the nitrogen fertilizer should be applied after germination of seeded species or after sprigs begin to grow.

When limestone is required to improve soil pH for establishment of perennial grass or legume, it should be applied in the fall prior to spring planting, and incorporated during seedbed preparation, when feasible. When limestone application is needed to improve soil pH for planting of over-seeded legumes, the limestone should be applied at least 6 months prior to over-seeding.

Coated seed should be seeded at the same rate as non-coated seed but the planting equipment needs to be re-calibrated.

Where wildlife and pollinator concerns exist, consider plant selection by using an approved habitat evaluation procedure. Refer to Texas Technical Note: Pollinator Plants for Texas Conservation Practices ([TX-PM-10-02](#)).

Where air quality concerns exist consider using site preparation and planting techniques that will minimize airborne particulate matter generation and transport.

Where carbon sequestration is a goal, select deep-rooted perennial species that will increase underground carbon storage.

During and upon stand establishment, planning and application of the following conservation practices should be considered as applicable; Forage and Biomass Harvest (511), Herbaceous Weed Control (315), Nutrient Management (590), and Prescribed Grazing (528).

## **PLANS AND SPECIFICATIONS**

Prepare plans and specifications for the establishment planting for each site or management unit according to the Criteria, Considerations, and Operations and Maintenance described in this standard. Record them on a site specific job sheet or in the narrative of a conservation plan.

The following elements will be addressed in the plan to meet the intended purpose:

Site Preparation and Soil tests.

- Fertilizer Application, if applicable shall be based on results from a current soil test and in accordance with Nutrient Management Standard 590.
- Seedbed/Planting Bed Preparation
- Methods of Seeding/Planting
- Time of Seeding/Planting
- Selection of Species
- Type of legume inoculants used (if applicable)

- Seed/Plant Source
- Seed Analysis
- Rates of Seeding/Planting
- Supplemental Water for Plant Establishment (if applicable)
- Protection of Plantings (if applicable)

### **OPERATION AND MAINTENANCE**

Inspect and calibrate equipment prior to use. Continually monitor during planting to insure proper rate, distribution and depth of planting material is maintained.

Monitor new plantings for water stress. Depending on the severity of drought, water stress may require reducing weeds, early harvest of any companion crops, irrigating when possible, or replanting failed stands. Refer to Texas Plant Materials Technical Note: Maintenance and Management of Conservation Plantings ([TX-PM-10-03](#)).

### **REFERENCES**

Ball, D.M., C.S. Hoveland, and G.D.Lacefield, 2007. Southern Forages, 4<sup>th</sup> Ed. International Plant Nutrition Institute, Norcross, GA.

Barnes, R.F., D.A. Miller, and C.J. Nelson. 1995. Forages, The Science of Grassland Agriculture, 5<sup>th</sup> Ed. Iowa State University Press, Ames

United States Department of Agriculture, Natural Resources Conservation Service. 1997. National Range and Pasture handbook. Washington, DC.

USDA, NRCS. 2008. The PLANTS Database (<http://plants.usda.gov>, 08October 2008). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, NRCS. 2009. Technical Note 3. Planting and Managing Switchgrass as a Biomass Energy Crop.

**APPROVAL AND CERTIFICATION  
FORAGE AND BIOMASS PLANTING**

**(Ac.)**

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**PRACTICE SPECIFICATIONS APPROVED:**

<u>/s/ William H. Durham</u>	<u>12/09/2010</u>
State Agronomist	Date

<u>/s/ Susan Baggett</u>	<u>12/09/2010</u>
State Resource Conservationist	Date

**CERTIFICATION:**

Reviewed and determined adequate without need of revision.

<u>Zone Agronomist</u>	<u>Date</u>
<u>Zone Agronomist</u>	<u>Date</u>