Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

FORAGE AND BIOMASS PLANTING

CODE 512

(Ac.)

DEFINITION

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

PURPOSES

This practice may be applied for one or more of the following purposes:

- Maintain or improve livestock nutrition and/or health;
- Provide or increase forage supply during periods of low forage production;
- Reduce soil erosion and improve water quality;
- Produce feedstock for biofuel or energy production.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on all lands suitable to the establishment of annual, biennial, or perennial species for forage or biomass production. This practice does not apply to:

- Establishment of annually planted and harvested food, fiber, or oilseed crops;
- Plantings primarily intended for wildlife habitat, where livestock grazing and/or mechanical harvesting is a secondary consideration. Refer to the conservation practice standard for Conservation Cover (327);
- Plantings that will be established on critically eroding areas that usually cannot be stabilized by ordinary conservation treatment. For site stabilization on these areas, refer to the conservation practice standard for Critical Area Planting (342);
- Herbaceous plantings on field edges or in riparian buffers, for which other standards are applicable. Refer to the conservation practice standards for Field Border (386), Filter Strip (393), and Riparian Herbaceous Cover (390).

CRITERIA

General Criteria Applicable to All Purposes

Select plant species to accomplish the intended purpose of the practice and the objectives of the client. Select plant species and varieties based on their adaptability to local environmental conditions and to the planned land use. Grasses and/or legumes may be appropriate. For best results, use species and varieties with proven conservation traits.
At a minimum, take the following factors into account when selecting forage and biomass plantings:

- Planned use of the forage or biomass (producer’s goals);
- Climatic conditions, such as annual and seasonal rainfall, growing season length, humidity, and USDA Plant Hardiness Zones;
- Soil and site conditions such as drainage class, pH, available water holding capacity, inherent fertility, salinity, and flooding or ponding frequency;
- Plant characteristics, such as:
  - Ease of establishment, plant persistence, and time needed for full stand establishment;
  - Season of growth (warm or cool) and plant life cycle (annual, perennial, or biennial);
  - Suitability of the species to provide desired quality and quantity of forage or biomass;
  - Plant resistance to disease and insect pests common to the area;
  - Fertility and management requirements.

Avoid selecting species that are aggressive and may become weedy in nearby areas. Two species of particular concern in Maryland are: reed canarygrass (*Phalaris arundinacea*), a native species that can spread from plantings into natural wetlands and riparian areas; and bermudagrass (*Cynodon dactylon*), an introduced grass that can spread into other pasture plantings, lawns, and cropland fields. If there is concern for these species spreading into areas where they are not wanted, buffer strips, herbicides or other means of containment should be implemented.

All plant materials shall meet state quality standards and be correctly handled before planting. **Certified seed shall be used for all pasture and hay plantings.**

When planting legumes, use pre-inoculated seed or inoculate with the proper, viable *Rhizobium* bacteria before planting.

Apply lime and fertilizer, if needed, based on soil test results. The use of commercial fertilizer and other forms of plant nutrients must be in compliance with Maryland nutrient management regulations, as applicable, and shall meet the requirements of the Maryland conservation practice standard for Nutrient Management (590).

Protect the planting from unacceptable impacts due to pests, wildlife, livestock, or wildfire. Exclude livestock as needed to establish the planting.

Control noxious weeds as required by state law.

Refer to the applicable sections of the Maryland Conservation Planting Guide for requirements concerning species selection, planting dates, rates, methods, and care in handling and planting of seed or planting stock. Refer to the Maryland NRCS Fact Sheet *Forage and Biomass Plantings* for establishment and maintenance recommendations.

**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.

Select forage species for mixtures that will exhibit similar palatability to avoid selective grazing.

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

Select plants that will help meet livestock forage demand during times that normal forage production is not adequate.

Additional Criteria for Reducing Erosion and Improving Water Quality

Select plants that will provide adequate ground cover, canopy cover, root mass, and resistance to water flow when site conditions require erosion protection. When a seeding rate is expressed as a range (e.g., 5 to 10 pounds/acre), use the higher rate if erosion is a concern. As appropriate, add a nurse crop if needed to provide sufficient cover during plant establishment.

Additional Criteria for Producing Feedstocks for Biofuel or Energy Production

Select plants that provide adequate kinds and amount of plant materials needed.

Note: Specific programs may dictate criteria in addition to, or more restrictive than, those specified in this standard.

CONSIDERATIONS

When selecting forage and biomass plantings, consider the planned use of the planting (producer’s goals), and site conditions including soils, residual herbicides to the extent known, available moisture during the growing season, and existing vegetation on the site and in adjacent areas, including any noxious weeds that may be present.

For forage plantings, consider whether the planting will be used primarily for pasture (grazing) or hay (mechanically harvested). Some species are better adapted to a pasture-type management, where plants are harvested at specific vegetative stages or at relatively frequent intervals. Other species and varieties benefit from a hay-type management, where rest periods of 4 to 6 weeks are needed between harvests if stands and production are to be maintained.

For more intensively managed systems, consider species and varieties that are adaptable to both haying and grazing. Fields in these systems are usually hayed in late spring and grazed during the balance of the year.

Consider mixes, as opposed to single species stands, for the diversity of root systems and the benefits to soil health. A mix of grasses and legumes can live symbiotically and share nutrients (e.g., clovers and other legumes can provide nitrogen to grass plants). Having a variety of species also builds resiliency in the pasture, because a diverse mix is more likely to result in some plants growing despite varying conditions during the season. As a result, diverse pastures are usually more productive and higher in nutritional quality than monoculture pastures.

When planning mixtures, consider the relative maturity dates of plant species and varieties, their growth habits, and palatability for grazing or feeding. Select species and varieties that are expected to mature at approximately the same time.

Consider the need for cool-season grass firebreaks when warm-season grass plantings are planned. Mature plantings of warm-season grasses can be flammable.

If wildlife habitat is desired, consider using plant species and management techniques that will provide food and cover for the desired wildlife species.

When water quality is a concern, consider the effects of the planting on controlling erosion and runoff, and on the use and management of nutrients and pesticides.
In areas where livestock congregate, consider establishing persistent species that can tolerate close grazing and trampling.

Consider the need for additional conservation practices, such as Forage Harvest Management (511), Prescribed Grazing (528), Brush Management (314), Herbaceous Weed Control (315), and Nutrient Management (590), as applicable.

For additional considerations, refer to the Maryland NRCS fact sheet *Forage and Biomass Planting*.

**PLANS AND SPECIFICATIONS**

Plans and specifications for this practice shall be prepared in accordance with the previously listed criteria. Refer to the applicable sections of the Maryland Conservation Planting Guide for specifications concerning species selection, planting dates, rates, methods, and care in handling and planting of the seed or planting stock. Plans and specifications shall contain sufficient detail concerning site preparation and establishment to ensure successful management of the practice and may be recorded in narrative form, on Implementation Requirements (IR) sheets, or on other approved forms.

Use the Maryland NRCS fact sheets *Forage and Biomass Planting*, *Cool-Season Grasses*, and *Warm-Season Grasses* to provide additional planting and establishment information, as applicable, and complete the 512 IR sheet. The IR sheet and appropriate fact sheet(s) can serve as the planting plan and specifications for implementing this practice.

The following items shall be addressed, as appropriate:

- Methods of site and seedbed preparation;
- Rate and type of soil amendments to be applied;
- Species and rates to be seeded/planted;
- Type of legume inoculant used, when applicable;
- Method of seeding/planting;
- Seeding/planting dates;
- Seed/plant source and seed analysis;
- Protection of plantings, if needed.

**Supporting Data and Documentation**

The following is a list of the minimum data and documentation to be recorded in the case file:

- Location of the practice on the conservation plan map;
- Assistance notes. The notes shall include dates of site visits, name or initials of the person who made the visit, specifics as to alternatives discussed, decisions made, and by whom;
- Completed IR sheet, and other specifications and management plans, as applicable;
- Certification of seed actually planted, including species, cultivar, germination, purity, and amount planted per acre. If available, include copies of seed tags, shipping invoices, or other documents that contain this information.
OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be prepared and is the responsibility of the client to implement. The appropriate fact sheet(s) and IR sheet may serve as the management plan, as well as supporting documentation, and shall be reviewed with and provided to the client.

At a minimum, the following components shall be addressed in the O&M plan, as applicable:

- Evaluate forage and biomass stands at least once each season, or more frequently as needed to determine appropriate management to achieve the desired purpose(s) of the planting;
- Apply soil amendments periodically, based on soil test results, to meet desired yield goals, promote plant regrowth, and help maintain the life of the stand. The use of commercial fertilizer and other forms of plant nutrients must be in compliance with Maryland nutrient management regulations;
- Control undesirable plants by mowing or spraying with a selective herbicide. To the extent feasible, “spot” spray or mow to control weeds, so that desirable plants are not destroyed unnecessarily. Noxious weeds must be controlled as required by state law;
- Control insects and/or diseases when an infestation threatens stand survival. Follow a pest management plan concerning the timing and methods of treatment;
- When optimum wildlife habitat is desired, do not mow, burn, or mechanically harvest fields during the nesting season. For Maryland, the primary nesting season is April 15 through August 15. Infrequent grazing may be allowed during the primary nesting season, provided the area is not grazed below 6 to 8 inches. During the establishment period, mowing may be needed during the nesting season to reduce heavy competition from annual weeds;
- Describe the time of year or frequency of use restrictions, if any. Pay particular attention to program requirements as they relate to acceptable vs. restricted uses and other management restrictions.

REFERENCES


Penn State Extension, College of Agricultural Sciences. *Forage Crops*. http://extension.psu.edu/plants/crops/forages


USDA, Natural Resources Conservation Service. *Conservation Practice Standards*. Maryland Field Office Technical Guide, Section IV.
