Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

PASTURE AND HAY PLANTING

CODE 512

(ac)

DEFINITION

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

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Improve or maintain livestock nutrition and health
- Provide or increase forage supply during periods of low forage production
- Reduce soil erosion
- Improve water quality
- Improve air quality
- Improve soil health

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on all lands suitable for the one-time establishment of perennial species for forage production that will likely persist for 5 years. This practice does not apply to the establishment of annually planted and mechanically harvested food, fiber, or oilseed crops planted on designated cropland.

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 Zones.
- 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. Utilize ecological site description pasture states and forage suitability groups if available.
- Intended use, level of management, realistic yield estimates, stage of vegetative growth for planned harvest, and compatibility with other species.
- Resistance to disease and insects common to the site or location.

Follow recommendations for planting rates, methods, and dates obtained from the NRCS Plant Materials Program, NRCS State guidance, land grant university extension, and applicable published research documents.

Calculate seeding rates to be consistent with State and local criteria.

Plant at a depth appropriate for the seed size or plant material, while assuring uniform contact with soil.

Implement site preparation and seedbed preparation methods that avoid restricting plant emergence.

Plant when soil moisture is adequate for germination and establishment.

Utilize seed and planting materials that will meet State quality standards.

Do not plant Federal, State, or local noxious species.

Apply all plant nutrients and soil amendments for establishment purposes according to a current soil test taken within 3 years of the proposed planting date. Nutrient application rates, methods, and dates are obtained from the NRCS Plant Materials Program, NRCS State guidance, land grant university extension, and applicable published research documents.

When planting legumes, use preinoculated seed, inoculum coated seed, or inoculate with the proper viable strain of rhizobia immediately before planting.

Exclude livestock until the plants are well established. Ensure the plants have reached the full start grazing heights or the recommended hay cutting heights (late elongation phase or later) before the first grazing or cutting begins. See NRCS CPSs Prescribed Grazing (Code 528) and Forage Harvest Management (Code 511) for details. There may be conditions and time of the growing season that require letting the plants reach maturity before any haying or grazing takes place to avoid the risk of killing the new plants.

Additional Criteria for Improving or Maintaining Livestock Nutrition and 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 grazed or fed.

Select species mixtures with similar palatability to avoid selective grazing.

Select species with low or no toxic effects on grazing livestock.

Additional Criteria for Improving Water Quality

Use State and locally recommended species from the NRCS Plant Materials Program, NRCS State guidance, land grant university and extension, and other reputable scientific sources to support planting recommendations when using this purpose for filtering runoff.

Additional Criteria for Improving Air Quality

Select deep rooted perennial plants that are recommended for sequestering carbon and reducing greenhouse gases. Use site preparation and planting techniques that minimize airborne particulate matter generation and transport.

Additional Criteria for Improving Soil Health

Minimize soil disturbance by using seedbed preparation and planting techniques, such as chemical burn-down and no-till drilling of forages, to protect soil aggregates. Nonchemical seedbed preparation methods that are low-disturbance can include soil spading, rototilling (set at reduced speeds with faster forward driving speeds), roller crimping, or timing planting to correspond with natural senescence of the preceding crop.

Planting a perennial with a specific nurse crop can quickly maximize ground cover during the establishment period.

Maximize biodiversity by selecting plants from at least two of the four functional groups (cool-season grass, cool-season broadleaf, warm-season grass, warm-season broadleaf).

Additional Criteria for Reducing Soil Erosion

Select plants that provide maximum ground cover for protection of the soil from wind and water erosion.

CONSIDERATIONS

In areas where animals congregate, consider establishing persistent species that can tolerate close grazing and trampling.

Follow criteria for protecting pasture plants and soil to promote soil health provided in NRCS CPS Prescribed Grazing (Code 528). This includes selecting appropriate plant species that increase deep rooting, soil carbon, and plant resiliency. Use native species if practicable.

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

For organic and transitioning-to-organic systems, all materials and methods used in the implementation of this NRCS CPS should comply with the National Organic Program Rules.

For the wildlife species of concern, select and plant species in a designated manner that will meet their cover and critical life cycle needs. Where wildlife and pollinator concerns exist, consider plant selection by using an approved habitat evaluation procedure using native species if at all practicable. For pollinator needs, consider appropriate pollinator seed mixes for planting. When wildlife habitat is the primary concern, use NRCS CPS Wildlife Habitat Planting (Code 420) where planting herbaceous plants.

If planting forage for feedstocks for biofuel, select herbaceous plants that provide adequate kinds and amounts of plant materials needed for the desired fuel and energy production.

Refer to NRCS Conservation Practice Standard (CPS) Nutrient Management (Code 590) for details for managing nutrients.

The criteria in NRCS CPS Forage Harvest Management (Code 511), Herbaceous Weed Treatment (Code 315), or Prescribed Grazing (Code 528) can be helpful in establishing and maintaining vigorous pasture and hay plantings.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for each site or management unit according to the requirements of this standard. Record these specifications using the appropriate implementation requirement documents to provide the information to the land manager.

Address the following elements in the plan to meet the intended purpose:

- Field number and acres
- Species of plants to be established
- Activities needed to ready the planting area and the establishment procedure to be used
- Seeding rates and depth of seeds planted
- Seeding dates
- Rates, timing, and forms of nutrient application and other soil amendments (if needed) from

approved soil test analysis results and recommendations
- Type of legume inoculant to be used (if applicable)
- Seed analysis (tag)
- All seed coating details (if applicable)
- Supplemental water for plant establishment (if applicable)
- Protection of plantings (if applicable), such as livestock exclusion periods and through use of NRCS CPSs Forage Harvest Management (Code 511) and Prescribed Grazing (Code 528), as needed.
- Description of successful establishment and when evaluation of establishment should be completed (e.g., minimum percent ground or canopy cover, percent stand, and stand density)

OPERATION AND MAINTENANCE

The operation and maintenance plan will include, as a minimum, the following requirements:

- Inspect and calibrate equipment prior to use
- Continually monitor equipment during planting to ensure 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.
    - Monitor new plantings for prolonged wet conditions, which may cause failure of the plant establishment.

REFERENCES

Ball, D.M., C.S. Hoveland, and G.D. Lacefield. 2015. Southern Forages, Fifth Editon. International Plant Nutrition Institute: Norcross, GA.

Barnes, R.F., C.J. Nelson, K.J. Moore, and M. Collins. 2007. Forages, The Science of Grassland Agriculture, Sixth Edition. Iowa State University Press: Ames, IA.

Collins, M., C.J. Nelson., K.J. Moore, and R.F. Barnes. 2017. Forages, Volume 1: An Introduction to Grassland Agriculture, Seventh Edition. Wiley-Blackwell: Hoboken, N.J. ISBN: 9781119300649

Cornell University. 2019. “Plants Poisonous to Livestock.” Department of Animal Science. Accessed August 24, 2020. http://poisonousplants.ansci.cornell.edu/

Skinner, R.H. and C.J. Dell. 2016. Yield and Soil Carbon Sequestration in Grazed Pastures Sown with Two or Five Forage Species. Crop Science 56:2135-2044. Crop Science Society of America, Madison, WI.https://doi.org/10.2135/cropsci2015.11.0711

Smith, R. 2016. “The Value of Coated Seed.” University of Kentucky College of Agriculture, Food and Environment. Accessed August 24, 2020. https://grazer.ca.uky.edu/content/value-coated-seed

USDA NRCS. 2008. National Range and Pasture Handbook (Title 190). Washington, D.C. https://directives.sc.egov.usda.gov/.

USDA NRCS. n.d. “PLANTS Database.” Accessed August 24, 2020. https://plants.sc.egov.usda.gov/

USDA NRCS. 2009. Plant Materials Technical Note No. 3 (Title 190). Planting and Managing Switchgrass as a Biomass Energy Crop. Washington, D.C. https://directives.sc.egov.usda.gov.

USDA NRCS. 2016. National Organic Farming Handbook (Title 190). Washington, D.C. https://directives.sc.egov.usda.gov/