

**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 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.

CRITERIA

General Criteria Applicable to All Purposes

Select plant species and cultivars based on the following.

- Climatic conditions such as annual precipitation and its distribution, growing season length, temperature extremes, USDA Plant Hardiness Zone and irrigation water availability

- 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

Follow recommendations for planting rates, methods and dates obtained from plant materials technical notes, land grant and research institutions, extension agencies, or agency field trials.

Calculate seeding rates on a pure live seed (PLS) basis.

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

Prepare the site to provide a soil medium that does not restrict plant emergence.

Plant when soil moisture is adequate for germination and establishment.

All seed and planting materials will meet state quality standards.

Do not plant federal, state or local noxious species.

Apply plant nutrients and/or soil amendments according to a nutrient management plan that includes a current soil test.

When planting legumes, use pre-inoculated seed or inoculate with the proper viable strain of Rhizobia immediately before planting.

Exclude livestock from seeded areas until plants are well established.

Select forage species based on the intended use, level of management, realistic yield estimates, maturity stage and compatibility with other species. Verify plant adaptation to the area prior to planting.

Additional Criteria to Improve or Maintain 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 that will use the feed.

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

Additional Criteria to Provide or Increase Forage Supply During Periods of Low Forage Production

Select plants that will help meet livestock forage demand during times that normal farm/ranch forage production are not adequate.

Additional Criteria to Reduce Erosion and to Improve Water Quality

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

Additional Criteria to Produce Feedstock for Biofuel or Energy Production

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

CONSIDERATIONS

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

Where wildlife and pollinator habitat concerns exist, consider plant selection using an approved habitat evaluation procedure.

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

Select deep-rooted perennial species that will increase underground carbon storage if carbon sequestration is a planning objective,

During and upon stand establishment planning and application of the following conservation practices should be considered as applicable; Forage Harvest Management 511, Herbaceous Weed Control 315, Integrated Pest Management 595, Nutrient Management 590, and Prescribed Grazing 528.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for each field or management unit according to the Criteria and Operations and Maintenance sections of this standard. Specifications shall describe the requirements to apply this practice to achieve the intended purpose.

Record practice specifications on a Colorado Forage and Biomass Planting 512, Conservation Practice Job Sheet. Record seeding recommendations on a currently approved CO-ECS-5, Grass Seeding Planned and Applied worksheet.

Site/Seedbed Preparation

Irrigated Sites

The seedbed should be firm and smooth, and free of annual and perennial noxious weeds and other plants that may interfere with stand establishment.

Plant seed in clean ground, weed free stubble or herbicide treated sod. Stubble and herbicide treated sod are ideal seedbeds for slopes where erosion from irrigation may be a problem. Plant companion crops if adequate water is available and management favors stand establishment rather than companion crop harvest.

Nonirrigated Sites

Seedbeds are required to have protection against water and wind erosion by one of the following methods or conditions.

1. Leave a standing preparatory dead litter stubble cover of sorghum or sudangrass to provide protection from blowing. If cover crop growth is more than desirable or if the cover crop will produce mature seed, clip the cover crop to a 12-15 inch height and remove the excess biomass from the field, unless restricted by program requirements.
2. Seeding into existing sorghum or small grain cover harvested the previous season may be used in place of a cover crop provided the stubble height is maintained at 12 inches or more and weeds and volunteer grain are controlled. When weeds and volunteer grain are not controlled, tillage and cover crop planting are required before grass seeding. Do not use cereal rye for existing cover.

Seeding

Use planting equipment capable of placing seed at the proper depth and rate for the selected species and site conditions.

Fertilizer Application

Base fertilizer applications on a nutrient management plan, which includes a current soil test. If phosphorus is required, apply and incorporate before seeding. Delay nitrogen applications until the stand is established. Nitrogen applications prior to establishment can cause excess weed growth that can inhibit stand establishment.

Species Selection

Select species for Forage and Biomass Planting according to Colorado Plant Materials Technical Note No. 59, Table 6, Suitability, or appropriate extension publications.

Seeding Rates

Grass and legume seeding rates will be consistent with the current Colorado Plant Materials Technical Note No. 59, Table 5, Seeding Rates, and the current CO-ECS-05, Grass Seeding Planned and Applied worksheet.

Cover crop seeding rates will be consistent with the current Colorado Cover Crop 340 Implementation Requirements Worksheet.

Planting Dates

Nonirrigated

Plant grasses, legumes and other seeded species within the seeding periods specified in Colorado Plant Materials Technical Note No. 59, Table 2, 2002, with a provision that allows 10 days flexibility from the specified periods for adapting to local soil moisture conditions.

Irrigated

Spring and summer seeding is acceptable where adequate irrigation water is available for stand establishment. Control early weeds before seeding and or plant a cover crop and seed late summer where irrigation water supply is dependable.

In areas with open winter ground conditions, plant late summer seedings before July 15 to prevent winter kill or frost heaving of seedlings.

Plant warm season species and hard to establish cool season species at least 60 days prior to the average date (2 years in 10) for a temperature less than 24° F. (NOAA RCC AgACIS)

Plant easily established cool season species at least 30 days prior to the average date (2 years in 10) for a temperature less than 24° F. (NOAA RCC AgACIS)

Seed Analysis

All seed either purchased or grown for personal use will meet the following minimum standards if the seeding is cost shared. Seed tags are required for check out and practice certification.

1. Seed labeling, quality and testing will be in accordance with the Colorado Seed Law, "Rules for Seed Testing" by the Association of Seed Analysts (AOSA), and Rules and Regulations under the Federal Seed Act.
2. Purity and germination tests for all lots of seed shall be less than one year old.

Seed Source

Use adapted improved varieties and cultivars in the following order of preference, when available.

1. Certified named varieties
2. Named varieties
3. Common seed

Certified named varieties are required for all NRCS cost shared programs. If certified seed is not available, submit a request for exemption to the State Resource Conservationist. If both Certified named varieties and Named varieties are not available, common seed, originating from the same general locality as the planting site, is acceptable upon approval.

Management for Establishment

Control weeds and seed production from volunteer small grain and cover crops with mowing or herbicide applications, as appropriate. Harvest during initial establishment is limited. Refer to the Colorado Forage Harvest Management 511, Conservation Practice Standard for minimum stubble heights to maintain stand life.

OPERATION AND MAINTENANCE

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

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.

REFERENCES

- Colorado State University Cooperative Extension Crop Publications, Fort Collins, CO. <http://www.ext.colostate.edu/pubs/pubs.html#ag>
- No. 0.303, Improve Yield with High Quality Seed. <http://extension.colostate.edu/docs/pubs/crops/00303.pdf>
- No. 0.305, Legume Seed Inoculants. <http://extension.colostate.edu/docs/pubs/crops/00305.pdf>
- No. 0.522, Fertilizing Cool Season Grasses and Grass/legume Mixtures <http://extension.colostate.edu/docs/pubs/crops/00522.pdf>
- USDA, NRCS. 2015. Cover Crop 340 Implementation Requirements Worksheet. Colorado Field Office Technical Guide, Sec. IV. Standards and Specifications. Denver, CO. http://efotg.sc.egov.usda.gov/references/public/CO/CO340_JS.xlsm
- USDA, NRCS. 2014. Grass Seeding Planned and Applied Worksheet, CO-ECS-05. Colorado Field Office Technical Guide, Sec. IV. Planning Forms. Denver, CO. http://efotg.sc.egov.usda.gov/references/public/CO/CO-ECS-05_2014-07.xlsm
- USDA, NRCS. 2013. Plant Suitability and Seeding Rates for Conservation Plantings in Colorado. Plant Materials Technical Note 59. Colorado Field Office Technical Guide, Sec. I. Technical Notes. Denver, CO. http://efotg.sc.egov.usda.gov/references/public/CO/COPMTN_59_2012-03.xls
- USDA, NRCS. 2007. Agricultural Applied Climate Information System (AgACIS) by Office ID (FIPS Code). Colorado Field Office Technical Guide, Sec. II. Climate Data. Denver, CO. <http://agacis.rcc-acis.org/?tok=90E1ED295A5D6ED041D4>