

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
NEW JERSEY**

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.

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.

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

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

Seeding rates will be calculated on a pure live seed (PLS) basis.

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

Prepare the site to provide a 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.

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.

Apply all plant nutrients and/or soil amendments for establishment purposes according to a current soil test. Application rates, methods and dates are obtained from the plant materials program, land grant and research institutions, extension agencies, or agency field trials.

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

Exclude livestock until the plants are well

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

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

Additional Criteria for Reducing Erosion and Improving Water Quality.

Ground cover and root mass need to 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.

CONSIDERATIONS

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

Where wildlife and pollinator concerns exist, consider plant selection by 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.

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
- Fertilizer Application (if applicable)
- Seedbed/Planting Bed Preparation
- Methods of Seeding/Planting
- Time of Seeding/Planting
- Selection of Species
- Type of legume inoculant 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.

REFERENCES

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

Barnes, R.F., D.A. Miller, and C.J. Nelson. 1995. Forages, The Science of Grassland Agriculture, 5th 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.

TABLE 1

CHARACTERISTICS OF FORAGES IN NEW JERSEY

Grasses	Regrowth Potential	Legume Compatibility	Winter Hardiness	Ease of Establishment	Drought Tolerance	Flooding Tolerance	Persistence
Orchardgrass	Good	Good	Good	Good	Good	Fair	Good
Timothy	Fair	Good	Excellent	Good	Poor	Poor	Fair
Smooth Bromegrass	Fair	Good	Good	Good	Fair	Fair	Good
Tall Fescue - Endophyte Free	Good	Fair	Fair	Excellent	Good	Fair	Fair
Bluegrass	Good	Fair	Good	Good	Poor	Fair	Good
Reed Canarygrass	Good	Poor	Good	Poor	Good	Excellent	Good
Perennial Ryegrass	Good	Fair	Poor	Excellent	Poor	Fair	Poor
Switchgrass	Excellent	Poor	Good	Good	Excellent	Good	Good
LEGUMES	Regrowth Potential	Bloat Concern	Winter Hardiness	Ease of Establishment	Drought Tolerance	Flooding Tolerance	Persistence
Alfalfa	Good	Yes	Good	Good	Good	Poor	Good
Birdsfoot Trefoil	Fair	No	Good	Fair	Fair	Fair	Poor
Red Clover	Fair	Yes	Fair	Good	Fair	Fair	Poor
Ladino Clover	Good	Yes	Good	Good	Poor	Good	Good

TABLE 2. RECOMMENDED FORAGE MIXTURES AND SEEDING RATES.

- Individual species and recommended mixtures are classified according to the soil depth drainage conditions and use for which they are suited. Each mixture has been given an identification number and is described in the text. Several mixtures are suggested in each category, but are not listed in any order of preference.

Depth and drainage characteristics of field soils					
Proposed use of forage	Deep, well-drained	Moderately deep, well-drained, (moderately draughty)	Shallow, well-drained, (droughty)	Moderately well-drained	Moderately and poorly drained
Hay or silage	1, 2, 4, 5, 6, 11, 14, 19, 20, 21, 22, 26, 27, 28, 31, 32, 34, 38	1, 3, 4, 5, 7, 14, 19, 20, 22, 25, 27, 28, 29, 32, 34, 35, 36, 37, 38 39	5, 7, 19, 22, 25, 27, 28, 29, 32, 33, 34, 35, 36, 37, 38	5, 7, 8, 16, 21, 22, 25, 27, 28, 29, 32, 33, 34, 35, 36, 37, 38	5, 7, 8, 15, 22, 33, 37
Pasture	2, 4, 6, 9, 10, 12, 14, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 39	3, 4, 7, 14, 18, 19, 20, 22, 24, 25, 26, 27, 28, 29, 30, 31, 33, 39	5, 7, 10, 19, 22, 24, 25, 26, 27, 28, 29, 30, 31, 33	5, 7, 9, 12, 13, 17, 18, 22, 23, 24, 25, 26, 27, 29, 30, 31, 33	5, 8, 13, 18, 22, 24

Alfalfa alone or in mixtures

- Alfalfa in pure stand, 15-18 lb
- Alfalfa, 10 lb, with one of the following: orchardgrass, 3 lb; smooth bromegrass, 8 lb; tall fescue, 5 lb; timothy, 4 lb
- Alfalfa, 10 lb, with one of the following: orchardgrass, 3 lb; reed canarygrass, 8 lb; tall fescue, 5 lb
- Alfalfa, 10 lb, with perennial ryegrass, 4-8 lb

Birdsfoot trefoil alone or in mixtures

- Birdsfoot trefoil in pure stand, 10 lb
- Birdsfoot trefoil, 6 lb, with one of the following: Pennlate orchardgrass, 3 lb; smooth bromegrass, 6 lb; Climax timothy, 2 lb; or perennial ryegrass, 6 lb
- Birdsfoot trefoil, 6 lb; with one of the following: Pennlate orchardgrass, 3 lb; reed canarygrass, 6 lb; or perennial ryegrass, 6 lb
- Birdsfoot trefoil (upright variety preferred), 6 lb, with one of the following: Climax timothy, 2 lb; or reed canarygrass, 6 lb
- Birdsfoot trefoil, 6 lb; timothy, 2 lb, and Kentucky bluegrass, 6 lb

Crownvetch

- Crownvetch, 10 lb, alone or with one of the following grasses: timothy, 4 lb; tall fescue, 6 lb; or Pennlate orchardgrass, 3 lb

Clovers

- Red clover in pure stand, 10-12 lb

12. Ladino clover, 1 lb, red clover, 2 lb, and alsike clover, 1 lb, with one of the following: orchardgrass, 4 lb; timothy, 4 lb; reed canarygrass, 8 lb; smooth bromegrass, 8 lb; or perennial ryegrass, 5 lb
13. Ladino clover, 1 lb, alsike clover, 2 lb, timothy, 4 lb, and reed canarygrass, 8 lb
14. Red clover, 6 lb, with one of the following: timothy, 4 lb; perennial ryegrass, 5 lb; or tall fescue, 12 lb
15. Alsike clover, 4 lb, and timothy, 4 lb
16. Red clover, 4 lb; alsike clover, 2 lb, and timothy, 4 lb
17. Ladino clover, 1 lb; red clover, 2 lb; Kentucky bluegrass, 4 lb; timothy, 2 lb, and perennial ryegrass, 5 lb
18. Ladino clover,, 1 lb, or red clover, 6 lb, and tall fescue, 10 lb (use endophyte-free seed)

Cool-season grasses seeded alone

19. Orchardgrass, 10 lb
20. Smooth bromegrass, 14 lb
21. Timothy, 8-10 lb
22. Reed canarygrass, 14 lb
23. Kentucky bluegrass, 14 lb
24. Tall fescue, 12 lb (use endophyte-free seed only)
25. Matua prairiegrass, 25 lb

Cool-season grass pasture mixture

26. Kentucky bluegrass, 8 lb; smooth bromegrass, 4 lb, and timothy, 4 lb (a good grass base for pastures, especially suited for horse pasture)

Warm-season grasses seeded alone

Seeding rates based on pure live seed (PLS).

PLS = (% germination x % pure seed) = 100

27. Switchgrass, 8-10 lb PLS/A
28. Big bluestem, 10-12 lb PLS/A
29. Indiangrass, 10-12 lb PLS/A

Annual forages

30. Turnips or swedes, 1.5 lb
31. Rape or kale, 4 lb
32. Sudangrass, 30 lb

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33. Sorghum x sudangrass hybrids, 25-30 lb
34. Millet, 15 lb
35. Forage sorghums, 8-12 lb
36. Soybeans, 90 lb, and sorghum x sudangrass hybrid, 25 lb
37. Soybeans (Group IV), 90 lb, and grain sorghum, 6-8 lb
38. Pea, 100 lb, and small grain, 50 lb
39. Spring oats and other small grains, 3 bu