NATURAL RESOURCES CONSERVATION SERVICE

SPECIFICATION GUIDE SHEET

FORAGE AND BIOMASS PLANTING

(AC)

CODE 512

SCOPE

This work will consist of establishing adapted and compatible native and introduced species, varieties, or cultivars to improve or maintain livestock nutrition and/or health, extend the length of the grazing season, to provide emergency forage production, and to reduce soil erosion by wind and/or water.

Because each farm is different, these recommendations may not fit all situations. Consult Cooperative Extension Forage Specialists for other recommendations that better meet the objectives of the farm. (Recommendations can also be found at www.fieldcrops.org or at www.umaine.edu/grazingguide.)

SOIL AND FERTILIZER

Acquire soil tests results before forage establishment. Apply lime and fertilizer according to soil test recommendations. Apply lime six months prior to planting if possible, and fertilizer at the time of planting. Appropriate pH and fertility is especially critical for establishment and longevity of legume forage stands.

Phosphorus is very important for rapid, vigorous growth of legume and grass seedings. Phosphorus applied at the time of seeding will increase the size and vigor of plants even on soils that have a medium to high soil test level of phosphorus.

Nitrogen is generally not required for the establishment of legumes or legume-grass mixtures. (Follow soils test recommendations for the specific crop to be grown.) Applying nitrogen at seeding may deter nitrogen fixation by the legume and will increase competitive growth of undesirable grasses and weeds.

SEEDING MIXTURES

Table 1 lists appropriate grass and legume species and varieties based on desired use.

Table 2 lists recommended seeding mixtures according to soil drainage and use.

Use only certified seed.

Inoculate legumes with the proper strain of fresh rhizobia inoculate shortly before planting, or use pre-inoculated seed. Maintain inoculate in a cool environment prior to use. Use of inoculate at planting is good insurance for effective nitrogen fixation by the legume.

WEED CONTROL

Identify and control weed problems prior to seeding, utilizing herbicides and/or tillage. For chemical weed control, refer to Cooperative Extension recommendations. Used appropriately, extensive tillage may be used to deplete weed seed banks and reduce pressure from perennial weeds that may exist in the field.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service. Contact Alice Begin, Resource Conservationist at 207-990-9568 or email alice.begin@me.usda.gov

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Companion or "Nurse" Crop considerations:

To help control weeds (in new spring seedings only), oats, barely, or triticale may be seeded along with legumes and grasses during a limited period between May 10 and May 20. Seed companion crop at no more than one half the normal rate. *Do not use companion crops with alfalfa/grass mixtures, or with Reed Canarygrass.* To prevent excessive competition with the new sod, and to maximize feed value, harvest and remove small grains during the early boot stage.

SEEDING METHODS;

Conventional Tillage: Obstacles should be removed and the area smoothed as needed. Tillage should be limited to the minimum number of operations needed to prepare a good seedbed. Since timing of seeding is important, tillage operations should be made to minimize the time soil is bare. This time period must be weighed against proper seed bed preparation and tillage operations to reduce weed populations.

Drilling Method – A grain drill or "Brillion" type seeder is often the best method of seeding on level and gently sloping areas. Seed must be placed no more than ¼ to ½ inch deep. If the drill does not have a packer wheel system, a cultipacker or roller should be trailed behind. A firm seedbed is essential for success of the seeding. Small seeds in a loosely packed soil will dry out and die quickly if a period of dry weather occurs after germination.

Broadcast Method – Seed may be broadcast by using whirlwind or end gate seeders. Cover seed with ¼ inch of soil or less. Roll, cultipack or use some other suitable method to firm seedbed before and after seeding. To ensure establishment of a perennial sod, increase seeding rates by 150-200% when using this method.

No-Till: This planting method is most recommended where high erosion hazard exists, where the seeding is following an annual crop, where the seeding is to supplement existing forage resources, or where tillage is not desirable because of stoniness. When no-tilling into old undesirable sods, chemical control of the sod should be achieved prior to the seeding. Consult Cooperative Extension for effective chemical sod control methods. Producers may also want to utilize non-chemical control options, such as intense grazing prior to seeding to reduce the competition from existing sod.

Frost Seeding: - This method is used to introduce legumes such as the clovers, Birdsfoot trefoil, or spreading alfalfa into pastures. Broadcast the seed during the spring period after the snow cover has melted and while the soil surface is still going through the daily freeze-thaw cycle.

This method is not as reliable as other seeding techniques, but due to lower costs and the ability to continue to utilize the forage in the pasture, a lower success rate may be overcome with repeated attempts.

Frost seeding is most effective when the seed falls on bare ground. Dead thatch will prevent soil to seed contact, and germination cannot occur. This method of seeding can also be effective when done into a winter grain cover crop in early spring. After establishment, competing grasses must be grazed close so that legume seedlings are not shaded out.

TIME OF SEEDING:

Plant seed during the optimum seeding periods given in **Table 3.**

There are advantages to both spring and late summer seedings.

Spring: Spring seedings have more available moisture and produce higher yields in the seeding year. Early planting results in vigorous growth and development before the onset of hot, dry weather. Plant as soon as a good seedbed can be prepared, particularly for perennial grasses. Pure alfalfa seedings can be made as late as the first week of June, but weed

competition can be a problem and may require the use of a grass herbicide. Grass or grass legume mixture seedings performed after May 15 have an increased risk of failure.

Late Summer: Late summer seedings generally have fewer weed problems, can follow another crop, and time and labor management may be easier than in the spring. Success of late summer seedings depends primarily on adequate rainfall. It is helpful to work the field one or two months before planting, if possible, to conserve moisture for planting. Seedings following another crop, such as winter wheat, are more at risk because the previous crop removes most available moisture.

Birdsfoot Trefoil and Reed Canarygrass should be seeded in late July because both need at least six weeks of fall growth before a hard freeze. Other perennial grasses and legumes should be seeded by mid August in Northern Maine and late August in Southern Maine.

ESTABLISHMENT (FIRST) YEAR MANAGEMENT:

Do not graze or cut new forage until the heights outlined in **Table 4** are reached. First year cutting should consider potential damage to plants and winter injury. If nurse crops are used, they should be harvested in a timely manner so the desired perennial crop will have time to establish well before winter.

Weed competition can be minimized by careful use of sickle bar or rotary mowers. Clip the area with the mower set high to avoid cutting the seedings, yet still be effective in removing the shading effect of the weeds. Removing significant amounts of leaf material from desired plants is more detrimental than the presence of weeds.

See Forage Harvest Management Code 511 for management of established stands.

WILDLIFE HABITAT IMPROVEMENT:

When the landowner is also interested in improving habitat for foraging wildlife or ground nesting birds, select plants that are suitable for both livestock and wildlife (Table 1).

GRASSES FOR BIOMASS PRODUCTION:

Switchgrass is a high-yielding warm season grass that will grow in most locations in Maine. To avoid frost heaving, it must be grown only on well-drained soils. Plant at a rate of 8 lbs pure live seed per acre. For specifications and guidelines on planting and managing Switchgrass specifically for biomass production, see Tech Note 3 in References section.

For fields with variable or less than ideal drainage, choose Reed Canarygrass. Plant as a pure stand and with no nurse crop, at a rate of 12-15 lbs per acre in late July.

TABLE 1. Grass and Legume Planting Guide

Common Name	Use – Pasture	Use-Hay	Wildlife Consideration	Rec. pH	Recommended Varieties or Cultivars (*indicates preferred)
Alfalfa, hay type	X	XX	xx	6.5-7.5	Oneida Ultra*, Eclipse, Preferred, Guardsman
Alfalfa, spreading type	XX	-	xx	6.0-7.0	Spreader II (Pasture)
Bluegrass, Kentucky	XX	X	ns	5.0-6.5	Will come in naturally, no need to plant
Brome grass, Smooth	X	XX	xx	5.8-6.5	Saratoga*, Belmont, Bravo, Radisson
Canarygrass, Reed	X	X	ns	4.5-8.0	Palaton*, Venture, Rival, Chiefton, Marathon (Use low alkaloid varieties like these)
Clover, red	X	X	xx	5.8-6.8	Marathon, Arlington
Clover, White, Ladino	X	-	x	5.5-6.5	Will come in naturally except for Ladino
Orchardgrass	XX	X	x	5.5-6.5	Pennlate*, Pennmead, Shawnee, Baridana, Haymate, Libra, Overland
Timothy	X	XX	x	5.5-6.5	Climax*, Champlain*, Chazy, Tupper
Trefoil, Birdsfoot	X	X	x	5.0-6.5	Empire (pastures), Pardee, Norcen, Viking (hay)
Bluestem, Big^	XX	X	xx	5.5-7.5	Niagra*, Kaw
Fescue, Tall^	X	X	ns	5.5-6.5	Barcel, Johnstone, Festival, Fuego (hay) Barcel, Stargrazer (pasture) {use endophyte (fungus) free seed}^^
Ryegrass, Perennial^	XX	X	ns	5.5-6.5	Tetraplus, Tetramax, Baraforte, Aubisque, Polly, Prana
Switchgrass^	XX	X	xx	5.0-8.5	Shelter*, Cave-in-rock, Blackwell

XX – means better suited for this use than other use
xx – means well-suited for wildlife
x – means somewhat suited for wildlife
ns – means not suited for wildlife
^ - Tall Fescue, Perennial Ryegrass, Big Bluestem, and Switchgrass may be used in special situations on a trial basis
^^ Older varieties of Tall Fescue may contain an endophyte fungus that can cause severe health problems when eaten in summer. Mares are especially sensitive to the fungus and should be removed from pastures containing endophyte infected tall fescue during the last 3 months of gestation.

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Table 2. Seed Mixtures of Perennial Forages

Soil Drainage (example soils)	Uses	Seed Mixtures (lbs. per acre) See notes at end of table. See Table 1 for recommended varieties
Excessively Drained or Somewhat Excessively Drained	Hay, Green Chop, Silage	Alfalfa (10) and Orchardgrass (5) or Bromegrass (12) or Reed Canarygrass (6)
Adams, Colton, Masardis, Hermon, Sunday	Rotational pasture	Orchardgrass (5) and Birdsfoot Trefoil 'Empire' (6) and Ladino Clover (1)
	Pasture for Horses	See well drained
Well Drained (Bangor, Becket, Berkshire, Caribou, Marlow, Penquis, Elliottsville, Plaisted, Turnbridge, Allagash, Fryeburg, Ondawa)	Hay, Green Chop, Silage	Alfalfa (10) and Orchardgrass (5) or Bromegrass (12) or Timothy (6) or Reed Canarygrass (6)
	Hay (F), Silage	Red Clover (6) and Timothy (6)
	Hay	Birdsfoot Trefoil 'Pardee, Norcen, Viking' (8) or Ladino Clover (2) and Timothy (5)
	Rotational Pasture	Orchardgrass (5) and Birdsfoot Trefoil 'Empire' (6) and Ladino Clover (1)
	Pasture of horses (C,D,E)	Kentucky Bluegrass (6) and Timothy (5) or Orchardgrass (3) and Ladino Clover (1) and Red Clover (2)
Moderately well drained (Boothbay, Buxton, Conant, Dixmont, Nicholville, Dixfield, Chesuncook, Perham, Howland, Skerry, Croghan, Madawaska, Lovewell, Podunk)	Hay, Green Chop, Silage	Alfalfa (10) and Bromegrass (12) or Timothy (6) or Reed Canarygrass (6)
	With spots in field too wet for Alfalfa	Alfalfa (10) and Birdsfoot Trefoil 'Pardee, Viking, Norcen' (4) and Timothy (6)
	Hay, Silage	Red Clover (6) and Timothy (6)
	Hay	Birdsfoot Trefoil 'Pardee, Norcen, Viking' (8) or Ladino Clover (2) and Timothy (5)
	Rotational Pasture (G)	Orchardgrass (5) and Birdsfoot Trefoil: 'Empire' (6) and Ladino Clover (1) Reed Canarygrass (8) and Ladino Clover (2)
	Pasture for Horses (C,D,E)	Kentucky Bluegrass (6) and Timothy (5) and Ladino Clover (1) Kentucky Bluegrass (6) and Timothy (5) and Birdsfoot Trefoil: 'Empire' (6)
Somewhat Poorly Drained or Poorly Drained: Telos, Daigle, Colonel, Lamoine, Cornish or Scantic, Brayton, Monarda, Swanville, Easton, Pillsbury, Roundabout, Charles, Rumney	Hay (F), Silage	Red clover (6) and Alsike Clover (2) and Timothy (5)

Soil Drainage (example soils)	Uses	Seed Mixtures (lbs. per acre) See notes at end of table. See Table 1 for recommended varieties
	Hay 1 cutting (C)	Late maturing Timothy (6) and Birdsfoot Trefoil 'Pardee Viking Norcen' (4) or Alsike Clover (3)
	Rotational Pasture (G)	Timothy (6) or Reed Canarygrass (8) and Ladino Clover (2) or Birdsfoot Trefoil 'Empire' (8)
	Pasture for horses	Reed Canarygrass (8) and Birdsfoot Trefoil: Empire (6)
Very Poorly drained: Biddeford, Peacham, Burnham, Searsport	Generally not suited for hay, silage, or pasture	Where drained, use appropriate seed mixture above.
	Pasture for horses	Timothy (6) or Reed Canarygrass (8) and Ladino Clover (2) or Birdsfoot Trefoil 'Empire' (8)
		Reed Canarygrass (8) and Birdsfoot Trefoil: Empire (6)
Very poorly drained (Biddeford, Peacham)	Generally not suited for hay, silage, or pasture	Where drained, use appropriate seed mixture above.

A. **Birdsfoot Trefoil** may not persist under intensive continuous grazing.
B. Pastures with **Alsike Clover** should not be used for horses.
C. **Birdsfoot Trefoil** has lower seeding vigor than Alfalfa and can be difficult to establish.
D. See footnotes for **Tall Fescue** in Table 1.
E. **Kentucky Bluegrass** is recommended as the main grass in seed mixtures for horses because it withstands close grazing. Because production may be lower, more acres may be needed to pasture the animals than for other species.
F. **Red Clover** is difficult to dry for haymaking. It is short lived, normally a 2 year crop. Best harvested as haylage or silage until Red Clover has declined.
G. **Reed Canarygrass** – use only low alkaloid varieties of which are slower growing and more palatable than common Reed Canarygrass.

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Table 3. Optimum Seeding Dates for Forages

	York, Cumberland, Knox-Lincoln, Androscoggin-Sagadahoc, Waldo, Kennebec Counties		All Other Counties	
Species	**Spring thaw to May 20th**	**August 1 to September 15 (2)**	**Spring thaw to May 30**	**August 1 to Sept 1**
Alfalfa	X	Aug 10-30	X	Aug 1st – 15
Kentucky Bluegrass	X	X	X	X
Smooth Bromegrass	X	X	X	X
Reed Canarygrass	X	July20- Aug 1st	X	July 20-Aug 1st
Red Clover (1)	X	X	X	X
White Clover	X	X	X	X
Orchardgrass	X	X	X	X
Timothy	X	X	X	X
Birdsfoot Trefoil	X	July 20-Aug 1st	X	July 20-Aug 1st
Tall Fescue	X	X	X	X
Perennial Ryegrass	X	X	X	X
Warm Season Grasses	X		X	

(1) Red clover can be seeded through September 15 on well drained soils. Earlier seedings will be more successful due to better winter survival.

(2) July 23 – September 30 if No-till

Table 4. Harvest Management – First Year

Forage	First Year Clipping/Grazing Height
Alfalfa	10”
Smooth Brome Grass	12”
Canarygrass	10”
Red Clover	8”
Orchardgrass	12”
Timothy	10”
Birdsfoot Trefoil	8”
Tall Fescue	12:
Perennial Ryegrass	4”
Warm Season Grass	N/A”

*N/A Not Applicable – do not graze or harvest during the first year growing season. Clipping weeds above the grass leaf height is desirable to control shading. Light grazing is permitted after the first hard frost.

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REFERENCES:

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USDA, NRCS. 2009. Technical Note 3. Planting and Managing Switchgrass as a Biomass Energy Crop. http://plant-materials.nrcs.usda.gov/pubs/NPMtechnotes/npmptn3-13079.pdf

Cornell Grass Bioenergy.org Information Sheets http://www.grassbioenergy.org/resources/bioinfo.asp

Production of Grass Biomass in the Northeast http://www.uvm.edu/pss/vtcrops/articles/EnergyCrops/ProductionofGrassBiomassintheNortheastVT_JerryCherney.pdf

Penn state Univ. Agronomy Fact Sheet Reed Canarygrass http://cropsoil.psu.edu/extension/facts/agfact26.pdf

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