

Conservation Cover Seeding Recommendations

**For guidance on establishing native prairie cover, refer to Wisconsin Agronomy Technical Note 5.*

INTRODUCTION

This technical note may be used to guide the establishment of cool season stands of perennial herbaceous vegetation for the purposes of Wisconsin Natural Resources Conservation Service (NRCS) Practice Standards 327, Conservation Cover; 645, Wildlife Upland Habitat Establishment; and occasionally 342, Critical Area Planting. Refer to these standards for specific practice purposes and requirements.

BACKGROUND

Cool season stands of perennial herbaceous vegetation have the potential to control soil erosion and sedimentation, improve water quality, and create or enhance wildlife habitat. A cool season stand must be properly established and maintained to accomplish these goals.

Cool season native and introduced plant species are typically easier and less expensive to establish than warm season grasses and forbs. Cool season plantings are also better adapted to the typical growing conditions in the Northern Planting Zone (Figure 1) and sites with a predominantly North or East exposure in the Central Planting Zone.

Cool season native plantings can be utilized to achieve a diverse plant community where needed to address identified resource concerns. Cool season introduced plantings will not typically achieve a high degree of plant diversity but seed sources are readily available, are relatively inexpensive and establishment methods are widely understood using common agricultural equipment.

Cool season native and introduced plantings can provide high quality wildlife habitat with some degree of routine maintenance and cover management. Cool season introduced species will require some reoccurring interseeding to maintain the diversity of the plant community.

SITE ASSESSMENT

Cool season prairies are generally divided into five soil moisture regimes: Wet, Wet-Mesic, Mesic, Dry-Mesic, and Dry. There is often no sharp division between the groups and one group may blend into another. Soil fertility and drainage characteristics contribute greatly to which of these categories a planting site will fall into.

Soil moisture regime plays an important role when planning an introduced cool season planting. Legumes adapted to wet and wet-mesic sites are typically short lived and will require routine reseeding to maintain plant diversity.

SOIL MOISTURE REGIMES SITE CONDITIONS

Wet

Wet mineral or organic soils are typified by poorly drained soil types. They can also be found on some frequently flooded sites. Examples of wet soils include Ashkum, Barronett, Barry, Brookston, Ettrick, Garwin, Ossian, Pella, and Sebewa.

Wet-Mesic

Wet-mesic sites are transitional between wet and mesic. Most wet-mesic sites occur on somewhat poorly drained mineral soils. Examples of wet-mesic soils include Aftad, Beecher, Curran, Elburn, Elliott, Kane, Lamartine, Locke, Matherton, Muscatine, and Rawley.

Mesic

Mesic sites will be found on most moderately well and well drained mineral soils which have moderate to very high Available Water Capacity. Mesic sites may occur on some somewhat poorly drained soils with low or very low Available Water Capacity or perched water tables. Examples of mesic soils include Downs, Dresden, Markham, Parr, Plano, Rosholt, Tama, Varna, and Warsaw.

Dry-Mesic

Dry-mesic sites are transitional between dry and mesic. They occur on some somewhat excessively drained and some well drained soils. Examples of dry-mesic soils would include Billett, Chetek, Dickinson, and Rasset.

Dry

Dry sites occur mostly on well to excessively drained soils. This would include soils such as Brodale, Impact, Menagha, Plainfield, and Sparta.

SPECIES SELECTION

Evaluate the winter hardiness of species selected for planting.

Select species based on the site conditions looking closely at soil type and moisture regime.

Determine if a cool season introduced specie or cool season native planting will be established. Use introduced species only in areas where they will not spread into existing natural areas.

Cool Season Native Planting

Utilize Wisconsin Agronomy Technical Note 5, Prairie Establishment/Restoration Seeding Recommendations, to select native species so that the planting will be in flower throughout as much of the growing season as possible.

Seed as many forbs from the appropriate tables in this technical note as the budget will allow.

Cool Season Introduced Specie Planting

To insure long stand life, seeds listed as Hardy (H) or Very Hardy (VH) (Tables 1 and 2 of Wisconsin Circular A-1525-1, Forage Crop Varieties and Seeding Mixtures found in the field office technical reference file), are preferred, with varieties listed as Moderately Hardy-Plus (MH+) acceptable. Varieties designated as Resistant (R) and Moderately Resistant (MR) for phytophthora resistance are recommended for soils that are moderately well-drained and can be wet during a portion of the year.

Table 1
Custom Seeding Mixture for Introduced Species¹

Genus and species	Name	Plant Type	Moisture Regime
<i>Bromus inermis</i>	Smooth brome	Grass	DM, M, WM
<i>Agrostis alba</i>	Redtop	Grass	D, M, W
<i>Festuca rubra</i>	Creeping red fescue	Grass	DM, M
<i>Festuca rubra ssp falax</i>	Chewings red fescue	Grass	DM, M, WM
<i>Festuca arundinacea</i>	Tall fescue	Grass	DM, M, WM
<i>Phleum pratense</i>	Timothy	Grass	M
<i>Poa pratensis</i>	Kentucky bluegrass	Grass	M, WM
<i>Lotus corniculatus</i>	Birdsfoot trefoil	Legume	M, WM
<i>Medicago sativa</i>	Alfalfa	Legume	D, DM, M
<i>Trifolium hybridum</i>	Alsike clover	Legume	M, WM, W
<i>Trifolium pratense</i>	Red clover	Legume	DM, M, WM
<i>Trifolium repens</i>	Ladino clover	Legume	M, WM

¹ It is required that at least 50 percent of the custom mixture is composed of grass.

SEED INFORMATION

Seeding rates in this Technical Note are shown in pounds or ounces of Pure Live Seed (PLS). Seed should always be purchased on a PLS basis. This allows the buyer to know the quality of the seed purchased and to properly make adjustments to the PLS seeding rates shown below. Federal cost sharing programs such as the **Conservation Reserve Program (CRP) require all seed purchased to be tested for germination and purity** (or PLS based). It is desirable that seed be tested for germination and purity for all uses. However, in some instances, due to the presence of an existing native prairie near a planting site, it may be desirable to use locally harvested genotype seed. If this seed is harvested locally it may be difficult to test it for germination or purity in order to determine PLS. The use of locally

harvested untested seed for USDA program participants must be approved by the Wisconsin NRCS State Agronomist.

Inoculate legume seed with the appropriate inoculant for the legume species. If the seed was pre-inoculated more than 60 days prior to seeding, re-inoculate. Inoculants must not be exposed to sunlight or allowed to dry out prior to planting legumes.

SEED MIXTURES

Seed Mixtures Requirements for Planting

Seeding mixtures will be selected from Table 2 or will be developed from Table 3 based on the following requirements:

Table 2
Sample Seed Mixes

Mixtures	Pounds PLS per Acre	Retardance Capacity Value	Wet Soils	Relative Wildlife Nesting Value
1. Timothy	2	B	No	High
Smooth Bromegrass	3			
Alfalfa	6			
2. Timothy	2	B	Yes	High
Orchardgrass	3			
Red Clover	5			
3. Timothy	2	B	No	High
Orchardgrass	3			
Alfalfa	6			
4. Timothy	2	B	Yes	Medium
Smooth Bromegrass	3			
Red Clover	5			
5. Timothy	2	B	Yes	Medium
Smooth Bromegrass	2			
Orchardgrass	1			
Red Clover	5			
Ladino (optional)	½			
6. Timothy	2	B	Yes	High
Orchardgrass	1			
Red Top	1			
Red Clover	5			
Ladino (optional)	½			
7. Timothy	2	B	No	High
Orchardgrass	1			
Red Top	2			
Alfalfa	6			
8. Kentucky Bluegrass	2	B	Yes	High
Red Top	1			

Table 3
Recommended Pure Stand Rate

Grasses	Pounds PLS per Acre	Legumes	Pounds PLS per Acre
Orchardgrass	5	Alfalfa	12
Kentucky Bluegrass	8	Alsike Clover	3
Smooth Bromegrass	10	Birdsfoot Trefoil	6
Timothy	6	Ladino Clover	3
Red Top	3	Red Clover	10
Tall Fescue (endophyte free)	10		
Perennial Rye Grass	6		
Creeping Red Fescue	5		

Cool Season mixtures must contain at least 50% grass. When soil erosion control is an identified resource concern, at least 50% of the grass in the mixture must be sod forming (i.e., at least 25% of the total seed mixture must be Smooth Bromegrass or Kentucky Bluegrass).

Cool Season mixtures for areas with shrub and tree planting are not required to contain 25% sod forming grass. These seed mixtures must still contain at least 50% grass. Smooth Bromegrass is not allowed in these mixtures.

SEEDING DATES

Date of seeding is a critical factor in determining whether a seeding will succeed or fail. The specific date that provides the best chance for success will vary from south to north and from year to year with prevailing moisture and temperature conditions. Late summer seeding is generally riskier than spring seeding. Planting at either end of the allowable range is riskier than the middle of the range. Seeding dates are as follows:

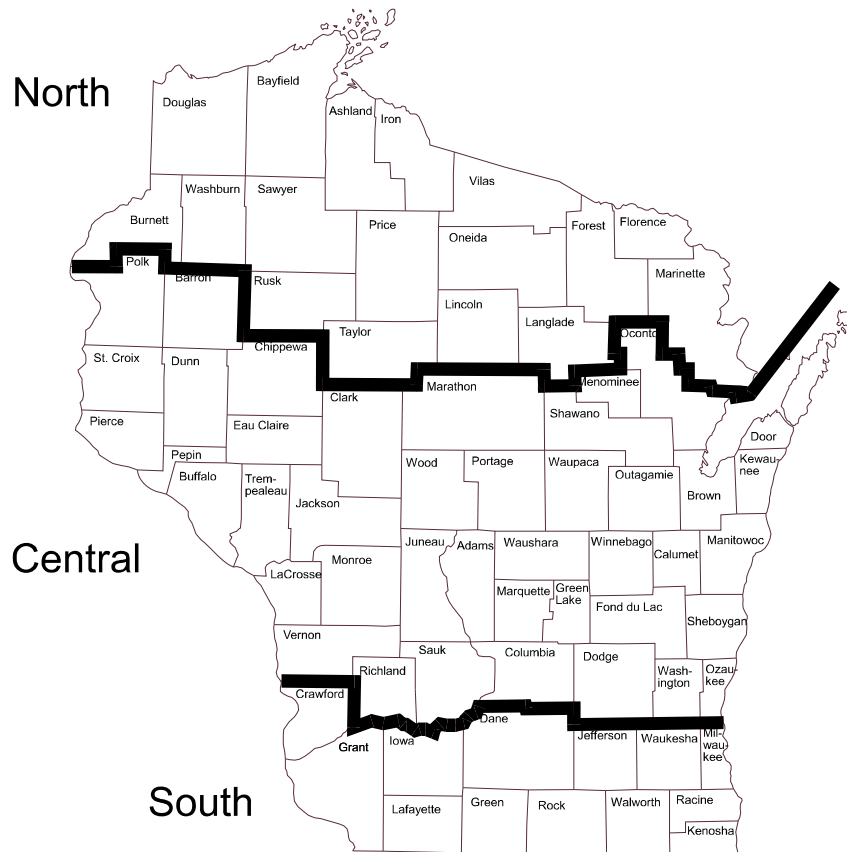
Table 4
Introduced Perennial Cool Season Grasses and Legumes - See Figure 1

Planting Zone	Spring	Late Summer
North	5/1 – 6/15	7/15 – 8/10
Central	4/15 – 6/1	8/1 – 8/21
South	4/1 – 5/15	8/7 – 8/29

Seeding outside of the established dates may be approved by the NRCS State Agronomist or designee. All variance requests shall provide documentation of the current soil moisture conditions and proposed timeframes for seeding to be completed.

Variances will be considered on a case-by-case basis by the State Agronomist and approvals granted in writing. Variances to the established seeding dates shall be documented in the case file for future reference.

**Figure 1
Planting Zone Map**



NURSE CROPS AND TEMPORARY COVERS

All land will be established to permanent vegetative cover during the first year of the land use conversion, if possible. Temporary cover, during the first year, may be used if: 1) required seeds or plant stock are not available, 2) the normal planting period for the species has passed or 3) where chemical residue will not allow establishment of permanent cover immediately. If temporary cover is used, the permanent vegetative cover must be established by the end of the normal planting period of the second year.

A. Nurse Crops

Nurse crops can be used to reduce the amount of erosion on critical sites. Canada wild rye

(*Elymus Canadensis*) for mesic sites or Virginia Wild Rye (*Elymus virginicus*) for wet sites can be seeded at a rate of 1.0 pound PLS/acre, Side-oats grama (*Bouteloua curtipendula*) can be seeded as a cover crop at a rate of 1.0 – 2.0 pounds PLS/acre on dry to dry mesic sites. These nurse crops will grow quickly in cooler weather and should be planted along with the seed mix. Note: the Side oats grama or wild rye species seeded as a cover crop shall not be counted toward the limit of 4 pounds per acre of grass in the seed mixture.

B. Temporary Cover

1. Erosion must be controlled until the permanent seeding is made. A temporary cover will typically not need to be seeded on those areas of fields where at least 70% of

the ground is covered with either crop residue or vegetative cover.

2. If seedbed preparation must be started in the fall, limited fall tillage operations are permitted as long as 50% crop residue cover remains after such tillage. Weeds must be controlled prior to seeding. Mow or use approved herbicides to prevent weed seed formation and reduce competition to the permanent seeding.
3. Where planting is delayed due to unavailability of seed or the normal planting period has passed, seed one of the following:
 - Winter wheat - 1 ½ bu/ac.
 - Winter rye - 1 ½ bu/ac
 - Oats - 1 ½ bu/ac.
 - Annual ryegrass - 6 lbs/ac.

Oats seeded as a temporary cover crop must be clipped or destroyed before it can head out to prevent excessive competition to the permanent seeding. Winter wheat and rye must be killed by tillage or herbicides before planting the permanent seeding.

4. Fields with atrazine carryover¹. Seed one of the following:
 - Forage sorghum - 15 lbs/ac.
 - Sorghum - Sudangrass hybrid - 25 lbs/ac.
 - Sudangrass - 25 lbs/ac.

¹ If more than 2 lbs of atrazine (active ingredient) per acre was applied pre-emerge or 1 1/2 to 2 lbs atrazine (active ingredient) per acre was applied post-emerge to the previous crop, a chemical carryover is assumed. A bioassay test may be used to better determine chemical carryover. Switchgrass may grow in areas of atrazine carryover.

SPECIAL EROSION CONTROL MEASURES

Evaluate the need for additional soil erosion controls during the establishment period. Where erosion is determined to be a concern, alternatives shall be developed (No Till, Contour Strip Cropping, Contour Buffer Strips, Grassed Waterways) to adequately address soil erosion.

SEEDBED PREPARATION AND SEEDING

Fertilizer

Fertilizer will be applied according to a current soil test and will be consistent with University of Wisconsin recommendations. A current soil test is defined as one dated July 1 or later of the third year prior to the current year.

Lime

When alfalfa is part of the seeding mixture, the soil pH must be corrected to 6.5. When birdsfoot trefoil, red clover or ladino clover is a part of the seeding mixture, pH must be corrected to 6.2. Liming material will be applied according to soil test recommendations except that recommended applications of 2 tons (4,000 lbs) per acre, or less, of grade 60-69 lime, do not have to be applied. For "grass only" seedings, correct soil pH to a minimum of 5.5.

Conventional Seeding

For conventional seeding, prepare a fine firm seedbed to a minimum of 3 inches. The seedbed should contain enough fine soil particles for uniform shallow coverage of the seed as well as contact with moisture and nutrients. It is important to have a firm seedbed. As a minimum, cultipack or roll before and after seeding. When walking on a properly prepared seedbed, the depth of your footprints should not exceed ¼ inch. Do not use heavy drills to seed on conventionally prepared seedbeds. Heavy drills tend to sink into the soil and it is very hard to control seed depth placement. The use of a drag or similar equipment after seeding is not advised when small seeded plant species are included in the mixture. Do not plant seed deeper than ¼ inch. It is acceptable to see some seed on the surface of the ground after seeding.

Tillage makes planting sites prone to erosion. Tillage should only be used on flatter slopes or in conjunction with erosion protection measures such as cover crops or mulching.

No-Till Planting

- 1) Site Preparation for No-Till Interseeding Into Existing Grass Cover

Land that has been in grass for many years usually has a thick layer of plant residue on the soil surface. In order to prepare a good seedbed for no-till planting and improve herbicide

effectiveness, this residue must be removed or altered. Options to prepare existing cover for no-till planting include grazing, mowing, haying, or burning the site.

- **Mowing:** Mow the site using a rotary mower or flail chopper to a height of 3 inches. The timing and type of mowing equipment selected shall be planned to uniformly distribute the mowed plant material over the field surface. Mowing should be planned to occur before any known weeds or invasive plant produce mature seeds.
- **Burning:** Carry out a Prescribed Burn according to an acceptable burn plan. The burn plan must address safety concerns and document the appropriate timing for the burn to provide the maximum control of weeds/invasive plants or to protect any existing, desirable plants on the site.
- **Haying:** Harvest a hay crop from the site the year before the planned interseeding. The timing of the hay harvest should be planned to minimize the amount of re-growth that will occur prior to interseeding.
- **Grazing:** Graze the site immediately prior to herbicide application. The timing and duration of the grazing must be managed to prevent erosion or damage to sensitive environmental areas but must be intensive enough to significantly reduce the standing vegetative cover. If possible, begin the grazing at a time of the year when the standing vegetation is green and growing to increase the palatability and feed value of the forage which will result in a more uniform removal of the existing vegetation.

2) Herbicide Application

Apply approved herbicides to kill or suppress existing vegetation and control weeds.

3) Seed Placement

Use a no-till drill. No-till drilling reduces the exposure of the newly seeded site to erosion. Consider fall seeding using a no-till drill on erosion-prone sites. Proper calibration of the drill using the manufacturer's instructions is very important to achieve uniform distribution of seed across the area being planted.

DETERMINING SUCCESS OF THE STAND

To evaluate a new or existing stand, refer to Wisconsin Agronomy Technical Note 1, Guidelines for Herbaceous Stand Evaluation.

ESTABLISHED COVER MAINTENANCE

Any planned maintenance (except for noxious weed control) after the establishment period, should be done before May 15 or after August 1 to protect nesting cover and reduce disruption of nesting activities.

The impact of any disturbance to existing cover on wildlife and threatened or endangered species must be assessed and mitigated to the extent practicable or as required by law.

Spot Treatment By Mowing

Spot mowing can be used to control annual weeds and to suppress other weeds. Spot mowing must be done before the target plant forms viable seed and must continue throughout the growing season. Spot mowing is not an effective control for biennial and perennial weeds but can be used to contain these plants until other control treatments can be implemented.

Spot Treatment With Herbicide

It is often necessary to spot treat invasive plants in a cool season stand. Spot treatment should be timed to treat the plant during active growth periods. Effective herbicide spot treatment can prevent the target plants from setting seed and spreading in the cool season stand.

Spot Treatment By Hand Pulling/Digging

Hand pulling or digging can be an effective control if the entire root is removed from the soil. Hand pulling/digging is most effective in spring when the soil is moist and loose from the winter freeze/thaw cycle.

Post Emergence Weed Control Herbicide Application - Established Cover

A post-plant herbicide application over the entire field can be used to control weeds. An herbicide product may be used if it is labeled for use on the

identified weed species, has been shown to effectively control the identified weed species, and can be effectively applied based on the existing site cover conditions. The timing of the herbicide product application is an important factor to protect the cool season stand. Note: Improper herbicide selection or application timing can severely damage a cool season stand.

REFERENCES

Curtis, J. T., 1959. The Vegetation of Wisconsin: an Ordination of Plant Communities. University of Wisconsin Press, Madison.

USDA, NRCS Wisconsin Field Office Technical Guide (FOTG), Section III, Conservation Management Systems.

University of Wisconsin Extension Publication A1525, "Perennial Forage Crop Variety Update for Wisconsin."

USDA, NRCS, Wisconsin Agronomy Technical Note 1, "Guidelines for Herbaceous Stand Evaluation."

USDA, NRCS, Wisconsin Agronomy Technical Note 5, "Prairie Establishment/Restoration Seeding Recommendations."