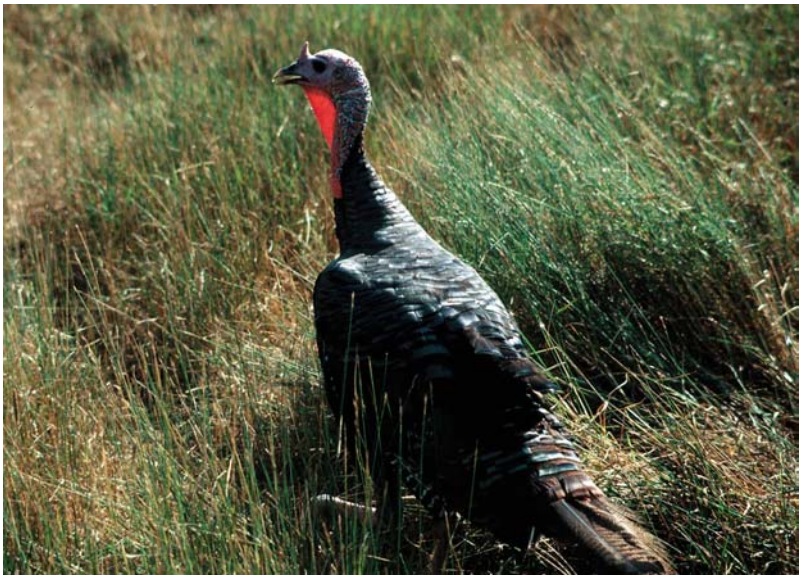
NATIVE GRASS ESTABLISHMENT FOR WILDLIFE

CONSERVATION INFORMATION SHEET AGRONOMY SERIES September 2004

Natural Resources Conservation Service

Rose Lake Plant Materials Program
Serving Indiana, Michigan, Ohio, Wisconsin



Wild turkey in native grass planting.

What Are Native Grasses?

Grasses, like all other plants, can be divided into two broad groups, native and introduced. As used here, native refers to those species that existed in North America prior to European settlement. Native species suitable for use in areas beyond their origin are referred to as adapted natives. Introduced species are those that have been brought into North America.

How Do Native Grasses Benefit Wildlife?

Native grasses provide nesting, food and shelter areas for wildlife. Native grasses, particularly warm season species, resist lodging and furnish important ground cover throughout the winter. In addition to plant parts and seeds that provide feed, insect populations concentrate in these areas supplying another food source for many wildlife species.

Where This Practice Applies

This practice is primarily intended for long-term plantings that create diverse, easily managed cover attractive to a wide range of wildlife. Native species when managed effectively are virtually permanent, making it unnecessary to reseed in future years. However, some site conditions produce only marginal native grass stands for wildlife use. Each site should be evaluated for its potential.

Where to Get More Assistance

Additional assistance may be obtained from your local Soil and Water Conservation District office or the USDA Natural Resources Conservation Service (NRCS) office at:

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Cool Season versus Warm Season

Whether native or introduced, grasses can be further divided into two categories: cool season and warm season. Cool season grasses produce most of their growth during the spring and late fall when the soil and air temperatures are cooler. Cool season natives of this region include Canada wildrye, Virginia wildrye, riverbank wildrye, bottlebrush grass, and northern wheatgrass.

Warm season grasses, on the other hand, produce most of their annual growth during the hot summer months. Growth for warm season grasses does not begin until air temperatures reach 60 to 65 degrees Fahr. Optimum biomass production occurs when temperatures average 85 degrees Fahr.. Switchgrass, big bluestem, little bluestem and indiangrass are among the predominant native warm season grasses of this area. Good seed supplies of native releases are available for these species.

Species Selection

Environmental factors such as soil, topography and climate influence the composition of plant communities. Therefore, it can be useful to design seeding mixtures which approximate the relative composition that may occur naturally on the site. Changes in conditions such as soil texture, soil drainage, aspect or elevation may necessitate a change in species use even within a field. Understanding which species naturally persist in certain environmental situations is the key to a technique called **sculptured seeding** (see reference: *Vegetating with Native Grasses in Northeastern North America*, Appendix B). Choosing this type of ecological approach can greatly enhance the longevity and diversity of a native plant community.

Site Condition and Preparation

There are relatively few site conditions in this region that challenge cool season grass establishment. In contrast, there are numerous conditions that create problems for warm season grass establishment. As such, the remainder of this conservation sheet will focus primarily on warm season grasses.

Reduced soil and air temperatures, higher elevations, or north or east facing slopes with poor airflow tend to make warm season grass success challenging. When these conditions occur with poor drainage the chances of creating marginal wildlife habitat are even greater. Of particular concern are north and northeast facing slopes at elevations above 1000 feet in plant hardiness zones 3 and 4. Also, long, narrow fields with northern aspects that are shaded by trees create plant establishment problems.

Planting warm season grasses should be avoided on sites prone to frost heaving. This situation is most likely to occur on poorly or somewhat poorly drained soils in Soil Management Groups 0, 1, or 2.5. Sometimes this is a condition on only part of the field, permitting a cool season mix to be strategically placed in the problem areas. If warm season grasses are to be planted on those sites, select varieties that are adapted to moist soil conditions.

Heavy mulches of crop residues or organic layers from old sod can pose problems when planting warm season grasses in no-till systems. A thick residue layer may hinder the placement of seed into the soil, limiting good seed to soil contact. Plant residue layers will also keep the soil cooler into the spring thus slowing germination and emergence. Another problem in killed sods is the possibility of high slug populations that will eat the seedlings in the spring. These conditions can be overcome by using tillage to incorporate the organic matter, preferably in the year prior to planting.

Severe soil compaction can be detrimental to seedling establishment, particularly with warm season grasses. Most sites where compacted zones are suspected or identified can be modified with the proper use of tillage.

Soil tests should be completed on the top 4-6 inches of topsoil in the fall prior to the spring planting. Nutrient levels required for warm season grasses are much lower than those needed for a grain crop, so moderate nutrient levels are adequate. Because they encourage weed competition, nitrogen applications are not recommended during the establishment year, except on sand and gravel pit reclamation sites where there is no weed pressure potential. Up to 50 pounds of nitrogen may be applied in the second year, along with herbicides for weed control, to improve appearance and tillering. Potassium and phosphorus may be applied either prior to or at the time of planting. If the application is a separate operation prior to seeding keep soil disturbance to a minimum. If applied during seeding, ensure that there is sufficient separation between the seed and fertilizer to minimize the risk of seedling injury. Potassium and phosphorus may be broadcast and incorporated in the fall prior to seeding.

For warm season and cool season grasses the pH levels should be corrected to at least 5.5 and 6.0 respectively. Lime can be applied to raise the soil's pH to the desired level. Four to six months are required for lime applications to change soil pH to

the desired level, depending on soil type and buffering capacity. Lime is most effective when incorporated into the soil, however, incorporation is not practical if no-till planting is used.

Evidence suggests that cereal rye may have an allelopathic effect on some native grass species. If a winter cover is needed to control erosion, oat is a good choice. Oat will winter-kill and not interfere with planting in the spring.

Weed Control

Weed control during perennial grass establishment is critical to the success of the planting. A weed control strategy for an establishment site should be implemented at least one year before planting. Warm season grass establishment has been successful when planted the year following corn treated with up to one pound of atrazine, or following a glyphosate resistant crop treated with a glyphosate herbicide product. Care should be taken to avoid using herbicide products that may cause carryover injury to the new grass planting.

Perennial weeds should be controlled before warm season grasses are planted. Perennial weed control is often best addressed in the late summer or fall before seeding. Care should be taken to select the weed control methods appropriate for the weed spectrum and site conditions.

At the time of this publication there are several herbicides registered for weed control in newly seeded or established warm season grasses. Refer to Cooperative Extension publications or a herbicide retailer for specific herbicide recommendations. Read and follow all pesticide label directions. Take special note of grass species tolerance to a herbicide and appropriate growth stages for application. Also be aware of any grazing restrictions listed on a pesticide label. Refer to the NRCS Pest Management Standard 595 for further pest control information. If the wildlife planting is being established as part of a NRCS Conservation Program, refer to the rules and policies of that program regarding weed control options.

Seeding Rates

Seeding rates for native grasses vary greatly depending on the environmental factors, purpose and species selected. For wildlife purposes thinner stands are desired to allow for animal movement. Under average field conditions native grass mixes typically range from four to six pounds of pure live seed (PLS) per acre. If the wildlife planting is being established as part of a NRCS Conservation Program, refer to the rules and policies of that program for additional information concerning seeding rates.

Due to relatively poor seedling vigor, native grass seedling establishment is estimated at 20 to 25 percent of the PLS rate.

Native forbs and shrubs should be added to the seed mix to enhance plant diversity and create additional food sources. The addition of forbs and shrubs can limit the herbicide products available for weed control during the establishment year. Herbicide products that control broadleaf weeds, especially those containing 2,4-D or dicamba, will severely damage most forbs and shrubs. Refer to NRCS Technical Standard 327 – Conservation Cover, or Standard 645 – Wildlife Upland Habitat Management, for recommended seeding mixes, seeding rates and planting dates.

Planting Dates

Warm season grasses require soil temperatures of at least 50 degrees Fahrenheit before they will germinate. This is eight to ten degrees Fahrenheit warmer than the requirement for cool season grasses. Therefore, the optimal seeding time for planting warm season grasses, either alone or in combination with cool season grasses, usually occurs between mid spring and early summer when moisture and temperature are most favorable. The later plantings may reduce problems with weed competition, whereas early plantings allow more time for stand establishment. Typically, dormant seedings are not recommended due to the possibility of fall germination and frost heave, seed loss to wildlife through the winter, and early weed competition in the spring. Dormant seeding of warm season grasses can be made, however, after November 1st or when soil temperature at a two-inch depth is below 50 degrees Fahrenheit. If the wildlife planting is being established as part of a NRCS Conservation Program, refer to the rules and policies of that program regarding planting dates.

Seedbed Condition

A firm seedbed is important when seeding native grasses. This helps conserve moisture and ensure good seed to soil contact that is critical for adequate germination. Recently tilled ground should be packed with a coil or roller packer, or empty grain drill press wheels prior to planting. The seedbed is considered firm enough when an adult's footprint penetrates no more than one-fourth to one-half inch deep.

Planting Equipment and Depth

Equipment used for seeding native grasses must be capable of operating at a consistent, shallow depth. Seed should be placed no deeper than one-fourth inch in fine to medium textured soils and no deeper than one-half inch in sandy soils. A good rule of thumb is to adjust the planter or drill so that 30 – 50 percent of the seed is visible on the soil surface. Carefully adjust drills designed for no-till planting to maintain a consistent, shallow planting depth in loose soil. Use of hydraulic cylinder stops may be needed on some drill models to prevent planting warm season grass seeds too deep.

Specialized grass seeding drills usually have seed-box agitators and/or specially designed seed cups to help ensure uniform flow without carriers. Most specialists in warm season grasses strongly favor the use of a native seed drill or a range drill equipped with chaffy seed boxes to handle awkward seed shapes. Standard grain drills without seed agitators can be used to plant switchgrass.

Warm season grass seed can be spread with a broadcast spreader or air seeder followed by a culti-packer to improve seed to soil contact. Increase seeding rates by 20 – 25 percent for broadcast seeding compared to planting with a drill.

Maintenance

Either clipping or herbicides should be used for first year weed control. If clipping is selected, mow to a height between 6 and 12 inches. Plant residue should be evenly distributed to prevent smothering of desired plants. With warm season grasses, only the leaf tips should be cut during the first year. Wait until most ground nesting birds have completed incubation and left their nests any year mowing is used. April 15th – August 1st is considered the primary bird-nesting season for grasslands in Michigan. Consult a local NRCS representative for primary nesting season in other states.

Prescribed burning is recommended for third or fourth[h] year management, then every three to five years thereafter, based on grass stand conditions and presence of undesired plant species. Prescribed burns should be completed in early spring and supervised by qualified personnel. Consult NRCS Prescribed Burning Standard 338 for specifications to plan a spring burn for removing plant residue. Mowing or grazing can be used to remove plant residue if burning is not possible. Excessive residue from mowing should be removed to prevent smothering of desired plants.

Stand Evaluation

Patience and perspective are important when evaluating a native grass stand. Remember these plants are relatively slow to establish. Wildlife plantings need to grow much taller than turf plantings, so plant vigor is important. Bigger plants are more drought tolerant, productive, and competitive with weeds. If too densely spaced, these plants will inhibit each other's development.

Because of slow development, particularly in warm season species, and the potential for frost heaving in the first year, assessments made in the second year are a more accurate measure of success. If a warm season grass stand has one strong plant per square foot by June of the second year, the stand will be successful in the great majority of cases. Densities in cool season native stands should be much greater.

For More Information

Additional information concerning the establishment or maintenance of native grasses may be obtained from the associated Conservation Information Sheets on native grasses, and the USDA-NRCS and Ducks Unlimited Canada publication: *Vegetating with Native Grasses in Northeastern North America.*

This Conservation Information Sheet

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Reference/File Indexes

Topic Application:

[ ] Construction
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FOCS Reference Number:
CS _____

Resource Series:

[X] Agronomy
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[ ] Engineering
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[ ] Hayland
[ ] Livestock
[ ] Pastureland
[ ] Recreation
[ ] _____

References:

- USDA-NRCS & DUC *Vegetating with Native Grasses in Northeastern North America,* Appendix B. Available Through USDA-NRCS Plant Materials Program, Syracuse, NY

Assisted by: _____

Project Identification and Location

Name: _____ **Farm:** _____

County: _____ **Tract:** _____

Date: _____

Design Considerations

1. Purpose(s) of Planting (✓)

☐ **Wildlife management** ☐ **Prairie restoration**

☐ **Conservation cover** ☐ **Filter strip**

☐ **Pasture/hayland** ☐ **Other** _____

2. Geographic Considerations

- **Native grasses are limited in their geographic area of adaptation due to hardiness and disease susceptibility.**
- **If specific marketed varieties will be used consider only those adapted to the plant hardiness zone of the planting site** (see reference: ***Vegetating with Native Grasses in Northeastern North America*).**

  _____**Plant Hardiness Zone** (from ***USDA-NRCS Tech. Guide Section 1***)

- If native material of local origin will be used, consider only material that originated within a specific area surrounding the planting site (e.g. ecoregion, subregion or section - as described in USDA-FS publications *Regional Landscapes of Michigan, Minnesota, and Wisconsin: A Working Map and Classification* by D. Albert, 1995 or *Ecological Units of the Eastern United States: First Approximation* edited by Keyes and Carpenter, 1995)
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3. Recent Herbicide Use

Exceptionally high rates of *Atrazine* or *Simazine* in the previous year could pose a carryover threat, particularly to cool season grasses and forbs. Warm season grass will typically benefit from residual effects of normal *triazine* rates. However, very high rates (*4 lbs./acre or higher*) in the previous year may hinder their establishment on lighter soils. Indianagrass appears to be particularly sensitive to *triazine* residues. Very persistent chemicals such as *Tordon* will negatively affect the success of forbs even when used several years prior to the planting date.

	Rate *(lbs./acre)*			
RECENTLY USED TRIAZINES AND OTHER PERSISTENT HERBICIDES	**Field/ Area** _____	**Field/ Area** _____	**Field/ Area** _____	**Field/ Area** _____

4. Planting Method (✓)

☐ **Native seed or range drill** ☐ **Standard grain drill**

☐ **Grass drill** ☐ **Broadcast**

____ **w/specialized seed cups**
____ **w/seed-box agitator** ☐ **Air seeder**

☐ **Other** _____
(specify)

5. Seedbed Condition (✓)	**Field/ Area** _____	**Field/ Area** _____	**Field/ Area** _____	**Field/ Area** _____
Tilled				
Standing residue				
Existing sod				

Design Recommendations

1. Species Selection

The selection of species should be based on a combination of criteria including the nature of the land base, purpose of seeding, likely management regimes, seed availability, seed costs, longevity, ease of stand establishment, and attributes of available plant species.

Seed should not be purchased as mixtures. Buy seed of individual species and create the mix that you require. When purchasing seed, request that the dealer provide a seed analysis report. This report will identify the laboratory where the analysis was performed, the data listed on the certified seed tag plus percent of hard seed, percent of other crop seed, and a list of weed seeds and their amounts. Avoid dealers who will not provide this information prior to the sale.

	PLS* *(lbs./acre)*			
WARM SEASON GRASSES (include variety if requested)	**Field/ Area**	**Field/ Area**	**Field/ Area**	**Field/ Area**
Big bluestem				
Little bluestem				
Switchgrass				
Indiangrass				
Sideoats grama				
Eastern gamagrass				
Prairie cordgrass				
Prairie sandreed				
COOL SEASON GRASSES				
TOTAL				

	PLS* *(oz./acre)*			
FORBS/LEGUMES/ SHRUBS	**Field/ Area**	**Field/ Area**	**Field/ Area**	**Field/ Area**
TOTAL				

*** % PLS (Pure Live Seed) = (% purity x % viability) ÷ 100**

MECHANICAL OPERATIONS (✓)	**Field/ Area**	**Field/ Area**	**Field/ Area**	**Field/ Area**
Chop & spread straw				
Incorporate OM/residue				
Remove crop residue				
Weed control				
Incorporate lime				
Reduce soil compaction				
Firm seedbed				
Other				

- **Herbicide treatments should replace tillage immediately prior to planting. Avoiding tillage at that time will leave a firmer seedbed thus greater control of seed placement.**
- **With any perennial weed problem, for best results do not perform any tillage operation several months before or five days following an application of glyphosate. This will permit the herbicide to be translocated through the undisturbed rhizome.**
- **Non-selective herbicides can be used in the spring immediately prior to or up to four days after seeding.**

	Date *(month/year)*			
HERBICIDE APPLICATIONS	**Field/ Area**	**Field/ Area**	**Field/ Area**	**Field/ Area**

		Rate *(lbs./acre)*			
ADDITIONAL REQUIREMENTS		**Field/ Area**	**Field/ Area**	**Field/ Area**	**Field/ Area**
Fertilizer	**N**				
	P				
	K				
Lime *(tons/ac)*					
Cover crop					

Additional remarks:

_____

_____

_____

_____

2. Site Preparation

3. Planting

Seed of some species are awned or have sharply pointed tips while others are light and fluffy. Any of those characteristics can result in undesirable skips within seed rows and uneven rates of seed flow in standard gravity-fed grain drills. To overcome that problem, an inert carrier like cracked wheat, cracked corn, oat groat or vermiculite at half the bulk seed rate can be mixed with the grasses to improve seed flow. The use of oats as a carrier *(5-10 lbs./acre*) can be valuable with soils subject to erosion or crusting. In drier areas native plant seedlings may have difficulty competing with oats. An inert carrier should be used under those conditions. Fertilizer is not recommended as a carrier due to the possibility of damaging the seed or seedling.

Although not typically recommended, companion crops can be used when absolutely necessary on steeply sloping areas where erosion control is essential, or on soils that tend to crust. A non-competitive perennial such as redtop *(1 lb./acre)*, an annual such as oats *(20 lbs./acre)*, or a less competitive early succession cool season native like Canada wildrye *(0.5 lbs./acre)* should be used for this purpose.

To ensure the desired PLS seeding rate is achieved, the drill must be calibrated for each seed mixture to be planted. Once the planting is underway, the operator should stop several times in the first acre or two to ensure the seeding depth is appropriate. A quick look in the seed box during those stops can also give an indication that the seeding rate is suitable.

BULK SEEDING CALCULATIONS	**Species** ____	**Species** ____	**Species** ____	**Species** ____
PLS Rate (*lb/acre)*				
PLS % *(from seed tag)*				
Bulk Seeding Rate = PLS Rate / PLS% X 100 *(lb/acre)*				
Total bulk seeding rate of all species planted *(lb/acre)*				

PLANTING SPECIFICATIONS		**Field/ Area** ____	**Field/ Area** ____	**Field/ Area** ____	**Field/ Area** ____
Bulk Rate *(lbs./acre)*					
Depth *(inches)*					
Carrier needed (✓)	**inert**				
	oat				
Planting Date:					
Companion crop (✓)					

If the seeding equipment does not provide adequate on row packing after seed placement, the site should receive an additional packing operation to ensure good seed to soil contact.

For More Information

Additional information concerning the establishment or maintenance of native grasses may be obtained from the associated Conservation Information Sheets on native grasses, and the USDA-NRCS and Ducks Unlimited Canada publication: *Vegetating with Native Grasses in Northeastern North America.*