

PASTURE AND HAY PLANTING

Warm Season Perennial Grass Planting

Virginia Conservation Practice Job Sheet

512 (b)



Practice Definition

Establishing stands of warm season grass(es) (WSG) or WSG mixed with legumes and forbs as part of a resource management conservation plan. The grasses may be used for forage, hay, pasture, or wildlife habitat.

Purpose

This practice should be used to establish WSG stands and WSG mixtures as part of a conservation plan for livestock, wildlife or both. This practice may also be used to improve or maintain livestock nutrition and/or health, extend the grazing season, reduce soil erosion, improve water quality, balance forage supply and demand during periods of low forage production, improve soil quality, improve wildlife habitat, and increase carbon sequestration. Not all warm season perennial grasses are suitable for wildlife habitat.

Conditions where Practice Applies

This practice applies on cropland, pastureland, hayland, and other lands where WSG is needed for pasture, forage, hay, or wildlife habitat.

Species Selection

WSGs fall into two very different groups. The first is native WSG. This group of warm season forages includes switchgrass, Indiangrass, eastern gamagrass, big and little bluestem. These are bunch grasses that are very well suited to forage production, grazing, and wildlife. The second group is introduced species that are important forages but offer little wildlife value. This group includes bermudagrass. This is a mat-forming grass spread by stolons and seed. With proper management, bermudagrass may provide very good summer grazing in the Southern Piedmont and Coastal Plain portion of the state. Caucasian bluestem, an introduced species with growth habits similar to native WSGs, is not recommended due to possible invasiveness, lower quality forage, and little wildlife value when compared to the native species. For recommended planting dates and species, see Table 1.

Establishment Specifications

The use of native warm season grasses requires special attention to the details of establishment and management (seedbed preparation, planting, and weed control). **Full establishment may take as long as three years.** The extra effort required to establish WSG is offset by longevity of the stand, forage quality, and wildlife benefits provided.

WSG and WSG mixtures are to be established in the spring. Warm season grasses grow best when the weather is hot and other species' growth are declining. They begin growing when the soil temperature is above 50° F and continue to grow until the soil temperature reaches nearly 90° F (usually May - September). If soil temperatures are cooler than 50° F or moisture is not adequate, the seeds will remain dormant until conditions are favorable. WSG seed requires a cool, moist period prior to germination. This process is known as a stratification period. Most seed may be purchased already stratified. Stratified WSG seed and forbs should be planted between April 15 – June 30. Check with the supplier to determine if any seed will require stratification or specific storage methods prior to planting. Unstratified seed may be planted in the fall (November 15 – March 1). However, this method is not recommended due to the low success rates and

low germination with the exception of eastern gamagrass which may be planted in the winter to allow environmental scarification of the seed. Legumes can also be overseeded during the fall or spring after a warm season grass planting. (Annual legumes should only be seeded during the spring.) WSG usually has a lower germination rate than cool season species; therefore, it is essential when purchasing and planting WSG that the quantities of seed be based on Pure Live Seed (PLS).

Seedbed and Site Preparation

Stands may be established either by conventional or no-till methods. No-till establishment is the preferred method since there is minimum soil disturbance, thus reducing weed competition and soil erosion. Regardless of the seeding method used, care should be taken to avoid planting the seed too deep. Seeding depth should never exceed $\frac{1}{4}$ inch with $\frac{1}{8}$ depth recommended in the coastal plain. Planting deeper than $\frac{1}{4}$ inch will almost always fail. Lime and fertilizer applications, will be applied according to the recommendations of an approved soil testing facility. If soil erosion is a concern during the establishment period, then it is highly recommended using a no-till method of planting. This will protect the soil in the field and reduce the potential off-site effects of soil erosion. Avoid no-till planting or cultipacking in wet soil since it may result in improper seed placement and planting failure.

When seeding by *conventional methods*, plowing and disking should be done deep enough to kill all existing vegetation and to incorporate lime and fertilizer into the top 4 – 6 inches of soil. Any rills and gullies should be eliminated. The surface should be reasonably smooth, free of ridges, rocks, and other obstructions and a firm seedbed prepared. A dry, firm seedbed is critical to avoid planting seed too deep and to ensure good seed-to-soil contact. The seeding may be done with a drill, cultipacker seeder, cyclone seeder or other suitable equipment. The seed should be covered no more than $\frac{1}{4}$ inches in a firm seedbed. A roller or cultipacker will ensure a good seed-to-soil contact. Cultipack or roll the seeded area only once to ensure good seed-to-soil contact and the proper seeding depth. Conventional seeding may be used for establishment on areas that have been recently cropped, where weedy competition will be reduced, and where the risk of soil erosion is minimal. Broadcast seed shall be spread in a uniform manner and should always be cultipacked after seeding. No more than $\frac{1}{3}$ of the seed should be visible on the soil surface. Broadcast fluffy seed (big and little bluestem and Indiangrass) with a drop or cyclone type spreader. A carrier may be used to help distribute the seed. The following carriers may be used: lime at 200 lbs/acre; wheat at 40 lbs/acre; or oats at 32 lbs/acre. Wind speed should be minimal when using this method.

When seeding by *no-till methods*, care needs to be exercised to ensure correct seed flow and seeding depth. Smooth seeded species like switchgrass may be planted using a conventional drill. Species such as little bluestem, big bluestem and Indiangrass will require a specialized no-till drill or a modified conventional drill that contains a fluff box. Specialized drills have seed boxes with dividers, agitators and oversized drop tubes and may be adjusted for shallow planting depths. Calibrate the drill and when planting, check the seeding depth often to avoid planting too deep. Do not pull the drill too fast.

Seed must be placed in firm contact with the mineral soil at a depth of $\frac{1}{4}$ to $\frac{1}{2}$ inch. Depth control bands or other controls should be used to ensure proper placement of seed. ***Packer wheels are essential.*** Eliminate competitive vegetation by heavy grazing, mowing and/or herbicides. Undesirable species should be controlled by applying a suitable herbicide at least two weeks before the seeding date. To maintain stand integrity, pesticides may be applied to control undesirable and harmful infestations. Effects on beneficial insects and wildlife will be considered prior to applications.

All seed will conform to minimum state standards for purity, germination, and other features. Never compromise seed quality. Seed tags and other information may be requested by an NRCS representative to verify seed quality.

When planting native WSG, application of nitrogen is not recommended.

Common bermudagrass and its hybrids may be established by seeding or with sprigs. Lime and fertilize according to soils test. Bermudagrass responds vigorously to nitrogen applications.

See planting specifications on pages 5 & 6 for the specific recommendations for your farm.

Weed Control before Planting

Native WSG seedlings are slow to establish. Weed control prior to planting and during the first two years are critical to success. In most situations, control should begin prior to the seeding and seedbed operations. Either conventional seedbed preparation or herbicide application/s or both may be used to control weeds prior to establishment. When using pesticides, consult your local Virginia Cooperative Extension (VCE) agent for specific pesticide recommendations or the VCE Pest Management Guide located @ <http://www.ext.vt.edu/pubs/pmg/>. Always follow the label instructions when using pesticides.

Operation and Maintenance

Be prepared to allow enough time for stand establishment prior to harvest or grazing of the stand, which may take as long as three years for native WSG.

Weed Control during the Establishment Period

Weed control during the establishment period may be accomplished by mechanical (mowing or disking) or by chemical methods. Competition control remains an important part of native WSG establishment for up to three years after planting. Never apply nitrogen to native WSGs during the planting year. This encourages unwanted vegetation and weed competition. Lime may be applied at recommended levels. Fertilization of WSG often results in stands becoming too dense for optimum wildlife use. Consider the need and use of fertilizers carefully for native WSG.

Planting Year

Mow the planting as needed to control weeds. As a general rule, never allow weeds to exceed 18 inches or form seed heads. Mow at a height of 4 to 6 inches or just above seedling height. A “wickbar” or similar device may be used to selectively apply herbicides. Selective or post-emergent herbicides may be sprayed over the planting to control specific weeds. Herbicides are most effective when weeds are young and actively growing. Many WSGs and wildflowers are not post-emergent herbicide tolerant (e.g. switchgrass). Fertilize bermudagrass according to soil test recommendations. Unlike native WSG, bermudagrass will respond to fertilization, particularly nitrogen, throughout the stand life.

Second and Third Year after Planting

Plantings should be inspected in the early spring. If unwanted vegetation or weeds comprise more than 25 percent of the stand, either treat with an appropriate post-emergent herbicide or keep the area mowed very short until the WSG start to green up. Throughout the growing season, mow as needed above the seedling height to prevent weeds from overtaking the stand. Apply lime, phosphorus, and potassium only if soil tests indicate that they are needed (i.e. pH is less than 5.5, or P and K test results are in the "low" range). Where feasible, delay any management activities of the area until conclusion of the *primary nesting period** (April 1 – June 15). Bermudagrass may be hayed or grazed in this period. Do not overgraze.

Fourth Year after Planting (Native WSG only)

By the fourth year, the stand should be well established. Manage livestock, maintain weed control, and monitor stand density for the intended purpose for the life of the stand. Established stands do not require frequent attention, but periodic disturbance and or grazing is necessary to stimulate growth of desirable vegetation and to eliminate encroachment of woody vegetation. The type and frequency of management will depend on the purpose of the planting. For optimum wildlife habitat, all management practices should be conducted outside the *primary nesting season** (April 15 - Aug 15). Management and maintenance activities may include mowing or haying, weed control, grazing, light disking, and in some instances prescribed burning to rejuvenate the stand. Phosphorus and/or potassium may be applied moderately where desired or needed. Careful consideration should be given to the application of nitrogen. If nitrogen is required, apply according to a soils test or use 40 to 80 pounds of nitrogen per acre split in two applications: one as growth of the WSG begins and the second in mid-summer.

Grazing

Controlled grazing is a very effective WSG management tool. Livestock may be used to manipulate stand density and remove residue. This method may provide excellent pasture and forage; however, strict management of the livestock is required to insure the stand integrity and wildlife value. This technique should only be performed in accordance with a grazing plan and should include wildlife as the primary or secondary objective of native WSG stands. The rate of removal of WSG forage is determined by how many head of livestock are placed on the stand and how long they are allowed to graze the stand. Native WSG grasses should only be grazed to a minimum height of 12 inches or livestock should not graze more than ½ of the above ground height. Under a rotational grazing system, there must be sufficient time for grass to recover. The optimum rest period for native WSG is 42 to 49 days. A minimum of 10 inches growth should occur in the fall in order for plants to build root reserves for wintering and initiating spring growth. As a general rule, WSG should not be grazed 30 days prior to the first killing frost to provide this reserve. This residual growth is excellent winter roosting cover and nesting the following spring.

Prescribed Burning (Native WSG only)

Historically, WSG have existed with and adapted to fire. Wildlife managers continue to use fire to manage WSG. This method is the best way to remove thatch or residue from prior growth, reduce invasion of woody species, and stimulate forb growth. **To conduct a prescribed burn in Virginia, a written burn plan must be prepared by a Certified Prescribed Burner Manager who has completed the Virginia Department of Forestry (VDOP) Certified Prescribed Burner Managers Program.** Refer to the Virginia Conservation Practice Standard *Prescribed Burning* (Code 338) for more information. In Virginia it may be difficult to manage warm season grasses with fire due to burning regulations, weather conditions, slope, topography, and liability. Untrained individuals should never attempt this method of management. Contact the Virginia Division of Forestry for current information concerning certified burn managers, permits and burning laws. Where possible, a WSG stand should be burned once every three to four years between January 1 and March 1.

Mowing and Haying

Mowing or haying not only provides forage, but can be used to control woody growth and remove plant matter (residue). Residue left on the surface will eventually smother the new growth. Cutting the stand for hay provides forage and is an excellent method to remove residue. On sites where soils are too wet in the spring to mow, harvest may be performed in the fall after the grasses are dormant. In order to allow a sufficient recovery period before winter dormancy, grasses should be allowed to reach a minimum height of 10 inches before the first killing frost. To maximize wildlife benefits, mow on a 2 to 3 year rotation to control woody growth. Where feasible, mow only ⅓ to ½ of the stand each year. The remaining areas will provide year-round wildlife food and cover.

Light Disking (Native WSG only)

If wildlife is the primary objective, occasional light disking may reduce the density of the WSG plants and provide openings in the planting for movement of wildlife. It may also encourage the germination of wild herbaceous plants. Disking should occur on a 3 to 4 year rotation. Preferably disk only ⅓ to ½ of the stand each year.

*The nesting season of April 15 – Aug 15 consists of two or more nesting periods. It is always best for birds and other wildlife utilizing the WSG to remain undisturbed during the primary nesting period of April 1-June 15 or the re-nesting period, June 16 – August 15. If this is not possible, the disturbance should be minimized as much as possible. It should be noted that if you participate in a USDA conservation program to establish WSG, there may be limitations to the use of the grass during the entire nesting season after the establishment period.

Specifications

Site-specific requirements are listed on this specification sheet. This job sheet is provided as a component of a resource conservation plan. Plan maps, location of fields to be planted, complementary conservation practices and measures, grazing schedule, other relevant information and additional specifications may be included. Specifications are prepared in accordance with the NRCS Field Office Technical Guide. See Conservation Practice Standard *Pasture and Hay Planting* (512).

Client:	Farm #:	A no-till drill is available from this Conservation District or VDGIF office: <div style="text-align: right;"><input type="checkbox"/> YES <input type="checkbox"/> NO</div> Phone: ()
Field(s):	Tract #:	
Designed By:	Date:	

Purpose (check all that apply)	
<input type="checkbox"/> <i>Improve or maintain livestock nutrition and/or health.</i>	<input type="checkbox"/> <i>Provide and /or improve wildlife habitat</i> <input type="checkbox"/> Quail <input type="checkbox"/> Farm Game <input type="checkbox"/> Songbirds <input type="checkbox"/> Other
<input type="checkbox"/> <i>Balance forage supply and demand during periods of low forage production.</i>	<input type="checkbox"/> <i>Reduce soil erosion and improve water quality</i>
<input type="checkbox"/> <i>Extend the length of the grazing season.</i>	<input type="checkbox"/> <i>Improve soil quality and increase carbon sequestration.</i>

Supplemental Information	
<input type="checkbox"/> WSG is to be established under a USDA conservation program. (Are there any special conditions/ requirements? If so, list in Additional Notes, Specifications, and Requirements on the last page.) Program _____	<input type="checkbox"/> NO

Layout	Field _____	Field _____	Field _____
Species (or Mixture from Va PEG*) lbs/acre PLS			
Species (or Mixture from Va PEG*) lbs/acre PLS			
Species (or Mixture from Va PEG*) lbs/acre PLS			
Other Species Seeding Rate (forbs, legumes, etc.) lbs/ac			
Total Area Planted (acres)			
Method of Establishment			
Site Preparation Method			
Fall Site Preparation Treatment Date			
Spring Site Preparation Treatment Date			
Herbicide (if known & applicable from VCE)			
Herbicide Application Dates			
Planting Date(s) (WSG)			
Planting Date(s) (Forbs, legumes, etc)			
Supplemental Nutrients for Establishment (lbs/acre)			
Lime (tons/acre)			

*Virginia Plant Establishment Guide (PEG)

Site Preparation (Select method)

A. Site Preparation for No-Till Method

- Replacement of tall fescue or orchardgrass with WSG plantings:
1. Mow or graze very low in late winter for a spring treatment or late summer for a fall treatment.
 2. Allow the fescue to green up to a height of at least six inches.
 3. Spray the field with an approved herbicide. For spring treatments, wait two weeks after the initial spraying. If there is still green fescue, spot spray the problem areas. For fall treatments, spray during fall green-up then wait until the next spring and spot spray if needed.
 4. After a good kill is achieved, establish WSG. **Additional requirements:**
- Graze or mow as low as possible to remove as much of the existing vegetation as possible. Apply an approved herbicide to kill existing vegetation at the rate recommended by VCE in the fall on or by _____ (date). Apply a second application on remaining vegetation after spring green-up once vegetation has reached 4-6 inches on or by _____ (date). Follow all label precautions and directions. Wait a minimum of two weeks or as directed by the product label and plant. **Additional requirements:**

B. Site Preparation for Conventional Method

- The seedbed should be prepared by disking and/or plowing to a depth of 4-6 inches. After disking, make **at least one** trip over the field using a cultipacker to firm the seedbed. Ensure that the seedbed is dry and firm to obtain the proper planting depth. Wet soils should not be cultipacked or planted. **Additional requirements:**

Planting Method (select method)

- No-Till Drill** Establish vegetation according to the specified seeding rate of _____ lbs/acre PLS. Seed should be drilled $\frac{1}{4}$ inch deep uniformly over the area. Smooth seeded species like switchgrass may be planted using a conventional drill. Other species may require a modified or specialized drill. Check depth of seed frequently during planting. **Additional requirements:**
- Seed should be **broadcast** at a rate of _____ lbs/ac PLS. Fluffy seed (Indiangrass, big and little bluestem) should be broadcast with a drop spreader. If using a cyclone type spreader, a carrier should be used to help distribute the seed. The following carriers may be used: pelletized lime at a 200 lbs/acre rate; wheat at a 40 lbs/acre rate; or oats at 32 lbs/acre rate. Since fluffy seed will only broadcast as far as the carrier, make sure your passes overlap to ensure even coverage. If wheat or oats are used as a carrier, mow them prior to seed head formation. **Additional requirements:**

Operation and Maintenance (select all that apply)

Follow the procedures and methods for Operation and Maintenance as outlined in this job sheet. Livestock will be excluded from the stand until well established (up to three years). Periodic disturbance of the stand may be required after establishment. Refer to other job sheets or conservation practices as indicated for more information. During the establishment period, a post emergent herbicide or mowing above the seedlings may be necessary to control weeds. Contact VCE for information regarding herbicide use. Fertilization may be required after the stand is established. No nitrogen should be applied during the establishment year. The recommended method(s) of management are:

- Mowing/Hay
- Light Disking
- Prescribed Grazing
- Prescribed Burning (requires certified burn plan contact VDOF)

When _____ How often _____

Additional requirements:

Additional Notes, Specifications, Requirements, etc.

For more information concerning this practice contact:

_____ at _____

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication program information (Braille, large print, audiotape, etc.) should contact the USDA Office of Communications (202) 720-2791. To file a complaint of discrimination write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

Perennial Warm Season Grass Establishment

Perennial Warm Season Grass Establishment						
		Recommended Seeding Dates				
Forage	Seeding Rate (pure live seed) lbs	Coastal Plain	Southern Piedmont	Mountain/Valley Northern Piedmont	Desired pH	Seeding Depth
Native Warm Season Perennial Grasses (Primary Use - Forage)						
Big Bluestem or Indiangrass	10 conv. 8 no-till	4/15 – 6/30	5/1 – 7/1	5/1 – 7/1	5.8 - 6.5	1/8" – 1/4"
Eastern Gamagrass	10	4/15 – 6/30	4/15 – 6/30	5/1 – 7/1	5.8 – 6.5	1"–1 1/2 "
Switchgrass	10 conv. 8 no-till	4/15 – 6/30	5/1 – 7/1	5/1 – 7/1	5.5 – 6.5	1/8 - 1/4"
Switchgrass and Big Bluestem and/or Indiangrass	5 conv. 4 no-till for each species	4/15 – 6/30	5/1 – 7/1	5/1 – 7/1	5.5 – 6.5 5.8 – 6.5	1/8" – 1/4"
Introduced Warm Season Perennial Grasses						
Bermudagrass (sprigged)	30 Bushels/acres	4/15 – 7/15	4/15 – 7/15	Not locally adapted due to winter kill	6.0 – 6.5	covered
Bermudagrass (seeded)	6	4/15 – 7/15	4/15 – 7/15	Not locally adapted due to winter kill	6.0 – 6.5	1/8" – 1/4"
Caucasian Bluestem	3	4/15 – 6/1	4/15 – 6/1	5/1 – 6/15	5.5 – 6.2	1/8" – 1/4"
Native Warm Season Perennial Grasses (Primary Use – Wildlife Habitat)						
Big Bluestem or Indiangrass	4 conv. 4 no-till	4/15 – 6/30	5/1 – 7/1	5/1 – 7/1	5.8 - 6.5	1/8" – 1/4"
Eastern Gamagrass	10	4/15 – 6/30	4/15 – 6/30	5/1 – 7/1	5.8 – 6.5	1"–1 1/2 "
Switchgrass	4 conv. 3 no-till	4/15 – 6/30	5/1 – 7/1	5/1 – 7/1	5.5 – 6.5	1/8 - 1/4"
Switchgrass and Big Bluestem, and/or Indiangrass and legume, forb, herbaceous mix (See Plant Establishment Guide for recommendations and rates.)	1/2 conv. 1 conv. 2 conv.	4/15 – 6/30	5/1 – 7/1	5/1 – 7/1	5.5 – 6.5 5.8 – 6.5 5.8 – 6.5	1/8" – 1/4"

Table 1