



Conservation Reserve Program

ESTABLISHING, MAINTAINING, AND MANAGING WARM-SEASON GRASSES

Natural Resources Conservation Service (NRCS)

June 2007

INTRODUCTION

Warm-season grasses produce most of their growth during the warmest months of the year, typically from June through early September. Many warm-season grasses are deep rooted, long-lived perennials with considerable tolerance to relatively low pH, low fertility, and drought. Warm-season grasses grow best on deep, well drained soils, although a few species will tolerate poorly drained soils.

Warm-season grasses, either alone or in combination with legumes and/or wildflowers, can be planted to reduce soil erosion and sedimentation, improve water quality, and provide wildlife habitat. Stiff-stemmed warm-season grasses can serve as a barrier to erosion and can trap sediment carried by water and wind. Warm-season grasses with a bunch-type growth form provide excellent nesting and protective habitat for many species of birds, as well as a source of seeds and insects.

Warm-season grasses can play an important role in conservation and agricultural production. However, establishment and maintenance requirements are significant and should be considered. First-time users of warm-season grasses must pay special attention to the details of managing these grasses (mowing, weed control, etc.) while they are becoming established. Full establishment usually takes two to three years. Once established, mature stands that are not regularly harvested (not hayed or grazed) may pose a fire hazard. Firebreaks of cool-season grasses may need to be maintained around buildings, woodlands, or other locations as appropriate.

This job sheet provides instructions for planting and maintaining warm-season grasses so they can serve their intended purpose. Using proper planting and management techniques, especially during the establishment years, will significantly improve plant health, reduce weed problems, and increase the likelihood of success.

SITE PREPARATION

Before planting, it is essential to reduce competition from other vegetation that may be present on the planting site, such as grasses or weeds. Warm-season grass seedlings are slow to establish, and can be easily out-competed by faster growing weeds and most cool-



season grasses. The type and density of the existing vegetation will determine how much pre-planting control is needed.

It's important to allow adequate time to complete this process. If significant quantities of noxious or aggressive weeds or invasive plants are present, be aware that you may need a year or two to control them before you can plant, especially if you will be planting a large area. By state law, noxious weeds in Maryland are Johnsongrass, shattercane, Canada thistle, bull thistle, plumeless thistle, and musk thistle.

Sites without Existing Vegetation

If warm-season grasses will be planted into a clean, relatively weed-free area, then competition from existing vegetation should not be a concern. However, a cover crop or nurse crop may be needed for erosion control and/or to reduce future weed competition (see page 3).

Take into account any noxious or aggressive weeds in cropland that might have been suppressed (but not killed) with previous herbicide applications. If live rootstocks are present, these weeds may be very difficult to kill in a new planting without destroying the desirable plants. If you think you have a significant weed problem, it may be prudent to plant a temporary cover crop such as spring oats and use an appropriate herbicide to treat weeds for one full growing season. Then plant the warm-season grasses the following year. If you don't know the site's weed history, consider contacting the local Maryland Department of

Agriculture weed control specialist. The local specialist may have a record of weed control assistance previously provided on the property.

Sites with Existing Vegetation

If warm-season grasses are going to be planted into existing vegetation (for example, other grasses or weeds), you will need to reduce competition before planting. For sites that need extensive preparation, much of the work can be done during the fall prior to spring planting.

Mow or brush hog the field or planting site. Then either treat the area with an appropriate herbicide or cultivate the planting area to reduce competition.

Using herbicides. Choose a non-selective herbicide such as glyphosate (for example, Roundup, KleenUp). A selective herbicide such as Plateau may be used instead, depending on the species of warm-season grasses, legumes, and wildflowers you are planting, and the species of weeds you are trying to control. Follow all label directions when using herbicides, and consider herbicide persistence (carryover) as it may affect new plantings.

For extremely vigorous turf or weeds, you should plan to make one application of herbicide in early fall, followed by another the next spring before planting. Or, if you make the first herbicide application in the spring, you should plan to make a second application a few weeks before planting, depending on label directions.

Do not plant the warm-season grasses until the competing vegetation is sufficiently controlled. It is much easier to control the competition before planting than afterward. Cultivation of the planting area may be needed following herbicide treatment if the dead plant matter is very thick and will be difficult to plant through. You may also need to re-spray after cultivation if weed seeds brought to the surface germinate.

Using cultivation only. If you do not want to use herbicides, then you will need to cultivate the field or planting site. Cultivation is usually less effective than herbicides for killing heavy sod or persistent weeds. Also, bare ground produced by cultivation may be subject to erosion and can provide a good seedbed for more weed growth. If necessary, use a cover crop or nurse crop (see page 3) to control erosion and help suppress weeds.

Herbicide Carryover

Carryover from herbicide treatments (recently applied or from prior years) can pose a threat to new plantings. Seedlings are particularly sensitive to herbicide carryover. Herbicides such as Basagran, Blazer, Poast, Plateau and Roundup have low persistence and

generally do not pose a risk for carryover. Herbicides such as Atrazine, Preview, Canopy, Classic, Lorox Plus, Command, Scepter and Treflan have medium to high persistence and can pose a risk of carryover. The persistence of herbicides is directly affected by factors such as soil pH and moisture. To assess risks before planting, read the herbicide label or contact the manufacturer for specific information on persistence.

PLANTING

Planting Dates

Recommended planting dates range from late winter to late spring, and may include fall plantings. Usually, warm-season grasses are planted in the spring. Warm-season grasses need a soil temperature of at least 50 degrees F in order to germinate. If soil temperatures are colder than 50 degrees, or moisture is not adequate, the seeds will remain dormant until conditions are favorable.

Before deciding on the best planting date for a site, consider the need for weed control vs. the likelihood of having sufficient moisture for germination and growth of grass seedlings. Where weeds are likely to be a problem, planting in mid to late spring will allow more time for emergence and control of cool-season weeds before planting. On droughty sites, plantings made during late winter to early spring are more likely to have the soil moisture necessary for seedling establishment.

To obtain recommended planting dates for your area, contact your local NRCS Field Service Center.

Types of Seed

Many warm-season grasses (for example, big bluestem, little bluestem, and indiangrass) have fluffy or chaffy seeds that are best planted by using a specially designed native grass drill. Native grass drills have picker wheels in the seed box that stir the seed and push it down into the large drop tubes.

Other warm-season grasses (for example, switchgrass, coastal panicgrass, and deertongue) have small, relatively "clean" seeds that can be planted by using a conventional grass drill or cultipacker-type seeder. A grain drill may also be used if it can be properly calibrated to plant small seeds at the recommended rate. Eastern gamagrass has a large, clean seed that can be drilled with a corn planter.

Warm-season grasses are sold in pounds of Pure Live Seed (PLS). $PLS = (purity \times germination) / 100$. PLS is important because native grass seed tends to be significantly lower in purity and germination than the seed of cool-season grasses.

Some native grasses (such as eastern gamagrass) are especially slow to germinate, and should be "stratified"

before planting. Stratification involves placing the seed in a moist material at a specified temperature and period of time to simulate natural conditions. Stratification can be a do-it-yourself project, but most people find it is easier and more reliable to purchase "treated" (pre-stratified) seed. Stratified seed must be planted very soon after treatment because the seed is moist and tends to get moldy.

Seed Availability

Seeds of many species may be available throughout the year, but supplies are usually best from late winter to early spring. Don't wait to buy seed until the day you are ready to plant. Local seed suppliers may not always have the species or varieties you want in stock, but may be able to order them for you. Or, you may need to order your seeds by mail or on the Internet. Contact your local NRCS Field Service Center if you need the names of suppliers. Store all seeds in a cool dry place before planting.

Using a Cover Crop or Nurse Crop

If erosion is a concern, use a cover crop or nurse crop of 20 to 40 pounds/acre of oats, barley, or wheat. Oats are the preferred nurse crop for warm-season grasses because they are less competitive than the other small grains. Plant the small grain as a cover crop at the higher rate in the fall prior to a spring planting of warm-season grasses, or at the lower rate as a nurse crop along with the warm-season grasses.

If erosion is not a concern, a cover crop or nurse crop can be planted at the lower seeding rate to help suppress weeds.

Planting Methods

Generally, the best method for establishing warm-season grasses is to use a no-till planter to drill seed into existing cover (for example, into a cover crop, crop residue, chemically killed weeds or grasses, etc.). No-tilling into undisturbed soil greatly reduces the germination of annual weeds and minimizes erosion, especially where slopes are 6 percent or greater.

No-till planting into plant residue. On sites where existing vegetation was killed with herbicide or there is crop residue from previous years, no-till the warm-season grasses directly through the dead residue. Add a nurse crop as needed to control erosion and/or suppress weeds. If you must work up the soil because the residue is too thick to plant through, it is strongly recommended that you use a cover crop or nurse crop.

No-till spring planting into a fall cover crop. In the fall, prepare a seedbed by working the soil with a plow, disk, or similar equipment. Continue tillage until a reasonably uniform seedbed is prepared. Then plant a cover crop. In the spring, no-till the warm-season grass seed into the cover crop. (If the cover crop is

tall, mow it first and no-till into the stubble.) If aggressive or noxious weeds have developed since the previous fall, use an appropriate herbicide to treat them before planting.

Broadcast planting. If necessary, warm-season grasses can be planted by broadcasting onto a conventionally prepared seedbed. Broadcast seed onto a well-prepared, firm seedbed. Grasses with small or fluffy seeds may need to be mixed with a filler (for example, sawdust, finely ground corn, or slightly moistened peat moss) to achieve an even distribution of seed. Incorporate the seed into the soil 1/8 to 1/4-inch deep by cultipacking, raking, or dragging. Broadcasting is usually less successful than no-tilling because it is more difficult to get good seed placement in the soil. Do not broadcast eastern gamagrass. It needs to be drilled 1/2 to 1-inch deep.

Lime and Fertilizer

Warm-season grasses are much more tolerant of poor site conditions than most cool-season grasses. It is usually not necessary to add lime to native grass plantings, provided the soil pH is 5.0 or above. A pH of 5.5 to 6.5 is ideal for most species.

Similarly, phosphorus (P_2O_5) and potassium (K_2O) should only be applied if a soil test indicates that these nutrients are in the low range. Remember that the use of commercial fertilizer and other forms of plant nutrients must be in compliance with Maryland nutrient management regulations, as applicable. For additional information, consult with your local Maryland Cooperative Extension specialist or certified nutrient management consultant.

Warm-season grasses need very little nitrogen. Do not apply any nitrogen at the time of planting because it will only encourage weed growth.

PROTECTING PLANTS

Use fences and other exclusion devices as needed to keep livestock out of the planting. Many types of fences and exclusion devices are available. Contact your local NRCS Field Service Center for recommendations for your site.

ESTABLISHING THE PLANTING

Warm-season grasses usually take two to three years to become fully established. During that time, weeds can be a major problem.

The goal of weed control is to reduce (but not eliminate) competition from broadleaf and grass weeds such as mare's tail, ragweed, dandelion, foxtail, crabgrass, etc. Many of these plants provide good food and wild-life cover, but if they get too tall and dense, they will shade out the warm-season grass seedlings. Don't wait

until weeds are four feet tall before trying to control them. Mowing them at that stage will produce so much plant litter that you may smother the seedlings.

For specific maintenance requirements, please refer to the maintenance schedule attached at the end of this jobsheet.

MAINTAINING ESTABLISHED PLANTINGS

CRP participants must maintain enrolled practices for the life of the contract. "Maintenance" refers to activities that are carried out as needed to keep plantings in good condition so they will continue to function as planned.

Mowing and spraying with herbicide are the most frequently used maintenance practices to control woody growth and noxious weeds. For specific maintenance requirements concerning mowing and weed control, please refer to the "Maintenance and Management Schedule" attached at the end of this jobsheet.

Managed haying and grazing may also be used, with approval from FSA, as a maintenance technique. If your CRP planting has been approved for managed haying or grazing, please refer to the "Maintenance and Management Schedule" at the end of this jobsheet for detailed requirements.

MANAGING ESTABLISHED PLANTINGS

Beginning in the summer of 2003, CRP participants that are enrolled in new general enrollment contracts (as of Signup 26), or in new continuous signup contracts (including CREP), may be required to perform specific management activities to ensure long-term plant diversity and wildlife habitat benefits. Participants can receive up to 50% cost-share after completing the management activities. For participants with older contracts, management practices are optional. Participants can request approval from FSA to add management practices to their contracts.

For warm-season grass plantings, the CRP management activities consist of strip disking and/or prescribed burning starting in year 4 of the contract, then every 3 years up to the 3rd to last year of the contract. Strip disking is the best method for reducing stand density and maintaining a diverse vegetative community. Prescribed burning is effective at removing accumulated plant litter, but when not performed in combination with disking, can result in increased stand density and less diversity. Interseeding native wildflowers and legumes can enhance habitat quality, but must be performed after disking and/or burning. Please refer to the "Maintenance and Management Schedule" at the end of this jobsheet for detailed requirements concerning these practices.

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MAINTENANCE AND MANAGEMENT SCHEDULE FOR WARM-SEASON GRASSES

Name:	Farm No.:	Tax Map:
	Tract No.:	Parcel:
Address:	Date:	Assisted by:
	Field(s):	Acres:

Establishing the Planting

Planting Year

1. Mow the planting as needed to control weeds. Nesting season restrictions on mowing do not apply during the establishment period. Don't let weeds get taller than 18 inches. Mow to a height of 4 to 6 inches or just above seedling height. **Do not mow the seedlings!** Discontinue mowing after early August unless you can set the mower high enough to stay above the seedlings. Using proper planting and management techniques, especially during the establishment period, will significantly improve plant vigor, reduce weed competition, and increase the likelihood of success.
2. Selective herbicides can be sprayed over the planting to control specific weeds. Herbicides are most effective when weeds are young and actively growing. Be sure to read and follow all label directions when using herbicides. Many warm-season grasses and wildflowers are Plateau-tolerant, but some are not (for example, switchgrass).
3. Control noxious weeds (specifically, Johnsongrass, Shattercane, Canada Thistle, Bull Thistle, Plumeless Thistle, and Musk Thistle) as required by state law. If you need assistance identifying these weeds, contact your local NRCS Field Service Center; Maryland Cooperative Extension; or Maryland Department of Agriculture, Weed Control Section.

Second and Third Year After Planting

1. Inspect the planting in early spring. If unwanted cool-season grasses or weeds comprise more than 25 percent of the stand, either treat with an appropriate herbicide or keep the area mowed very short until the warm-season grasses start to green up. (Note: While the warm-season grasses are still dormant, Roundup can be used to kill cool-season grasses, but it will also kill most legumes or wildflowers that are growing.)
2. Throughout the growing season, mow as needed above seedling height (about 8 inches or so) to keep weeds under control. Always avoid damaging the plantings during mowing and herbicide applications.
3. If weed pressure is very low, you can apply 40-60 pounds/acre of nitrogen to stimulate growth of the warm-season grasses. Apply lime, phosphorus, and potassium only if soil tests indicate that they are needed (i.e., pH is less than 5, or P and K test results are in the "low" range).
4. Continue to control noxious weeds as required by State Law.

Maintaining an Established Planting

1. Where prescribed burning is not feasible, mowing can be used to control woody growth. For optimum wildlife benefits, mow on a 2 to 3 year rotation to control woody growth. Mow only 1/3 to 1/2 of the planting each year. The remaining unmowed areas will provide year-round wildlife food and cover. The best time to mow is late winter to early spring, preferably in March. This will allow grasses to provide protective cover for wildlife during the winter. On sites where soils are usually too wet in the spring, you can mow in the fall when soils are dry. Do not mow during the primary nesting season (April 15 - August 15).
2. Tall warm-season grasses such as big bluestem, indiangrass, switchgrass, coastal panicgrass, and eastern gamagrass produce large quantities of top growth that, when cut, can smother new growth. Mowing these grasses is not an effective technique for maintaining the stand unless FSA allows you to remove the cuttings. If the planting is approved for managed haying and grazing, you can bale the cuttings, remove

MAINTENANCE AND MANAGEMENT SCHEDULE FOR WARM-SEASON GRASSES

Maintaining an Established Planting (continued)

them from the field, and use them for forage or bedding. In order to allow a sufficient recovery period before winter dormancy, grasses should be allowed to reach a height of 6 to 8 inches before the first killing frost. Mowing can also be done after the first killing frost when plants are dormant.

3. Periodic mowing for cosmetic purposes is prohibited at all times, and annual mowing for generic weed control is also prohibited.
4. Control noxious weeds and other invasive plants by spot treatment, using mechanical methods or approved herbicides. If it becomes necessary to control noxious weeds during the nesting season, contact your local weed control specialist concerning recommendations for spot-treating the weed problem. Spot treatment is limited to the immediate area of infestation. In an established planting, you must request and receive approval from the FSA County Committee before spraying or mowing during the nesting season. For more information about controlling specific weeds, contact your local office of Maryland Cooperative Extension; the Maryland Department of Agriculture, Weed Control Section; or the Maryland Department of Natural Resources, Wildlife and Heritage Service.

Managed Haying and Grazing *Has been requested and approved for* *acres* *Will not be used*

Managed haying and grazing may be implemented for 1 out of every 3 years after the planting is fully established. The following practices are eligible for these activities: CP1, CP2, CP4B, CP4D, CP10, CP18B and CP18C. You must request approval from FSA before haying or grazing any CRP acreage. Your annual rental payment will be reduced based on the number of acres hayed or grazed.

Managed haying and grazing:

1. Is not allowed during the primary nesting season (April 15 - August 15);
2. Is not allowed within 120 feet of a stream or other permanent waterbody;
3. Is allowed only during the Haying and Grazing Period (August 16 - November 13) established by FSA.

Haying. Warm-season grasses are best suited for haying in the summer when they are actively growing. For perennial warm-season grasses, take the first cutting when plants are in the late boot stage. For most species, it's important to leave at least a 4-inch stubble (at least 8 inches for eastern gamagrass). Allow grasses to reach a height of 6 to 8 inches before the first killing frost. Remember that you aren't allowed to cut hay during the nesting season, so you may only be able to take one cutting per year.

Grazing. Begin initial grazing when the plants are at least 8 inches tall. Graze down to 3 inches, and allow regrowth to 8 inches before grazing again. The final grazing height should be about 4 inches to allow sufficient recovery before dormancy.

Prescribed Burning

Is a required management activity *Has been voluntarily selected by the participant* *Will not be used*

This is the most effective management technique for removing accumulated plant litter and controlling woody plants. This CRP management activity consists of prescribed burning starting in year 4 of the contract, then every 3 years through the 4th to last year of the contract. Do not burn during the primary nesting season (April 15 - August 15).

1. Depending on the size of the warm-season grass planting, the site may be divided into sections for burning in different years. If separated into 3 sections, you can establish a rotation of burning one section every year beginning in year 4 of the contract.
2. Prescribed burning can be used in combination with strip disking to create greater habitat diversity and/or to facilitate disking. Within a given year, half of the undisked strips between disked strips can be burned to create a mosaic of undisturbed, disked, and burned strips.

MAINTENANCE AND MANAGEMENT SCHEDULE FOR WARM-SEASON GRASSES

Prescribed Burning (continued)

3. Prescribed burning requires the use of firebreaks that are usually 12 to 15 feet wide. Firebreaks can either be bare ground that is disked up just before burning, or a mix of cool-season grasses and/or legumes. Contact your local NRCS Field Service Center to obtain information about cool-season mixes for firebreaks.
4. Prescribed burning requires a permit and may not be allowed in some areas. Contact your local office of the Maryland Department of Natural Resources, Forest Service, for current information concerning permits and assistance for this practice.

Strip Disking

Is a required management activity
 Has been voluntarily selected by the participant
 Will not be used

This CRP management activity consists of disking starting in year 4 of the contract, then every 3 years through the 4th to last year of the contract. Do not strip disk during the primary nesting season (April 15 - August 15).

When performed correctly, strip disking will:

1. Temporarily reduce the density of the warm-season grass plants;
2. Provide openings in the planting for movement of quail, pheasants, and other wildlife; and,
3. Increase plant diversity by encouraging the germination of forbs and legumes. Forbs and legumes provide food and habitat for many native species, and are an important component of a grassland ecosystem.

Cautions. Strip disking may be used only if it will not result in excessive erosion or adversely impact water quality, and will not destroy the approved planting. For disking on highly erodible land, see the special guidance below. Due to minimum set-back requirements (see below), disking is usually feasible only on plantings that are greater than 35 feet wide.

Disking Intensity. Before disking, mow the area that will be disked. Fall mowing can facilitate spring disking by providing time for breakdown of leaf matter. Disking intensity should be adjusted to attain 50% bare ground and 50% residue and standing plant matter in the disked strip. Depending on the thickness of the grasses, this can be achieved by disking in one or two passes to a depth of 3-6 inches. In some cases, heavier disking may be required, but always use the minimum disking intensity required to achieve the desired 50% bare ground/50% surface cover goal.

Width, spacing, and timing. Disk in strips on 1/3 of each field on the contour on a 3-year rotation. For relatively small buffers (less than 75 ft in width), 1/2 of each field can be disked on a 3-year rotation with no disking in the 3rd year (i.e., disk 1/2 – disk 1/2 – no disk). For best results, strip disk either in late summer to early fall (September 1 – October 15), or in late winter to early spring (preferably in March). Fall disking tends to promote the growth of forbs and legumes (e.g., ragweed, partridge pea), whereas spring disking tends to promote the growth of annual grasses (e.g., foxtail).

Highly Erodible Land with an EI \geq 16. On highly erodible land, it is recommended that disking be conducted in the spring. If disking in the spring, follow the same disking intensity as described above. If disking in the fall, adjust the disking intensity to attain 25% bare ground and 75% surface cover. Disk in strips no wider than 30 feet on the contour, in an alternating pattern of disked and undisked strips. Undisked strips should be twice the width of disked strips. Do not disk parts of the field where excessive erosion or gully erosion is likely to occur. On highly erodible land with an EI > 30, only disk in the upper half of the slope, and adjust the disking intensity to attain no more than 25% bare ground, regardless of the time of year.

Minimum set-backs. The following set-backs are required in order to maintain the functions of the planting and protect water quality. Do not disk in these areas.

1. At least 24 feet away from a watercourse, waterbody, or wetland;
2. At least 15 feet away from adjacent cropland or intensively used areas, if present. Infrequently used field roads or firebreaks planted with cool-season grasses can be included in this set-back.

MAINTENANCE AND MANAGEMENT SCHEDULE FOR WARM-SEASON GRASSES**Interseeding Native Wildflowers**

Is a required management activity *Has been voluntarily selected by the participant* *Will not be used*

Native wildflowers (including legumes) are important food sources for ground-nesting birds and pollinators. Interseeding of native forbs and legumes can be used when necessary to maintain or enhance vegetative diversity in a grass-dominated planting. Interseeding of wildflowers must be preceded by prescribed burning or disking (per this job sheet) to ensure adequate seed to soil contact. This management practice is not a food plot activity, and should not be required more than once during the contract period because disking and burning will encourage germination of wildflowers in the seedbank. Seed ½ pound per acre of native or CRP-approved wildflowers into burned or disked strips. Wildflowers may be broadcast seeded or no-till drilled at a depth of ¼- to ½-inch.

Additional Recommendations: