United States Department of Agriculture

Cool-Season Grasses

Establishment, Maintenance and Management for Erosion Control, Water Quality, and Wildlife Habitat

Conservation Fact Sheet ***February 2016***

INTRODUCTION

Cool-season grasses are plants that grow best in the spring and fall when soil and air temperatures are cooler. They generally go dormant in mid-summer. Cool-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 or forage for grazing animals. Red fescue, hard and sheep fescues, ryegrass, orchardgrass, bluegrass and timothy are examples of commonly planted cool-season grasses.

Legumes such as clovers and annual lespedezas are often planted or over-seeded in combination with cool-season grasses to maintain stand vigor and provide additional wildlife benefits. For more detailed information about establishing herbaceous plantings primarily for wildlife and pollinator habitat, refer to the Maryland NRCS fact sheet *Native Herbaceous Plantings.*

This fact sheet provides instructions for planting, maintaining, and managing cool-season grasses so that they can serve their intended purpose. Using proper planting and establishment techniques 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 other grasses or weeds. 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. Noxious weeds — johnsongrass, shatter-cane, bull thistle, Canada thistle, musk thistle, and plumeless thistle — must be controlled as required by Maryland state law.

For more information about controlling specific weeds in cool-season grass plantings, contact your local Maryland Cooperative Extension office or county weed control specialist.

Photo by Anne Lynn

Sites without Existing Vegetation

If the cool-season grasses will be planted into a clean, relatively weed-free area (such as cropland that was planted during the previous growing season), 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 2).

Take into account any noxious or aggressive weeds on the site 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 may have a weed problem, or if you don't know the site's weed history, it may be prudent to wait one full growing season to see what comes up. Use an appropriate herbicide to treat weeds if they occur, and plant a full-season cover crop. Then plant the cool-season grasses in the fall or in the following spring.

Sites with Existing Vegetation

If cool-season grasses are going to be planted into existing vegetation (for example, into other grasses or

Program Participation *– If you are enrolled in a program that provides financial assistance for establishment and/or management of cool-season grasses/legumes, specific restrictions and requirements may apply. Refer to the program guidance provided in addition to this fact sheet.*

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, or in late summer before a fall planting.

Mow or brush hog the field or planting site, and treat using one of the following methods:

Herbicide treatment. Choose a non-selective herbicide with low persistence (e.g., glyphosate) to kill existing vegetation. A selective herbicide (e.g., 2,4-D) may be used instead, depending on 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 cool-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.

Cultivation only. If you do not want to use herbicides, then you will need to cultivate the field or planting site to remove all existing vegetation. 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 of oats, barley, or wheat 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. 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 typically range from late winter to late spring and late summer to mid-fall. Most cool-season grasses benefit from planting in early fall, which allows two growing periods (fall and the next spring) for establishment of roots before summer. Summer heat and the lack of moisture are very stressful for cool-season grasses. Their survival is dependent on a well-developed root system.

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

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

Seed Availability

Seeds of many species may be available throughout the year, but supplies are usually best from late winter to early spring and early in the fall. 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 that you want in stock, but may be able to order them for you. Or you may need to order your seeds from a catalog or online. Contact your local NRCS 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 because they are less competitive than the other small grains. To use as a cover crop, plant the small grain at the higher rate in the fall prior to a spring planting of cool-season grasses, or in the spring before a fall planting of cool-season grasses. Plant the small grain at the lower rate when used as a nurse crop along with the cool-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 cool-season grasses is to use a standard no-till drill to plant 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 more.

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 cool-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 cool-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 before planting.

Broadcast planting. If necessary, cool-season grasses can be planted by broadcasting onto a conventionally prepared seedbed. Broadcast seed onto a well-prepared, firm seedbed. Grasses with small 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.

Lime and Fertilizer

Most cool-season grasses prefer a pH of 5.5 and above. If legumes are included in the planting, a pH of at least 6.0 is desirable. A pH of 6.0 to 6.5 is ideal for most plantings. If the pH is below 5.5, lime can be applied to achieve a pH of 6.0 to 6.5.

Apply lime and fertilizer if needed based on soil test results, and in compliance with Maryland nutrient management regulations, as applicable. Fertilizer applied without a soil test may result in an inefficient quantity of nutrients for plant establishment, or could result in over application of nutrients leading to potential water quality problems and excessive weed growth. For additional information, consult your local Maryland Cooperative Extension specialist or certified nutrient management consultant.

PROTECTING PLANTS

Use fences and other exclusion devices to control livestock and human access to the planting, at least until it is well established. Many types of fences and exclusion devices are available. Contact your local NRCS Service Center for recommendations for your site.

ESTABLISHING THE PLANTING

Cool-season grasses usually take one to two 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 food and cover for wildlife, but if they get too tall and dense, they will shade out the cool-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.

If you must use herbicides, minimize the risk to pollinators and other beneficial insects by choosing active ingredients and formulations (such as granules or solutions) that have the least impact on bees. Spray on warm, dry evenings and at least an hour after sunset when bees are not active. Do not spray when flowers in or immediately adjacent to the planting are in bloom.

Planting Year

In the first growing season after seed germination, it is very important to ensure that the seedlings do not get shaded out by weeds. Weeds can be controlled by mowing or herbicide treatment, as follows:

Mow the planting as needed during the first growing season to control weeds and keep them below 18 inches. Mow to a height of 4 to 6 inches or just above seedling height (do not mow seedlings). Nesting restrictions on mowing do not apply during the establishment period.

Selective herbicides can be used for controlling specific weeds, and are most effective when weeds are young and actively growing. If you have native wildflowers in your planting, mowing may be the best option, because most wildflowers are susceptible to herbicides that control broadleaf weeds. Be sure to read and follow herbicide label instructions.

Second Year After Planting

Inspect the planting in early spring. If weeds persist and comprise more than 25 percent of the stand, either treat with an appropriate herbicide or plan on periodically mowing the area to a height of 6 to 8 inches. A good rule of thumb is to cut off no more than one-third of the grass leaf area at one time. Throughout the growing season, continue to mow as needed to keep weeds under control.

MAINTENANCE

By the 2nd or 3rd year, cool-season grasses should be well established. Once established, cool-season grasses need periodic maintenance to control noxious and invasive weeds, and to prevent succession of woody vegetation. Most stands require occasional mowing every 2 to 3 years to keep trees and shrubs

from invading. Additional measures, such as targeted herbicide application, may also be needed.

Weed Control

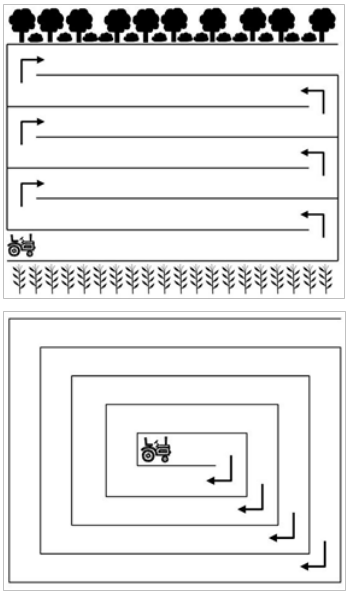
Control noxious weeds and other invasive plants by spot treatment, using mechanical methods or approved herbicides. Control of noxious weeds (specifically, johnsongrass, shattercane, bull thistle, Canada thistle, musk thistle, and plumeless thistle) is required by state law. Contact your local University of Maryland Extension office or county weed control specialist concerning recommendations for spot-treating the weed problem.

Control of Woody Growth

Methods to control woody growth include mowing, targeted herbicide treatment, and strip disking. Mowing is the most common method because of access to equipment, but is not necessarily the most effective method. Herbicide treatment is a common and effective method of controlling brush. Strip disking may also be used, and is discussed in the Management section (see page 5) of this fact sheet.

Mowing. For woody vegetation control, mowing during the growing season, generally in late summer, will be more effective than mowing during the dormant season, because it will limit the amount of carbohydrate reserves that can be translocated to the roots. If mowing in the fall, mow early enough to allow grasses to reach a height of 6 inches or more before the first killing frost.

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.



Edge-to-edge (top) or inside-to-outside (bottom) mowing patterns provide escape routes for wildlife.

Do not mow during the primary nesting season (April 15 - August 15), and do not mow only for cosmetic purposes.

To the extent possible, mow in a manner that will provide escape routes for wildlife at the time of mowing, such as mowing from the inside out, or mowing from the field side toward the woods edge.

Where water quality has been identified as the primary purpose of the planting, more frequent mowing may be needed to maintain grass in a dense turf-type condition that will control erosion and reduce sedimentation. If stands are dense and have large quantities of top growth, cuttings should be removed if at all possible. If the cuttings are not removed, they can smother new growth.

Targeted herbicide application. Herbicide treatment is a common and effective method for controlling woody vegetation. Methods vary depending on the type, size, and age of the target species, and the size of the treatment area. This fact sheet provides some general recommendations on the use of herbicides for woody vegetation control. For more specific information, contact your local University of Maryland Extension office or county weed control specialist.

Small areas of woody vegetation can be treated using basal bark, foliar spray, or cut-surface treatment methods in which the herbicide is applied with portable sprayers and hand tools.

Large areas of woody vegetation will likely require foliar application of a systemic herbicide using a wick bar applicator. Systemic herbicides (e.g., 2,4-D) are absorbed by the plant and translocated to the roots. Woody vegetation may need to be mowed and allowed to re-grow to enable effective application of herbicide to foliar surfaces.

Application of systemic herbicides in late summer or early fall, prior to leaf-drop, is typically more effective because the herbicide will be translocated to the roots.

Check the pesticide label to determine the types of plants that are controlled or damaged by the herbicide. Be aware that most forbs are susceptible to herbicides that control broadleaf weeds.

Always read and follow the pesticide label when applying herbicides.

MANAGEMENT

Once established, cool-season grass stands may need periodic management to maintain stand vigor, reduce litter accumulation, enhance wildlife benefits, and enhance or maintain plant diversity. The type and frequency of management will depend on the purpose of the planting. Management practices may be used alone or in combination to achieve desired objectives.

When cool-season grasses are established primarily for wildlife habitat, the most common management activity is over-seeding legumes. Other habitat management activities may include strip disking, inter-seeding forbs and legumes, and managed haying and grazing. For optimum wildlife habitat, all of these activities should be conducted outside of the primary nesting season for birds and ground-nesting wildlife (April 15 - August 15).

For optimum water quality benefits, maintaining a dense stand of grasses is recommended, and where feasible, using management practices such as haying and grazing to remove nutrient-rich top growth from the site.

Strip Disking

Strip disking can be used to reduce the density of cool-season grass stands, provide openings in the stand for wildlife movement and foraging, and increase plant diversity and food sources by encouraging the germination of forbs and legumes. Disking may also be used to reduce competition from woody vegetation when mowing is not sufficient.

Disking should only be used if it will not result in excessive erosion or adversely impact water quality, and will not destroy the planting. Cool-season grasses are typically more susceptible to disking than native warm-season grasses. Disking may be facilitated by mowing prior to disking.

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:

- Within 20 feet from a watercourse, water body, or wetland.
- Within 15 feet 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.

Disking intensity. A single pass with a disk at a depth of 3 to 5 inches should be sufficient. Two passes may be required for extremely thick grass stands. If the soil surface becomes rough or uneven, it can be smoothed with a cultipacker or harrow.

Spacing and timing. Disk in strips on 1/3 to 1/2 of each field on a 2 or 3-year rotation. Disk on the contour in an alternating pattern of disked and undisked strips. 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).

Do not disk during the primary nesting season (April 15 – August 15).

Use the following additional guidance for disking on highly erodible land with an Erodibility Index (EI) ≥ 16:

- Disk in strips no wider than 30 feet. Undisked strips should be twice the width of disked strips. Disking intensity should be light enough to maintain at least 30% residue cover in the disked strips. Do not disk parts of the field where excessive 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 at least 60% residue cover.

Interseeding Forbs and Legumes

As a grass stand matures, the forb and legume components tend to naturally decline. Forbs and legumes, commonly clovers and annual lespedezas, may be interseeded into existing cool-season grass stands to maintain plant diversity and provide food for wildlife.

Interseed forbs and legumes on an as-needed basis. This management practice is not a food plot activity, and should only be used as necessary to maintain plant diversity. The use of strip disking will also encourage germination of forbs and legumes that are currently in the seedbank.

Use the same forbs and legumes as originally specified in the planting mix, or select a different mix based on recommendations from your local NRCS Service Center. Native forb and legume mixes can be inter-seeded at a rate of 2 to 5 lbs. pure live seed (PLS) per acre, while introduced legumes such as clovers and annual lespedezas are typically interseeded at rates from 5 to 10 lbs. per acre, depending on the species.

If the grass stand is thick or contains more than ¼ inch of litter (thatch), lightly disk or harrow the stand prior to seeding. It is especially important for native forbs and legumes to ensure that the stand contains space for the plants to establish. When disking or harrowing is needed, use a minimum set-back of at least 20 feet from a watercourse, water body, or wetland.

Contact your local NRCS Service Center for appropriate planting dates for introduced legumes (e.g., clovers or annual lespedezas). The best time to interseed native forbs and legumes is in the spring.

For optimum wildlife habitat, do not interseed during the primary nesting season (April 15 - August 15). Use one of the following planting methods for interseeding:

***Broadcast seeding*.** Cut the grass short before seeding. Broadcast the seed. Then go over it with a cultipacker, drag or harrow to enhance seed-to-soil contact.

***No-till planting*.** Cut the grass short before seeding and no-till drill the seed ¼-inch into the soil.

Frost seeding (introduced legumes only). Introduced legumes can be frost-seeded during the dormant season. Broadcast legumes over the grass in late winter or very early spring when the ground is still frozen. Freezing and thawing, in combination with rainfall, will work the seed into the soil surface.

Managed Haying and Grazing

Managed haying or grazing can be used to reduce excess biomass and provide supplemental feed for livestock. Cool-season grasses are best hayed or grazed during the spring and fall when they are actively growing.

Haying. Take the first cutting of orchardgrass, fescue, and other non-jointed grasses when plants are in the boot stage, with successive cuts made after an 8 to 10-inch recovery. For timothy and other jointed grasses, take the first cutting when plants are in early to full head, then successive cuts at 6 week intervals. For most species, it's important to leave at least a 4-inch stubble to allow for recovery.

If the planting is intended primarily for wildlife habitat, harvest in a manner that will provide escape routes for wildlife (see *Mowing,* page 4), and do not cut hay during the primary nesting season (April 15 - August 15).

Grazing. Begin initial grazing when the plants are at least 8 inches tall. Graze down to 3 inches, and allow re-growth to 8 inches before grazing again. Allow grasses to reach a height of 4 to 6 inches before the first killing frost to allow for recovery before dormancy.

If the planting is intended primarily for wildlife habitat:

- Do not hay or graze until after July 15th, and wait until after August 15th if possible.
- Hay or graze only 1/3 to 1/2 of the stand on a 3-year rotation.
- Do not overstock or overgraze the area.
- Exclude livestock from streams, wetlands, and other environmentally sensitive areas.