

RIPARIAN BUFFER MANAGEMENT GRASSES FOR RIPARIAN BUFFERS AND WILDLIFE HABITAT IMPROVEMENT

Riparian areas link the land and the water together. A *riparian buffer* planted in native, warm season grasses in combination with trees or by themselves can uptake nutrients in groundwater, filter sediments from runoff, spread waterflow, and provide valuable wildlife habitat. For the greatest overall environmental benefits, grasses should be planted in combination with trees and incorporated with conservation practices (Figure 1). This fact sheet will focus on establishing and maintaining grass buffers that will mainly benefit wildlife species.

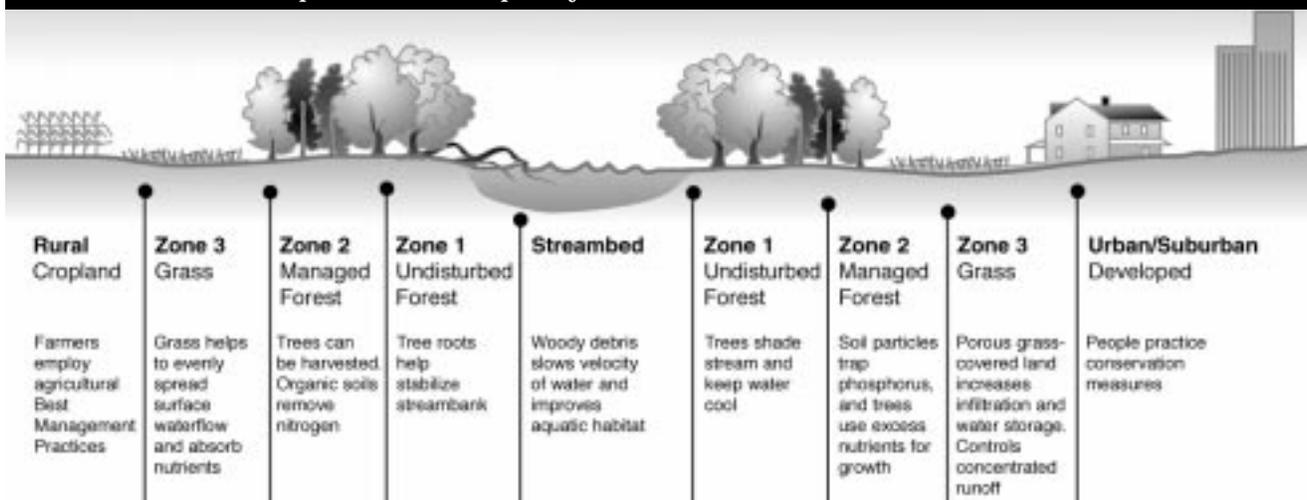
WARM SEASON GRASS BUFFERS

The area between a field and a riparian forest is an excellent place to establish warm sea-

son grasses for wildlife habitat. Although many people equate improving wildlife habitat with providing winter foods, cover is an important factor for animals living in and using the riparian buffer. Cover is vital for mating, nesting, brood-rearing, and feeding activities. Much of the decline seen in populations of ground-nesting birds results from lack of nesting and brood-rearing cover. By planting native, warm season grasses rather than introduced or exotic species, the needs of bobwhite quail, turkey, meadowlarks, some songbirds, and rabbits can be met. Small mammals such as meadow voles, field mice, and cottontail rabbits provide food for hawks, owls, and fox. Incorporating forbs (broad-leaved herbaceous plants and wildflowers) in

Figure 1.

Grasses in Zone 3 provide water quality benefits and wildlife habitat.



WARM AND COOL SEASON GRASSES

Warm Season Grasses

Big bluestem (*Andropogon gerardi*)

Robust warm season, native bunchgrass (with short rhizomes). Prefers moist, well-drained soils, but is more drought tolerant than other warm season grasses. Good acid tolerance. Grows 6 to 7 feet tall.

Cultivars: Niagara, Kaw, Rountree

Little bluestem (*Schizachyrium scoparium*)

Warm season, native bunchgrass. Fair to excellent acid tolerance. Grows 3 to 4 feet tall. Usually sown in mixtures with other native grasses. Seeds are light and fluffy.

Cultivars: Aldous, Camper, Blaze

Indiangrass (*Sorghastrum nutans*)

Native, warm season perennial. Acid tolerant. Difficult to establish in pure stands, best used in mixtures. Seed light and fluffy.

Cultivars: Rumsey, Oto, Holt

Switchgrass (*Panicum virgatum*)

Native, perennial, warm season, tall grass. Drought resistant, but grows under a wide range of conditions. Salt and acid tolerant. Used as a sand stabilizer and for erosion control. Earliest maturing warm season grass. Grows 3 to 8 feet tall.

Cultivars: Blackwell, Cave-in-Rock, Shelter

Eastern gamagrass (*Tripsacum dactyloides*)

Large, native, warm season, colony-forming bunchgrass. Useful in lowland, irrigated, or subirrigated sites. Not alkaline tolerant. Do not include in seeding mixture with other warm season grasses. Currently being tested for silage in place of corn.

Coastal panicgrass (*Panicum amarum* var. *amarulum*)

Deep-rooted, long-lived, warm season, native bunchgrass. Thrives on droughty, infertile, sandy soils. Moderate saline tolerance. Grows 3 to 5 feet tall. Used to stabilize sand dune areas in Coastal Plain.

Cultivar: Atlantic

Weeping lovegrass (*Eragrostis curvula*)

Introduced, warm season, perennial bunchgrass. Tolerant of acid, dry, and infertile soils. Moderately salt tolerant. Establishes rapidly, providing good initial cover, gradually gives way to other perennial species.

WARM AND COOL SEASON GRASSES

Cool Season Grasses

Reed canarygrass (*Phalaris arundinacea*)

Tall, coarse, sod-forming, cool season perennial with aggressive rhizomes. Grows on land with high water tables. Will survive long periods of flooding. Has very good acid tolerance, moderate saline and alkaline tolerance. Can be used for streambank and gully stabilization where woody plants are not suitable. Introduced. Grows 3 to 7 feet tall.

Cultivars: Ioreed, Palaton, Rise, Venture

Perennial ryegrass (*Lolium perenne*)

Introduced, cool season, rapid developing, short-lived perennial bunchgrass. Moderately alkaline tolerant. Requires over 20 inches annual precipitation. Grows 1 to 2 feet tall.

Cultivars: Blazer (99), Pennfine

Orchardgrass (*Dactylis glomerata*)

Introduced, cool season, drought tolerant bunchgrass. Exhibits some shade tolerance.

the riparian buffer will benefit a variety of butterflies and other valuable insects.

The growth habits and attributes of the warm season grasses recommended for this area include

- a strong root system to hold the soil;
- growing in bunches (these are not turf-forming grasses, such as fescue);
- remaining standing throughout the winter, providing cover as well as filtering sediment from runoff;
- growing well on low fertility soils; and
- in some cases, such as eastern gamagrass, providing high quality pasture forage and hay. (Pasture use must be carefully controlled to protect nesting birds.)
- In general, warm season grasses are not considered high quality forage, except for eastern gamagrass. Their main attribute as a forage is that they produce 1 ½ to 2 times the yield of cool season grasses, even in low fertility sites. However, warm season grasses are able to provide forage during the summer slump when cool season grasses are not productive.

Warm season grasses are slower to establish than the more familiar cool season grasses traditionally planted, so be patient. It may take two growing seasons for a grassy area to fully establish itself. Once a stand is established the benefits of low-maintenance, increased wildlife, and improved water quality (when part of a riparian forest buffer) far outweigh the extra initial effort.

In general, native, warm season grasses are not especially shade tolerant. A possible solution when planted next to a forested area (as with a riparian forest buffer) is to incorporate a shrub transition area between the grasses and the trees.

SITE PREPARATION

Proper site preparation is critical to the success of any planting. Remove existing vegetation by herbicide use, cultivation, or a combination of the two. Soil test sites and bring fertility up to medium levels for phosphorus and potassium. Do not apply nitrogen to warm season grass planting sites. Nitrogen will only stimulate weeds that could dominate the warm season grass seedlings. Finally,

pH levels should be between five and eight for warm season grass plantings. If necessary, apply lime as indicated.

Existing Turf Fields

A) Applying herbicides: Use a nonpersistent, glyphosate-based herbicide such as Roundup. Follow manufacturers' instructions.

- Apply in previous fall and in mid-spring for spring plantings.
- Apply once in early fall for fall planting.
- Till soil and plant. Remove dead sod to create smooth seedbed.

B) Cultivation: Cultivate two to three times to kill grass and work up soil. Remove dead sod to create smooth seedbed.

C) Sod removal: Use a sod-cutter to remove the sod, then till the exposed soil to prepare the seedbed.

Existing Agricultural Fields

A) Applying herbicides: Spray once in mid-spring for spring planting, or once in early fall after removal of crop for fall planting. Till soil and plant, or use no-till seeder and plant directly into soil with no soil tillage.

B) Cultivation: Work up seedbed as for any other crop. If rhizomatous perennials are present, work up soil all year, as recommended in section "Old Fields." After the existing veg-

etation is removed, the seedbed should be prepared by tilling or discing, and then dragging or raking smooth. Properly prepared seedbeds will be smooth and free of large clumps.

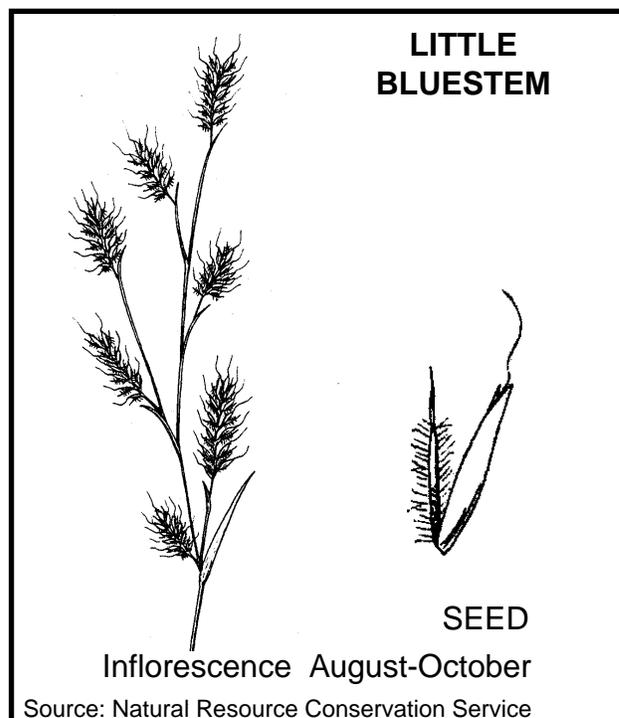
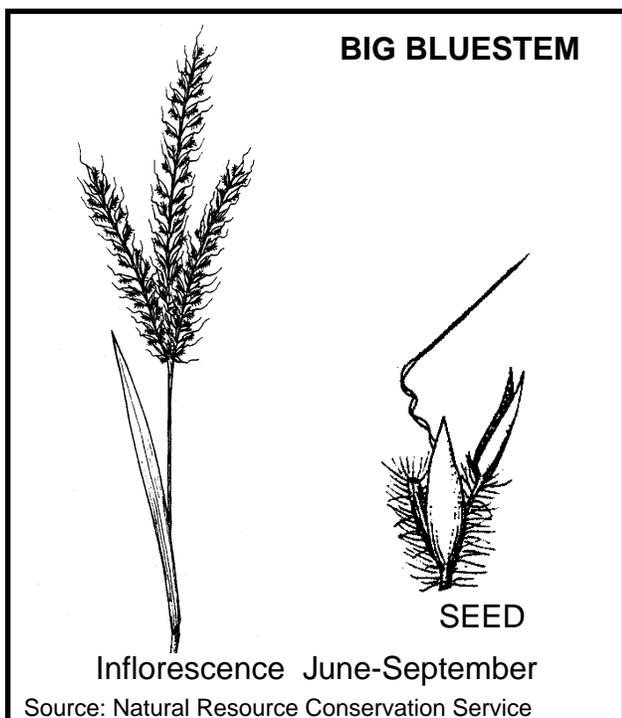
Old Fields

A) Applying herbicides: Mow in early spring, then spray twice, once in mid-to-late spring and once in early fall. Till soil after final spraying and plant, or use no-till seeder and plant directly into dead sod.

B) Cultivation: Prior to planting, cultivate soil 4 to 6 inches deep periodically throughout the growing season to kill rhizomatous perennial weeds. After the final cultivation late in the year, a dormant fall seeding can be made. If further weed control is desired, the planting can be done the following spring, allowing for light surface cultivation to kill weeds prior to spring planting.

PLANTING

With few exceptions, warm season grasses should be planted using a specialized warm season or rangeland grass planter or drill. In fine soils, all species should be drilled as shallow as possible, $\frac{1}{4}$ to $\frac{1}{2}$ inch, except eastern gamagrass, which should be planted $\frac{3}{4}$ to 1 inch. In coarse, sandy soils, it is recommended all species be planted $\frac{3}{4}$ to 1 inch, except



for eastern gamagrass, which should be planted 1 to 1 ½ inch. Seeds tend to dry out and not germinate if planted shallower in these sandy soils. Planting seed any deeper will prevent adequate germination. If a drill is not available, clean seed can be broadcast or drop-seeded (with a cultipacker seeder) onto a firm seedbed, except for eastern gamagrass, which needs to be drilled.

Fall planting—Plant from early September to first freeze

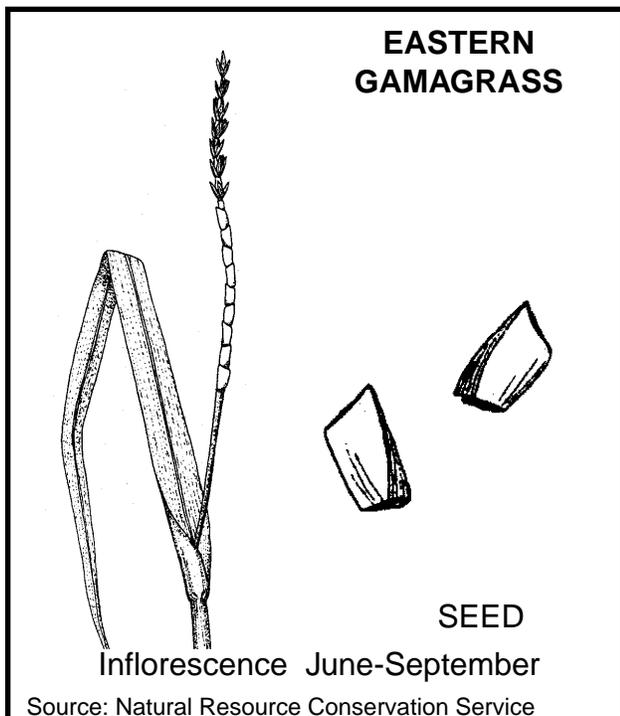
Generally it is not recommended to fall plant any of the warm season grasses, except for eastern gamagrass. The cool season grasses can be fall planted as well as the eastern gamagrass after the first killing frost.

Advantages:

- 1) Seed overwinters and comes up in spring when conditions are right.
- 2) In general, forb seed has greater germination.
- 3) Recommended for planting on droughty soils, because seeds germinate when soil moisture levels are optimal.

Disadvantages:

- 1) Grass seed often has poorer germination.
- 2) Because weeds will have a head start the following spring, there is limited opportunity for early season weed control by cultivation.



- 3) It is NOT recommended for clay soils, due to difficulty in preparing proper seedbed after dry summer months.

Early spring planting—Plant from March to April

Advantages:

- 1) Forbs will germinate better than those planted in late spring.
- 2) Grass seeds will germinate better than those planted in fall.
- 3) Droughty soils should be planted as soon as possible in spring, if it is not possible to plant in fall.

Disadvantages:

- 1) Limited opportunity for early, cool season weed control.
- 2) It is NOT recommended to plant heavy soils in early spring, because it is difficult to work these soils.

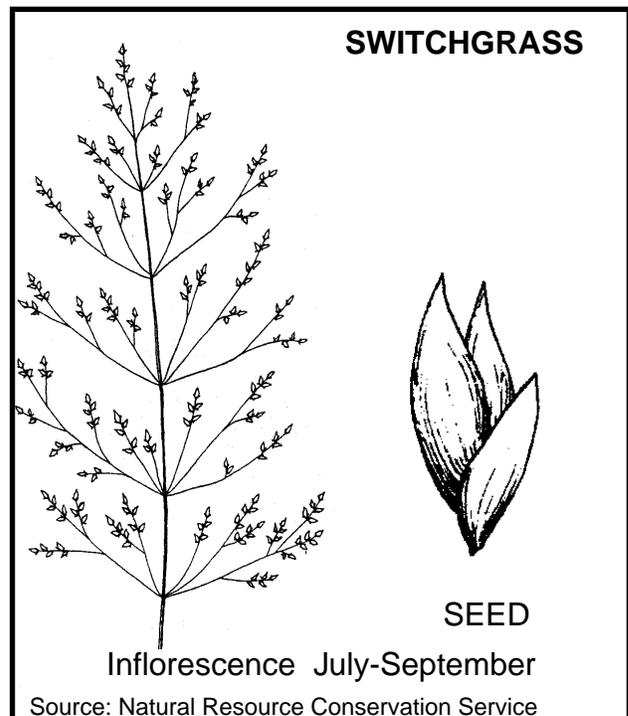
Late spring planting—Plant from May to end of June

Advantages:

- 1) More time for soil preparation. This is important for planting on heavy soils.
- 2) Longer time for weed control.
- 3) Best time to plant warm season grasses.

Disadvantages:

- 1) Increased chance of drought conditions.



2) Overall, poorer for germination, except for warm season species. Many cool season species will not germinate until fall or the next spring. This allows the weeds a 1-year head start.

Broadcast Planting

Broadcast planting includes spreading seed with fertilizer spreaders, other spinner-type seeders, and drop-seeders. Warm season grass seeds are light and fluffy because of attached “parachutes” that facilitate wind dispersal. For successful broadcast planting, the seed needs to be clean. This means seed that is at least 75 percent pure-live seed (75 percent PLS). Seed that is less than 75 percent PLS should only be planted with a specialized warm season grass drill or planter.

When broadcast seeding, extreme care must be taken to ensure good seed to soil contact while limiting maximum seed depth to $\frac{1}{4}$ to $\frac{1}{2}$ inch. Seed should be rolled lightly after seeding. However, do not be concerned about covering all of the seed. In fact, it is better to leave some on the surface rather than cover it too heavily.

Planting Steps:

1) Prepare soil for planting by tilling (plow, disc, and drag). Raking or dragging will loosen the soil to allow incorporation of the seed into the surface soil.

2) Inoculate legume seeds prior to planting. Mix inoculated legume seeds with forb/wildflower seeds. These can be mixed together with the grass seed to form a uniform mix. Plant the mixed seed.

3) Drag lightly and firm with a roller or cultipacker; avoid firming soil when wet.

Note: On steep slopes, it is often beneficial to plant a nurse crop and/or mulch the planting.

Post-planting Maintenance (Warm season grasses)

Year One. If straw mulch is used, control annual weeds by mowing to 4 to 6 inches in the first year. Invading weeds can dominate the planted grass seedlings by depriving them of water, light, and space. Do NOT let weeds get higher than 12 to 14 inches before mowing. Cutting down tall weeds can smother the grass seedlings below. If wildflowers were

included in the mixture, do not mow lower than 8 to 12 inches.

If a nurse crop is used, do not mow in the first year, unless weeds become a serious problem. If weeds are dense and begin to grow up to 16 inches, cut them down along with the nurse crop to prevent shading-out of desired grass seedlings.

Year Two. Once your stand has established itself, prescribed or controlled burning is the most effective method of maintaining and rejuvenating a stand of warm season grasses. Burn one-third of your total grass acreage every year. Controlled burning will ensure a cleaner, more valuable stand over a longer period of time. Burning is much easier and less expensive than you might think, however, permits are required and great care must be taken during the burning. Contact your local Project Forester for permits and assistance.

Haying or grazing at the proper times, using proper methods, can also help maintain a stand. Cut hay or graze to a minimum height of 6 inches. It is important to rotate mowed or grazed areas on an annual basis. Avoid, if possible, haying or grazing any stand during the peak nesting period between April 15 and August 15. Disturbances during this time period are detrimental to the reproductive success of the area’s wildlife.

Note: Certain management practices, such as haying or grazing, are restricted under USDA programs such as the Conservation Reserve Program. Contact your local NRCS (Natural Resource Conservation Service) or Farm Service Agency for details.

You can mow your grass to maintain it, however, this is not the most desirable alternative. Mow one-third of your stand every year, once it is established. Mowing will keep woody growth from encroaching, but repeated mowing will create a layer of “litter” on the ground. This mulch layer will eventually crowd grass seedlings. The mulch also makes it difficult for young birds to move on the ground and makes the stand less attractive to insects they eat. If you do decide to mow, it may be necessary to lightly disc the stand every 3 or 4 years in order to turn over the litter layer, destroy woody growth, and encourage dormant grass seed and native annuals.

Note: It is important to understand that you are required by law to control noxious weeds, including Johnsongrass, jimsonweed and Canada thistle, on your property. Should you encounter these species in your plantings, your first priority should be control of these weeds, even at the expense of the planted grasses. Contact your county weed control specialist for more information.

Nurse Crops

Annuals or short-lived perennials that provide rapid soil stabilization, and help keep weeds down without competing with the grass/forb seedlings are called *nurse crops*. Nurse crops can be planted at the same time as the grass/forb seed. Mix the nurse crop seed with the grass/forb seed and hand-broadcast together. On large plantings, oats can be drilled prior to, or after, seeding.

Oats: Apply at a rate of 50 pounds per acre in spring plantings. Use 100 pounds per acre in mid-autumn plantings, because it will winterkill. Heavier seeding rates ensure better soil holding ability.

GRASSES FOR WILDLIFE HABITAT

Wildlife Habitat Seeding Recommendations

Native Warm Season Mixtures (rates are per acre)

Mix 1: Upland/Dry Soils

3 lbs Indiangrass (*Sorghastrum nutans*)

2 lbs Big bluestem (*Andropogon gerardi*)

1 lb Little bluestem (*Schizachyrium scoparium*)

Mix 2: Lowland/Moist Soils

3 lbs Big bluestem (*Andropogon gerardi*)

2 lbs Indiangrass (*Sorghastrum nutans*)

1 lb Switchgrass (*Panicum virgatum*)

Individual Stands:

Rates for seeding pure stands of individual grasses from the above-mentioned mixtures:

7-15 lbs Big bluestem (*Andropogon gerardi*)

7-15 lbs Little bluestem (*Schizachyrium scoparium*)

7-12 lbs Indiangrass (*Sorghastrum nutans*)

5-12 lbs Switchgrass (*Panicum virgatum*)

Listed below are other grasses that may be used for both wildlife habitat and sediment filtering in a grassy buffer strip. Except for eastern gamagrass and coastal panicgrass, these are cool season, non-natives adapted to this area and utilized by wildlife. The seeding rates given are per acre for pure stands.

8 lbs Coastal panicgrass (*Panicum amarum* var. *amarulum*)

7 lbs Eastern gamagrass (*Tripsacum dactyloides*)

6-8 lbs Reed canarygrass (*Phalaris arundinacea*)

4-25 lbs Perennial ryegrass (*Lolium perenne*)

4-6 lbs Orchardgrass (*Dactylis glomerata*)

3 lbs Weeping lovegrass (*Eragrostis curvula*)

In addition to the grasses recommended above, it is a good idea to include a variety of forbs or wildflowers. Plant a premixed variety at a rate of ¼ pound per acre. The following is a partial list of native species:

Black-eyed Susan (*Rudbeckia hirta*)

New England aster (*Aster novea angliae*)

Lanceleaf coreopsis (*Coreopsis lanceolata*)

Ox-eye sunflower (*Heliopsis helianthoides*)

Partridge pea (*Cassia fasciculata*)

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FS 725	Buffer Design, Establishment, and Maintenance
FS 726	Trees for Riparian Forest Buffers
FS 727	Understory Plants for Riparian Forest Buffers
FS 729	Soil Bioengineering or Streambank Restoration for Riparian Forest Buffers
FS 733	Riparian Buffer Systems

Riparian Buffer Management: Grasses for Riparian Buffers and Wildlife Habitat Improvement

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