Switchgrass for Riparian Buffers

Switchgrass (Panicum virgatum) is a perennial, warm season grass native to most of the eastern United States. It is drought and salt tolerant, needs little to no fertilizer and does well in shallow, wet soils. Its long roots improve soil and water quality by absorbing nutrients and sequestering carbon dioxide. The tall bunch grass benefits wildlife, offering optimal nesting and cover. Switchgrass is a particularly beneficial warm season grass for use in riparian buffer zones.

What is a Riparian Buffer?

A riparian buffer is an area of permanent vegetation immediately adjacent to a moving body of water. These areas often consist of three zones. The first and closest to the body of water typically consists of established, fast-growing trees. The second is characterized by shrubs and other early-successional vegetation. The third, and farthest from the water body, often contains native grasses and forbs (see diagram).

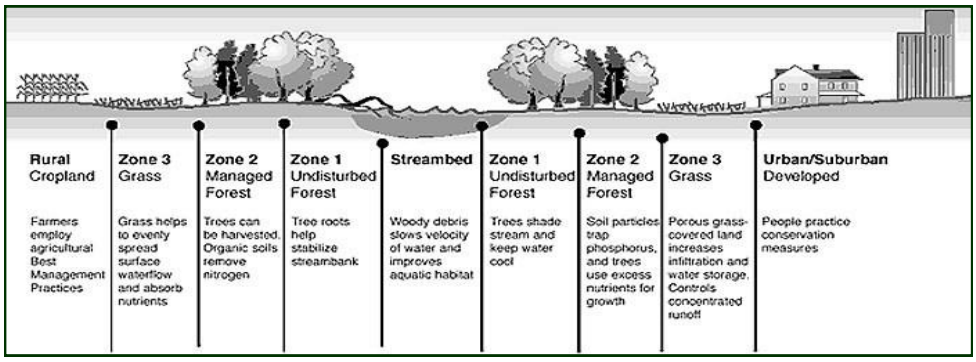
Streams that drain agricultural and urban areas can often suffer from the effects of runoff, contaminating the water body with pollutants and increased nitrogen and phosphorus levels. Riparian areas are crucial for ecological diversity, erosion control and absorption of harmful runoff prior to reaching the water body. They ensure the stability, health and biodiversity of the stream itself, while also providing necessary habitat for many terrestrial organisms.

A riparian area on the Allegheny River in northwest Pennsylvania consisting of cordgrass, switchgrass and other warm season grasses.

Creating a Riparian Buffer

A riparian buffer can be established *passively* — by simply establishing a "no-mow" zone and allowing vegetation to establish through natural disbursement of seeds by wind, birds and animals. But this method does not always result in the most effective riparian area, and can be marked by the existence of non-native, aggressive and/or invasive species that offer little ecological function.

It is advisable to take an *active* approach to riparian buffer establishment by providing a well-conceived and biodiverse selection of vegetation. Careful consideration should be given to assessing the site, developing a planting plan, preparing the site, selecting appropriate seeds and live materials, and planting. For the purpose of this handout, we will focus on the many benefits of switchgrass (*Panicum virgatum*) and other perennial, native, warm season grasses.



Source: Maryland Cooperative Extension, University of Maryland

Why Switchgrass?

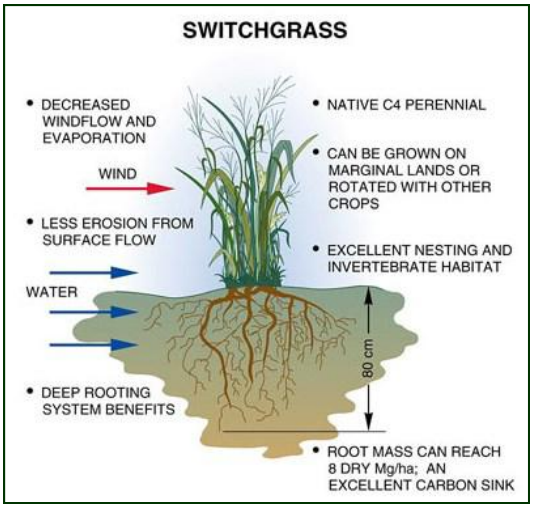
Use of switchgrass as a buffer between agricultural and/or urban activity and watersheds is seen by many as one of the best methods for protection of these priceless resources.

Note the crystal clear water in this stream bordered by a lush stand of switchgrass

Switchgrass has extensive roots that can grow as deep as five to six feet into the ground. In addition to serving as a superior soil stabilizer for erosion control, this plant and its root system form a tremendous ecological filter — soaking up nutrients like nitrogen and phosphorus, and sequestering carbon dioxide.

The shade offered by overhanging grasses and other vegetation helps to regulate water temperature as well.

Adding to its ecological value, switchgrass and many other warm season grasses provide necessary cover for the mating, nesting, brood rearing and feeding activities of ground-nesting birds. Small mammals such as mice and rabbits also thrive in this habitat. The addition of native forbs to a riparian area planting adds foraging benefits for pollinators such as honeybees, native bees and butterflies.



Source: Oak Ridge National Laboratory

In 2004, researchers from the USDA Natural Resources Conservation Service and Agricultural Research Service studied the performance of various warm season grasses in riparian areas that see occasional flooding. They determined that certain specific cultivars of switchgrass, eastern gamagrass and prairie cordgrass performed the best in the categories of survival, vigor and biomass production.

Site Preparation and Planting

Factors such as soil type, hydrology, pH, fertility, erosion/run-off potential, compaction, existing vegetative cover and previous crop history must be considered when establishing perennial, native, warm season grasses.

Switchgrass can survive in a wide range of soil moisture and tolerates a soil pH of 5.0-8.0. Soil pH below 6.0 should be corrected with the addition of lime.

Soil fertility is a function of the available nutrients that can be used by the plant. Warm season grasses can be more productive at lower fertility levels than row crops or alfalfa. Soil tests are required to determine soil fertility levels. Fertilizer is not recommended for soils with moderate fertility levels.

Tilling a field going to warm season grasses corrects surface roughness and incorporates crop residue before planting.

Perennial vegetation of grasses and broadleaf weeds must be controlled before a field can be planted. The first step is to mow or burn existing vegetation which produces new vegetative growth. Roundup® and a systemic broadleaf herbicide can then be sprayed which effectively kills undesirable species.

No till or minimum till are the most effective means of seeding new warm season grasses. One of the limiting factors of no till is surface crop residue that prevents proper seed-to-soil contact, shades the germinating seedlings and/or creates a nitrogen deficiency during decomposition. Each situation requires customized tillage and herbicide considerations.

A riparian test plot featuring switchgrass one year after planting. Source: USDA NRCS