

Native Warm-Season Grasses: Establishment Issues

Native warm-season grasses (NWSG) have long been touted for their significance in wildlife habitats. These perennial grasses, as the name suggests, produce the majority of their biomass in the summer months and have a bunch-type growth habit. Examples of these grasses include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), indiagrass (*Sorghastrum nutans*), wiregrass (*Astrida* spp.), and switchgrass (*Panicum virgatum*).

Their structure and spacing between plants create natural corridors for small mammals and grassland birds to forage, build nests, rear young, and escape from predators. Historically, these grasses dominated certain areas of Mississippi, including the prairies of the Black Belt region and longleaf pine understories in the Coastal Plain region.

Centuries of land development and conversion to domesticated forage grasses and row crops have all but eliminated natural stands of these grassland communities. However, they are making a comeback. Landowners across the state have taken drastic steps to identify areas of their

property—such as field borders, pine understories, and unproductive pastures—to transform into natural areas for wildlife or to manage as dual-purpose lands for livestock production and wildlife habitat (Figure 1).

It is important to note that there is a drastic difference between establishing these natural areas and simply planting supplemental food plots for deer, turkey, or quail. These areas require extensive preparation, timing, and patience to accomplish. Most successfully managed areas for wildlife habitat have been shaped and developed for decades. Simply cleaning up an area, spraying herbicide, and planting seed will not produce the desired results. In fact, it often leads to stand failure and a waste of time, effort, and money.

Native warm-season grasses are perennial, so they require more time to germinate and develop than do annuals, such as millet (*Echinochloa esculenta*), corn (*Zea mays*), and wheat (*Triticum aestivum*). Also, as most often is the case, sites chosen for restoration are covered in tough-to-control weeds, particularly sod grasses such as bermudagrass (*Cynodon*



Figure 1. Second-year stand of indiagrass, big bluestem, and little bluestem. Proper weed control and planting methods and timely rains can produce mature stands by the second year.

dactylon) and bahiagrass (*Paspalum notatum*), johnsongrass (*Sorghum halepense*), cogongrass (*Imperata cylindrica*), and woody species like eastern red cedar (*Juniperus virginiana*), Chinese tallow (popcorn tree; *Triadica sebifera*), and green ash (*Fraxinus pennsylvanica*). These species require several herbicide applications, prescribed burns, and mechanical removal well before the first seed is planted.

That being said, this publication is based on phone surveys of landowners who have successfully and unsuccessfully established native grasses, forbs, and legumes on their property for wildlife habitat creation or for livestock grazing. All questions were based on their establishment experiences. On the following pages, you will see the questions, along with generalized statements about the answers received.

Where did you originally hear about native warm-season grasses (NWSG)?

Most property owners (95 percent) researched these grasses fairly extensively before planting. Information was obtained from several sources, including the Extension Service, Natural Resource Conservation Service (NRCS), Forestry Commission, and Wildlife Federation personnel and meetings. Other sources included private consultants, land-management companies, online searches, and neighbors who had planted NWSG before.

Were these grasses established for grazing or wildlife habitat?

A majority of landowners (more than 80 percent) were establishing NWSG for wildlife habitat creation only. Wildlife interests were predominantly focused on quail, turkey, and pollinators. Associated wildlife use (such as deer, songbirds, nonpollinating insects, and gopher tortoises) was noticed by most landowners, but it was not a primary interest in establishing NWSG.

A few producers planted NWSG to combine grazing lands with wildlife habitat. These grasses are excellent sources of forage for livestock if managed and grazed properly. Increased drought tolerance and reduced fertilizer demand are just two attributes these grasses have over traditional forage species. Areas established for grazing of NWSG are usually less diverse (fewer species planted) and planted with heavier seeding rates (6–10 pounds of pure live seed per acre).

What was your site like before planting NWSG?

Answers to this question were quite variable. Some sites were abandoned pastures, fallow crop fields, and cutovers following timber harvest. Site preparation can be quite extensive depending on the history of the site and the landowner's objectives for the given piece of property. Sod grasses are typically difficult to control with herbicides. Tree and stump removal and tillage are quite labor-intensive and disturb the site's soils. However, a firm, smooth, weed-free seedbed is essential if successful establishment is expected. This ensures germinating seeds the best chance for development and survival.

What technical services did you use to accomplish establishment (i.e., consulting, co-op, farm services, or custom planting)?

Resources used to establish NWSG depended on the individual's skills and knowledge base in agriculture/forestry, proximity to outside services (distance from co-op, consulting service, or neighbor with equipment), and what was needed to accomplish site preparation. Planting was accomplished with several different methods, including custom planting with specialized planters designed to handle native grass and forb seed, broadcasting using cone-spreaders followed by a cultipacker, or using conventional grass drills (which are not recommended).

Herbicides were used at some point by all landowners surveyed. These are critical when removing existing vegetation. Herbicides contain different active ingredients that control various metabolic pathways inside the plant. Several variables dictate which herbicide should be used:

- vegetation to be controlled
- application method (boomless or boom)
- grazing restrictions
- site specifics (soil type, water sources, etc.)
- temperature
- herbicide residual effect
- moisture availability

Some products are nonselective, meaning they control whatever vegetation the herbicide contacts, while others are selective, meaning they only control certain species, such as grasses or broadleaf weeds. When establishing NWSG, broad-spectrum, nonspecific herbicides are used for "burndown," where all vegetation is controlled before planting. Secondly, a pre-emergent should be applied at planting or shortly thereafter (2–3 days after planting). This prevents undesirable weeds from germinating and developing. Knowing which

herbicides are needed and how they are to be applied is an extremely important component of establishment. Calibration of spraying equipment is essential. Improperly calibrated equipment can result in overapplication (species will not emerge, money is wasted from applying too much, desirable species can be harmed or killed) or underapplication (weeds are not controlled; see Figure 2). Several landowners surveyed experienced the effects of not properly calibrating spraying equipment. When dealing with herbicides, remember, you can't kill a plant "more dead"—if a label says 1 quart per acre will control a specific weed, 2 quarts per acre won't control it more. Finally, always consult the herbicide label before application. If you are not familiar with herbicides, always default to outside expertise (Extension, consultants, etc.).

Which species did you plant?

This choice was ultimately left up to the landowners and their specific objectives. One example was a longleaf pine site where the landowners desired a habitat for quail, gopher tortoises, and pollinators. Their seed mix comprised more than a dozen grasses and forbs that provided cover and nectar sources, and ultimately produced seed for foraging

birds and mammals. However, a majority (more than 75 percent) planted grasses only, specifically big and little bluestem, indiagrass, switchgrass, and splitbeard bluestem (*Andropogon ternarius*). Tall grass cover was the main objective for most of the landowners surveyed.

How was your site prepared?

Herbicides, tillage, cultipacking, and mechanical tree/brush removal were the most common site preparation methods reported. Herbicides were used for initial burndown (killing of existing vegetation), pre-emergence (provides weed control during germination and seedling development), and post-emergence (controlling weeds following establishment). Sites that were planted alongside trees (longleaf pines) were mechanically ripped for tree planting. Some sites with particularly shallow soils or hard fragipans (layer of soil that is extremely hard or dense, preventing root development) were chisel-plowed. Some sites were conventionally prepared by disking, harrowing, and cultipacking, while some were simply sprayed for weeds, and grass seed was no-till planted. Again, these decisions were based on research and tailored to each landowner's specific goals.



Figure 2. Calibration of spraying equipment is necessary for herbicide applications. The left side of the picture received too little herbicide, whereas the right side received too much or was overlapped (double the rate).



Figure 3. Uncontrolled sod grasses can result in diminished stands. Bermudagrass prevents seedlings from developing, eventually outcompeting weaker NWSG stands.

Have you experienced any weed control issues following planting?

Unfortunately, all but one survey respondent experienced weed control issues after planting. However, what some were calling a weed may or may not be a weed in certain situations. Several broadleaf species, such as ragweed, are very beneficial for quail and may have come up from the soil's seed bank following planting. Perennial grassy weeds such as bermudagrass, johnsongrass, bahiagrass, and vaseygrass (*Paspalum urvillei*) were very common (Figure 3). Woody encroachment was also common, including species such as

Chinese tallow, hackberry, Chinaberry, and green ash. On former agricultural lands, agricultural weeds such as marehail (*Conyza canadensis*), sicklepod (*Arabis canadensis*), hemp sesbania, Cherokee or multiflora rose (*Rosa multiflora*), and dogfennel (*Eupatorium capillifolium*) were prevalent. Fortunately, of the weeds mentioned, all can be controlled with proper site preparation and persistent management (prescribed burning, spot spraying, etc.).



Figure 4. Native grass seed drills are designed to plant a variety of seeds, including fluffy or hairy NWSG seeds. This piece of equipment is highly recommended for establishing larger areas to native grasses, forbs, and legumes.

Based on your experience, what would you change if given the opportunity to plant again?

Respondents most commonly answered that they would improve site preparation. Some said they would prepare a smoother seed bed for travel across the site and more thorough weed control. One landowner suggested altering the seed mix—reducing the amount of forbs and planting more grass—while another would have reduced the amount of a particular species of grass due to the amount that was

coming up from the disturbed seedbed. Several landowners said they would use native grass drills in the future (Figure 4). Those who broadcasted said a carrier, such as lime, cat litter, or crushed corn, should be used to help evenly distribute the fluffy grass seed onto the soil surface. Conventional planters or drills were often found inadequate, and respondents said they would not use them in the future.

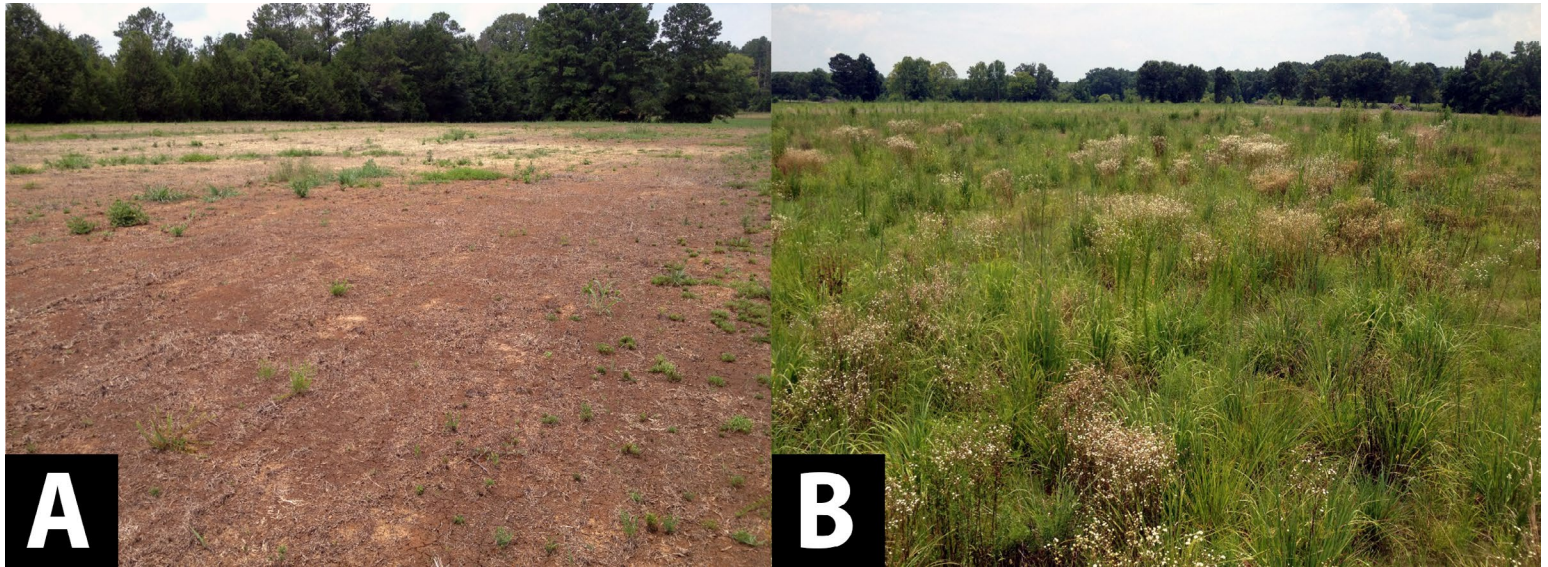


Figure 5. Establishing NWSG requires patience. The left photo was taken approximately 4 months after planting. The right photo was taken at the same spot 1 year later.

What do you think keeps other producers and landowners from establishing NWSG?

There were two main answers to this question. The first was cost. Seed costs can be high, especially for forb and legume species. Unfortunately, some species are often hand-harvested in small amounts and can be highly variable in their production, germination, and availability, which increases their price. Native grass seed is also very “hairy,” meaning uncleaned seed has hairs or appendages that prevent it from flowing easily through seed drills and broadcast spreaders. Extensive, multi-stage cleaning processes are used to clean the seeds, which increases the cost. Seed is not available at local cooperatives, farmers’ gins, or retail stores. Therefore, the only way to obtain this seed in bulk is to custom order it from out-of-state sources. Site preparation, often accomplished using contracted services, is also costly.

The second most common answer was patience (Figure 5). Establishing these species, specifically the grasses, is an extremely slow process. These are essentially wild, perennial grasses that must develop belowground (roots) before they begin producing aboveground. Unlike annual species like wheat or ryegrass (*Lolium multiflorum*), these grasses do not have to produce seed in the same year they are planted in order for them to “survive” to the next season. Sometimes, though not in all situations, these grasses can take up to 3

years to become fully mature. That is why site preparation and persistent weed control is essential for management. Many of the landowners stated that they were extremely concerned in the first year. They worried that the seed was not any good, that they planted it wrong, that it was too dry, or that they didn’t know how to identify it to know if it was coming up. Do not get discouraged. Drought tolerance is a distinct advantage of these species, which have deep, extensive root systems that mine water at soil depths no annual species can get to. You must be patient as the roots develop (Figure 6).

Another concern of some landowners was the profitability of the established site. Planting NWSG is not monetarily profitable unless the sites are grazed by livestock or leased for hunting rights. Landowners plant NWSG for aesthetic purposes or to create dedicated areas for wildlife habitat. They typically choose unproductive (unprofitable) areas to establish NWSG. They do not convert income-producing lands into restored grasslands. These restored areas fit well in agricultural ecosystems, such as nonproductive farm areas, field borders, wet areas, open logging decks from previous timber harvests, or fallow fields or degraded pastures. These areas are not designed to replace supplemental food plots, but rather to enhance the areas around these plots and provide tall grass cover.



Figure 6. This seedling was scraped from a furrow approximately 2 months after planting. NWSG can be extremely slow to germinate and develop.

Would you recommend this practice to other producers and landowners?

The resounding answer to this question was “yes.” In spite of the time, effort, and costs of establishing these species, more than 90 percent of survey respondents strongly encouraged other landowners to implement this management practice, especially if they are dedicated to enriching their property for wildlife habitat. Several of those surveyed have already experienced drastic differences in wildlife use on their

property. These plant communities are extremely critical for dozens of insects, birds, and small mammals that are of no direct use or concern for wildlife enthusiasts. Indirectly, however, the habitats these grasses create are areas where game species can often find food (insects or seeds) and nesting cover from predators. Those surveyed were genuinely concerned about setting aside areas of refuge for wildlife.

Summary

Native warm-season grasses, along with forbs and legumes, are highly beneficial for wildlife habitat. Native plant species provided seed, forage, and nectar to wildlife long before people began planting food plots.

If you have any questions about this management practice, please contact your local MSU Extension office. You also can find a wealth of information on establishment techniques at <http://extension.msstate.edu>.

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