

# NATIVE WARM-SEASON GRASSES AND EARLY SUCCESSIONAL HABITAT: PAST LESSONS *and a* NEW VISION

By Dr. Craig Harper, Associate Professor/Wildlife Extension Specialist, The University of Tennessee Department of Forestry, Wildlife and Fisheries.

Land-use patterns have changed dramatically across the South in the past 50 years. Arguably, the biggest change is human encroachment into rural areas. Thousands of acres of potential wildlife habitat are lost each year to a growing suburbia. Moreover, land that isn't lost to urban development has changed greatly. The small family farms of yesteryear have disappeared along with the small rowcrop fields that were fallow for much of the year, as well as the weedy field borders and fencerows, and brushy creek banks. Today, remnant farmland is stressed to produce high yields on larger fields that are double- or triple-cropped each year and cleaned with herbicides, leaving no fallow growth for wildlife habitat. Many fields that were in rowcrop production through the 1960's were planted to pasture or hay through the 1970's, and 80's, often just to



Prescribed fire is the recommended practice for maintaining early succession and improving vegetation composition and structure.

keep the fields from “growing up” rather than for financial gain. The vast majority of these pastures and hayfields were planted to non-native perennial grasses, such as tall fescue and Bermuda grass, which provide little wildlife benefit and displace potential quality early successional cover.

Through this period, many wildlife species dependent upon and/or associated with early successional habitats experienced significant population declines. Northern bobwhite, loggerhead shrike, Henslow's sparrow, field sparrow, grasshopper sparrow, eastern meadowlark, indigo bunting, cottontail rabbit, and others have decreased to a fraction of their population 30 years ago. Although there are many factors associated with these declines, an overriding factor is habitat loss and or conversion to unsuitable cover.

The population decline for many early-successional species was so slow that it was not perceived by most wildlife managers until this past decade. Initially, many factors were blamed for population declines. For example, predation, diseases, and inadequate food supply all were suspected and investigated to some degree as the cause for northern bobwhite declines. More recently, however, intensive habitat investigations and

population modeling have identified broad deficiencies in habitat quality on a landscape scale for most species strongly associated with early successional habitats. Managers now realize the importance of habitat connectivity and landscape-scale conservation, and that many early successional species cannot be managed on a field-by-field basis. Nonetheless, habitat improvement begins at the individual field level and there is a strong push from the conservation community for landowners to improve early successional habitat. This effort includes a wide variety of programs that provide cost-share assistance and sign-up incentives designed to persuade landowners to change many current land-use habits.

## PROBLEMS ASSOCIATED WITH HABITAT IMPROVEMENT

Habitat improvement efforts have included eradication of non-native perennial grasses and establishment of native warm-season grasses (“NWSG”). Switchgrass, big and little bluestem, and indiagrass have been the primary species recommended by state wildlife agencies, the Natural Resources Conservation Service (NRCS), and non-profit organizations. As private lands management initiatives were developed, 3 main problems associated with these habitat improvement recommendations became evident.

## LACK OF NON-NATIVE GRASS CONTROL

Non-native perennial grasses, such as tall fescue and bermudagrass, lack desirable cover and provide poor structure for many birds and other small wildlife. Thick growth at ground level makes travel through fields dominated by these non-native species difficult. Seed availability also is reduced by the sod and thatch produced. Forb coverage is limited because of the literal “carpet” of grass that blankets the seedbank and limits germination. Before any habitat improvements can be made within an individual field, it is imperative that non-native grasses be eradicated.

Many fields have been planted to “NWSG” without first spraying and effectively killing the existing non-native grass cover with the appropriate herbicide. Plowing and disking do not kill these undesirable grasses! Even if native grasses are established successfully, non-native grasses grow amongst the native grasses within 2 years if they are not eradicated beforehand. Thus, even though native grasses are growing on the site, field conditions for wildlife remain suboptimal. Native warm-season grasses planted in fields containing Bermuda grass pose an especially unique problem. Although herbicide advancements in the past 10 years have made “NWSG” establishment much easier, there





Fields of tall fescue or Bermuda grass do not provide quality wildlife habitat. Conversion of small rowcrop fields that remained fallow during much of the year to non-native pasture grasses has had a huge detrimental effect on wildlife species dependent upon quality early successional cover.



A major reason for establishment failure is planting too deep. Pictured here are native grass seed along the drill furrow. Bluestems, indiangrass, switchgrass, and sideoats grama should not be planted any deeper than 1/2 inch. Approximately 30 percent of the seed may be just on top of the soil. That's OK. Just don't bury the seed. The exception is eastern gamagrass, which can be planted approximately 1 inch deep.

is no herbicide that will kill Bermuda grass growing in association with “NWSG”. Thus, all warm-season grasses present in the field must be killed if Bermuda grass is eradicated. This has caused much frustration and led to unnecessary expenses. Again, before native grasses (and forbs) are planted, non-native species must be eradicated. Because the seed bank may persist for some time, it is necessary to wait at least 2 years and continue spraying problematic species (such as Bermuda grass and *Sericea lespedeza*) before planting some fields.

### LACK OF ESTABLISHMENT SUCCESS

Early attempts (1980's through the mid-1990's) at habitat restoration with “NWSG” was set back severely because of establishment problems. Establishment success has improved dramatically with recent advancements in planting equipment (such as no-till drills with seed boxes designed specifically for “NWSG” seed with long awns) and herbicides. Despite these advancements, difficulties establishing native grasses still occur. Most notably, planting seed too deep, too late in the growing season, and competition with undesirable plants make many establishment efforts futile. As a result, many landowners and managers have become discouraged and recommend against planting “NWSG” because they “don't

germinate” quickly (if at all), “don't grow” quickly during the year of establishment, and/or don't compete well with “weeds.”

It is imperative that landowners realize a successful native grass planting does not look like a field recently planted to tall fescue or Bermuda grass. Perception is everything! A green carpet of tiny grass seedlings across the field is not desirable if wildlife is the objective.

### IMPROPER SPECIES MIXTURES, HIGH SEEDING RATES, AND LACK OF MANAGEMENT

Prior to development of the appropriate drill attachments, it was difficult to sow the fluffy seed of bluestems and indiangrass. As a result, most landowners and wildlife managers planted switchgrass. The seed is small and smooth (much like millet) and switchgrass is easily top-sown or drilled. Problems with plant competitors, especially non-native warm-season grasses (such as crab grasses and johnsongrass), were often encountered, but the patient manager could usually establish a stand of switchgrass within a couple of years. Thus, for many, establishing “NWSG” meant sowing a pure stand of switchgrass. Moreover, expectations as to what the field

should look like undoubtedly were influenced by past experiences with non-native cool-season grasses. Thick stands of switchgrass were planted, often using 8 – 10 pounds of pure live seed (PLS) per acre. As a result, wildlife response was mixed. Some thick stands of pure switchgrass did not present much better habitat than—and was about as unnatural as—a field of tall fescue.

As cost-share assistance programs began to enroll considerable acreage into “NWSG” and equipment improvements were made (late 1990's), more bluestems and indiangrass were planted. However, problems associated with field image continued. Mixed stands of “NWSG” were planted at 6 – 10 pounds PLS per acre, resulting in thick mixed stands with few forbs present in the field. Landowners began to think this was what “early successional habitat” should look like because that's what the biologists prescribed! Again, wildlife response was mixed, and it was common to see reduced wildlife activity in those fields with dense grass that had not been burned or disked. Grass density often

became excessively dense 4 – 5 years after planting.

Thick stands of grass limit forb coverage, which reduces habitat quality for most wildlife species that use early successional habitats. Forbs provide structural diversity, more openness at ground level, and an important seed source as well as quality forage for deer, rabbits, and groundhogs. Forbs also attract higher numbers of pollinators and other invertebrates, which are an important food source for many birds. Shrubs represent yet another critical component for a number of wildlife species. Scattered shrubs provide additional cover and diverse structure needed by northern bobwhites and several songbird species. Certain shrubs (such as wild plum, sumac, and elderberry) and blackberry also provide soft mast for birds and mammals.

Until 2004, many fields enrolled into conservation programs were never “set back” or managed. Mid-contract management practices were prescribed by the NRCS to invigorate fresh growth and improve the structure and composition of enrolled fields. Unfortunately, a “reluctance to burn” attitude prevents many landowners and some wildlife managers from using fire to manage early successional cover, leaving only mowing and disking as viable management options. Because it is most difficult to disk thick, tall mixtures of “NWSG” (unless landowners have a large tractor and heavy offset disk), most landowners use mowing as a management practice. This only makes field conditions worse. Mowing accumulates thatch and other debris, reduces openness at ground level, and limits germination and growth from the seedbank. Worse yet, mowing is most often conducted during the summer. Mowing at this time not only destroys reproductive cover and severely reduces reproductive success, it also kills young wildlife, such as nestlings, young rabbits, and fawns. A more proactive, aggressive management strategy is needed!

### A NEW VISION

Recent research has shown burning and/or disking are highly desirable and, in fact, necessary to improve the composition and structure of fields managed for wildlife. Fire consumes dead vegetation, stimulates fresh growth, and creates open space at ground level. Burning also stimulates the seedbank and recycles nutrients, increasing forage quality for rabbits, deer, and groundhogs. Disking stimulates the seedbank, facilitates decomposition of dead vegetation, and creates an open structure at ground level. Disking



Advancements in planting technology, such as this native grass seed box on a Truax drill, and herbicide development have made establishing native grasses and forbs relatively easy.



Just a few years ago, this was a tall fescue field—void of wildlife. Now, the perfect composition and structure has been created to benefit a wide variety of wildlife. Native grasses for nesting structure; forbs for umbrella cover, forage, and seed; and an open structure at ground level that provides dusting opportunities and enables seed and invertebrates to be picked up by broods that are able to travel throughout the field, not just along the edge. Now, wildlife abounds in the field. If you are interested in quail and rabbits, this should look pretty, not ugly!



Fig 3; This field in McMinn County is being managed with prescribed fire and disking. Various sections of the field are managed each year; the entire field is never managed at once. This ensures nesting cover, brooding cover, and escape cover are always present and never far away.





is also an excellent practice to decrease grass density and promote additional forb cover. Depending on the existing cover and equipment available, burning or mowing prior to disking may be necessary.

Managers have determined 3 – 4 pounds PLS per acre of native grass seed complemented with 1 – 2 pounds of desirable forb seed is most appropriate for wildlife habitat (if planting is necessary—see below). Coverage of native grasses should not exceed 60 percent if the objective is to provide optimal habitat for a wide variety of wildlife species. Pure grass stands may attract eastern meadowlarks, Henslow’s sparrows, and, if large enough, grasshopper sparrows. However, fields containing native grasses along with several forbs and shrubs, are much more attractive to a wider variety of wildlife species, including meadowlarks, bobwhite quail, indigo buntings, field sparrows, yellow-breasted chats, blue grosbeaks, dickcissels, wild turkeys, eastern cottontails, white-tailed deer, and many, many others. Indeed, without excessive shrub cover, even Henslow’s and grasshopper sparrows may be found in these fields as well (depending upon field size and surrounding habitat).

Maintaining grass coverage below 60 percent allows an early successional community to develop, replete with a variety of forbs and grasses and scattered shrubs. This composition and structure is absolutely crucial when trying to replicate the quality habitat with which our native wildlife evolved. Ironically, ideal early successional habitat conditions are often created simply by eradicating the non-native cover and

allowing the seedbank to respond. It is amazing how long seed can remain viable in the seedbank, just waiting for a chance to germinate. Recent research has shown dramatic increases in wildlife populations when naturally occurring forbs and grasses are allowed to develop in place of non-native cover.

#### IS THERE A NEED TO PLANT?

If quality early successional habitat can be created by stimulating the seedbank, is it necessary to plant? No! However, there are a couple of risks when direct planting is not used.

An obvious risk is trying to manipulate a seedbank that is depleted of native seed. Seedbanks vary greatly from site to site, but there are some generalities that hold true. Forested areas at least 60 – 70 years old usually contain extremely rich seedbanks with relatively few (and sometimes no) non-native species. Within 2 years after clearing, a diverse early successional community is usually established without planting. Old pastures, however, are always full of non-native grasses and forbs. Techniques used to eradicate these species can deplete existing native plant populations, thus lowering habitat quality. Fields that have been in agricultural production for many years often have a severely depleted seedbank, especially fields with a history of continued herbicide use. Planting is often necessary when establishing quality early successional habitat on these sites.

Nonetheless, if the undesirable non-native species are killed (if the “carpet” is

removed), and desirable species arise from the seedbank, there is no need to plant. For example, there is no “NWSG” better suited for bobwhites, grassland songbirds, scrub-shrub songbirds, white-tailed deer, or cottontail rabbits than broomsedge bluestem. And other native plants, such as blackberry, pokeweed, ragweed, beggar’s-lice, and partridge pea are commonly found in fields. Where these occur, high-quality early successional habitat is possible without planting, but the first step is to remove the carpet of non-native grasses. Through this process, landowners must realize quality habitat does not develop overnight. Just as when planting, patience is required when encouraging desirable plants from the seedbank.

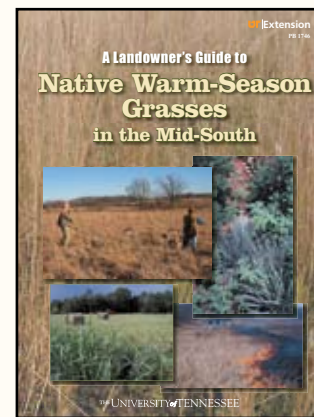
As mentioned, perception is key when promoting quality early successional wildlife habitat. The specific plants (such as broomsedge, blackberry, and ragweed) and habitat conditions that need to be promoted are those many landowners have fought for years—“weeds”! Creating desirable vegetation composition and structure for wildlife is not visually pleasing for many people. These fields look unkempt. To most onlookers, it reflects laziness of the owner, an unwilling attitude to “tend their property properly.” Concern over what others might think is a real issue in persuading people to more appropriately manage their property for wildlife associated with early successional habitat.

#### THE FUTURE

The future for wildlife species dependent upon early successional habitats is still in question. However, where proactive management strategies have been implemented, dramatic increases of these species have been documented. Researchers and managers have identified limiting factors for declining early successional wildlife, and technical assistance and cost-share opportunities are available for landowners. Without question, the biggest influence on the future of these species’ is with private landowners and the land-use practices they implement. Perceptions and attitudes towards “weedy” fields, fencerows, and creek banks must change if landscape-scale population increases are realized. ↗

*For additional information on technical assistance and cost-share opportunities for establishing and managing early successional wildlife habitat, visit the Natural Resources Conservation Service or UT Extension office in your county, and/or your regional Tennessee Wildlife Resources Agency office.*

**Note:** This article was adapted from: Harper, C.A. and C.E. Moorman. 2006. Qualifying native warm-season grasses and early successional habitat. Proceedings 11th Triennial Extension Wildlife and Fisheries Conference.



This guide is available online at: <http://www.utextension.utk.edu/publications/pbfiles/PB1746.pdf> or can be purchased by calling 865-974-7126.

## TWRA Offers Incentive For Native Grass Buffers

The Tennessee Wildlife Resources Agency is offering a one-time incentive payment of \$75 per acre for farmers to plant native grass buffers around cropfields under a 10-year contract in the Conservation Reserve Program (CRP). This payment makes this economically smart practice an even better deal than already exists.

The Conservation Practice-33, “Habitat Buffers for Upland Birds”, allows farmers to establish 30-to-120 foot wide buffers planted to native grasses on one or more sides of eligible cropfields.



“It’s a smart move for many farmers to enroll unproductive field edges that lose money year after year, such as shaded edges along the woods”, said NRCS biologist Chris Wolkonowski. “The TWRA payment makes it even more profitable for the farmer, and provides habitat that bobwhites and rabbits utilize year-round

## Center for Native Grassland Management Update

The first year of the Center has been a busy one as many first steps have been taken on a number of exciting initiatives that are at the core of our mission. A good deal of effort has been put into getting the research program underway. This has included a successful National Research Initiative (CSREES) grant (\$398,000) to develop management strategies to integrate biofuels production, forage production, and wildlife habitat for native grasses. This project has involved faculty from three departments and six RECs. A number of other projects have been initiated at RECs dealing with basic management issues in native grasses including burn timing, cutting heights, and development of systems that will incorporate legumes and winter annuals into production stands. Work is also underway to develop management systems for oak savannah restoration. A 5 – 6 site, multi-state project is being initiated with a large number of partners

(TWRA, USFS, TNC, QU, RMEF, NC Wildlife Resources, KY DFWR, RMEF, NWTF, and the Fire Learning Network). Work is being explored to evaluate development of grazing opportunities in these systems. Grants are pending for the oak work, quail research, and capacity building for the Center itself.

On the outreach side, we held a “State of the State” conference on native grasses in Murfreesboro in January with nearly 250 in attendance. In-service training sessions involving NRCS, TWRA, FSA, and Extension agents were held in Decatur, Williamson, and Knox Counties, and one even traveled to SW Missouri to see native grass management systems there. A new Native Grass manual was printed, a web page is under development, a web-based bibliography of native grasses is under development, and presentations were made to producers at a Hamilton County workshop and

a field day at MTREC.

A series of demonstration projects are being developed on working farms across the state integrating native grasses into production systems.

A steering committee has been formed and had their inaugural meeting during October 2007. We are in the process of forming the Eastern Native Grassland Alliance, an “organization of organizations” as a means of tying together the many folks throughout the east with an interest in these grasses. This group will foster better communication, centralization of information, and will strengthen the position of the Center as the leader in native grass management and conservation in the east. While we have clearly been busy, these steps are only a beginning. There are many opportunities that need to be taken advantage of in the coming years.