

Native Warm-Season Grasses and Wildlife

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Introduction

Native grasslands once covered vast expanses of North America, providing habitat that supported more than 800 native species of plants and animals. Native warm-season grasses were the dominant component of these prairie grassland ecosystems. Native warm-season grasses have minimal requirements for supplemental water or fertilizer. Once established, they are drought tolerant and almost completely disease free. Peak growth periods of these mostly perennial bunch grasses are from June through August. Like other native plants, they have coevolved with the local climate, soils, and rainfall, and are well suited to the growing conditions found in different regions across North America. Likewise, wildlife associated with grasslands are adapted to the habitats that native warm-season grasses provide.

When Europeans began to settle the North American prairies in the late 1800s, they converted large tracts of native grassland to crop production and introduced cool-season grasses. They also began suppressing fire, which had been essential to maintaining natural grasslands. Many of the introduced cool-season grasses were hardy and aggressive species that flourished in the North American climate. These species can grow in dense mats that are almost impenetrable by wildlife and consequently are poor providers of nesting and escape cover for many species. One of the most common introduced cool season grasses is fescue, which often carries a toxic endophyte fungus that can cause reproductive problems for both wildlife and livestock.

Modern development continues to change the landscape and destroy natural grasslands. Today, less than 10 percent of the original tallgrass prairie and 30 percent of shortgrass prairie remains. This loss has directly affected native wildlife; many prairie-dependent species are declining, threatened, or endangered. However, new efforts to restore pre-settlement habitats are helping to educate landowners about the benefits of grasslands. Many people do not realize that warm-season grasses can benefit humans and live-



Billy Teels, NRCS

Reconstructed tall-grass prairie

stock as well as wildlife. The deep root systems of native grasses hold soil in place, reducing erosion and decreasing runoff, which helps keep waterways healthy and recharges ground water. When native grasses die, their roots decay and add significant amounts of organic matter throughout the soil, replenishing fertility.

This leaflet serves as an introduction to native warm-season grasses and the benefits they provide to wildlife and livestock. The leaflet also provides an overview of the management of native warm-season grass habitat projects. Landowners are encouraged to consult with natural resource professionals to design the most suitable grassland habitat and associated management techniques for their property.

Benefits to wildlife

Native warm-season grasses provide optimum habitat conditions to more native wildlife species than do cool season grasses. They provide three of the basic habitat requirements of grassland wildlife species – food, shelter, and space. The habitat provided by native warm-season grass species is preferred by

ground-dwelling wildlife such as rabbits, wild turkeys, ring-necked pheasants, northern bobwhites, and a variety of songbirds and small mammals. Table 1 provides examples of some wildlife species associated with native warm-season grasses.

The growth form of native warm-season grasses is a key factor in their wildlife habitat value. The bunch grass open structure provides bare ground between the plants allowing for easy wildlife movement while providing protective overhead cover. Many cool-season grasses, such as tall fescue, grow too densely for easy wildlife movement. This is particularly important for seed eating birds that pick seeds from the ground. Native warm-season grasses provide effective brood rearing habitat for game birds, allowing chicks to move easily on the ground in search of food. Native warm-season grasses are generally associated with a greater number of important food sources, such as broadleaf forbs, legumes, and insects, than are cool-season grasses.

Native warm-season grasses are structurally durable, with stems capable of withstanding heavy loads of snow in the winter. This characteristic provides wildlife with winter cover and decreases winter mortality. Some warm-season grass species will stand upright even under 2 feet of snow.



Victor Love, IBM Boulder, CO

The eastern cottontail uses native warm-season grasses for food and nesting cover.

Warm-season grasses provide ideal nesting cover for many species, which consists of scattered clumps of herbaceous plants interspersed with bare soil or soil with only a light litter layer. Warm-season grasses provide particularly useful nest sites for ground-nesting birds. Their bunching nature provides the type of structure and materials important for nest building. Where warm-season grasses are harvested, typical haying dates of late June to late July enable early nests to succeed before haying. In contrast, haying

Bobwhite quail: A habitat example

Northern bobwhite populations have been in decline in the eastern U.S. since the late 1960s. Shrinking native grasslands, with corresponding increases in forest and pasture, are main causes of this decline. Bobwhite quail require habitat that has clumps of vegetation where they can nest, in close proximity to sparsely vegetated, recently disturbed areas with bare ground where quail chicks can access insects. Good quail habitat consists of native warm-season grasses, particularly broomsedge, Indiangrass, and little bluestem, interspersed with native legumes such as partridge pea, lespedezas, and beggarticks. Ideally, the landscape also provides scattered shrubs, briars, and blackberry thickets for contrast and escape cover. Quail require a minimum of nine inches of overhead cover for nesting, which is easily supplied in stands of well-managed warm season grasses.



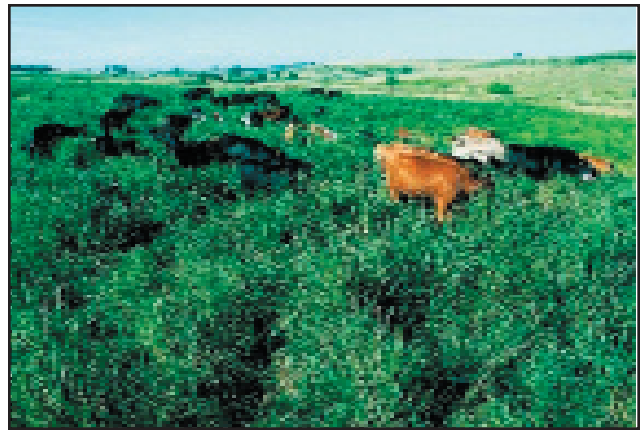
U.S. Fish and Wildlife Service

Native warm-season grasslands provide many of the habitat requirements of the northern bobwhite.

dates of cool-season grasses are much earlier, causing the destruction of many grassland bird nests. Studies have shown that pheasants build 20 percent more nests in switchgrass than in orchardgrass/alfalfa fields. In many regions of the U.S., the use of warm-season grasses has resulted in extraordinary rebounds of several upland game bird populations. The conversion of as little as 5 percent of hayfields to warm-season grasses can increase bird populations 10-fold.

Benefits to livestock

Native warm-season grasses have been shown to be very beneficial for livestock production. Warm-season grasses thrive and provide high quality forage during hot summer months, during which time cool-season grasses are slow growing and unproductive. Approximately 60 to 90 percent of the annual growth of warm-season grasses occurs during June through August, whereas, more than 60 percent of the growth of cool-season grasses occurs before June. Landowners without adequate warm-season grass pastures frequently have to feed hay to their livestock during the height of summer. Some warm-season grasses are more palatable and produce significant-



Lynn Betts, NRCS

Native warm-season grasses provide nutritious forage during hot summer months.

ly higher weight gain in livestock than some popular cool-season grasses. The ratio of weight gain by cattle feeding on big bluestem and switchgrass to those that feed on tall fescue is approximately 2:1. The high productivity of warm-season grasses, combined with their high digestibility (70% or more) and high protein content (6 to 12%) make warm-season grasses a valuable summer forage.

Table 1 Warm-season grassland types and associated wildlife species

	Tallgrass prairie	Mixed prairie	Shortgrass prairie
Region	Corn Belt (Kansas, Oklahoma, Iowa, Minnesota, North Dakota, South Dakota, Wisconsin, Missouri, Illinois)	Great Plains Region (North and South Dakota, Nebraska, Kansas, central Oklahoma, north central Texas)	Montana, eastern Wyoming, Colorado, western Kansas, Oklahoma panhandle, northern Texas, North and South Dakota, Alberta, Saskatchewan
Grasses	Big bluestem, Indiangrass, little bluestem, side-oats grama, switchgrass	Little bluestem, buffalo grass, grama grass	Blue grama, buffalo grass, needle grass
Associated	Pocket gophers, ground squirrels, elk, white-tailed deer, mule deer, rabbit, coyote, greater prairie-chicken, sandhill crane, logger-head strike, waterfowl	Pronghorn, black-tailed jackrabbit, desert cotton-tail, coyote, eastern cottontail, mule deer, white-tailed deer, prairie dog, ground squirrel, gopher, burrowing owl, grassland birds	Prairie dog, pronghorn, swift fox, bison, black-tailed deer, white-tailed deer, bobcat, cougar, short-horned lizard, rattlesnake, burrowing owl, ferruginous hawk, Swainson’s hawk, golden eagle, sharp-tailed grouse, sage grouse, mountain plover, killdeer

Management

Table 2 provides management considerations for landowners in planting and maintaining native warm-season grasses. Management techniques vary from region to region. Landowners are encouraged to consult local grassland management experts, local conservation districts, state wildlife agencies, or local NRCS offices for more information on site preparation, planting, burning, and grazing management.

Landowner assistance

Financial and technical assistance for native grassland projects are available from an array of government agencies and public and private organizations. Table 3 lists the contact information of organizations that can provide information about grassland manage-

ment, as well as other natural resource projects, and describes their associated conservation incentive programs.

Conclusion

The benefits to both wildlife and livestock from warm-season grasses far surpass the initial investment of time and money to plant and establish them. Native warm-season grasses provide food and nesting and escape cover for a variety of grassland wildlife species. They also serve as valuable summer forage for livestock. With some assistance from local agencies, landowners can plant and maintain warm-season grasses on their properties. Native warm-season grasses provide a relatively low-maintenance land cover alternative that is extremely beneficial to both landowners and wildlife.



Top: Little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*). Bottom: Switchgrass (*Panicum virgatum*), Indiangrass (*Sorghastrum nutans*). Photos courtesy Charlie Rewa, NRCS.

Table 2 Management considerations for native warm-season grasses

Planning	Determine site conditions (soil types, topography, rare plants and animals, existing vegetation, hydrological characteristics) Identify project goals
Obtaining seed	Ensure that purchased seed has been tested by a certifying agency Purchase seed as Pure Live Seed (PLS) and not as bulk seed Consult the PLANTS National Database (http://plants.usda.gov/) for help with seed selection Consult the Plant Materials Program (http://www.plant-materials.nrcs.usda.gov/) for fact sheets and planting guides to select the plant releases that are best suited to a particular area and for source identified or selected releases to use for wildlife purposes Ensure that seed does not contain undesirable species If collecting seed, ensure that collection is legal and that seeds are adapted to local conditions
Site preparation	If necessary, pack the soil with a cultipacker. The site is properly packed when a footprint barely registers in the soil
Planting	For sites smaller than half an acre, seed by hand For sites larger than half an acre, use a native drill seeder, which will reduce labor and costs, plant seed uniformly, and produce consistent successful results
Controlling weeds	Reduce weed competition during the first few years by mowing to allow sunlight to reach developing seedlings. Other methods include plowing, hand pulling, burning, grazing, or applying herbicides
Prescribed burning	Obtain a burn permit before a prescribed burn is performed Because proper timing of burning operations is dependent upon the landowner's objectives, landowners should consult their local NRCS office for assistance with timing of native grass burns Burn rotationally every three to five years To suppress established warm season grasses that get too dense and rank for wildlife benefit, summer or early fall burns will set back warm season grasses
Mowing	Only mow if burning is not an option If mowing is necessary, mow after peak wildlife nesting times on a three to five year rotation. Peak nesting times vary from region to region and can continue through the end of July in some areas
Discing	To suppress established warm season grasses that get too dense and rank for wildlife benefit, use light discing or strip discing to open stands
Rotational grazing	Do not allow warm season grasses to be grazed lower than 10 inches Allow grasses to regrow to approximately 18 inches before they are grazed again Grazing pure stands of switchgrass can be potentially toxic to horses, sheep, and goats

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Table 3 Financial and technical assistance available to landowners with habitat projects

Program	Land eligibility	Type of assistance	Contact
Conservation Reserve Program (CRP)	Highly erodible land, wetland and certain other lands with cropping history; stream-side areas in pasture land.	50% cost-share for establishing permanent cover and conservation practices, and annual rental payments for land enrolled in 10- to 15-year contracts. Additional financial incentives available for some practices.	NRCS or FSA state or local office
Environmental Quality Incentives Program	Cropland, rangeland, grazing land and other agricultural land in need of treatment.	Up to 75% cost-share for conservation practices in accordance with 1- to 10-year contracts. Incentive payments for certain management practices.	NRCS state or local office
Partners for Fish and Wildlife Program (PFW)	Most degraded fish and/or wildlife habitat.	Up to 100% financial and technical assistance to restore wildlife habitat under minimum 10-year cooperative agreements.	Local U.S. Fish and Wildlife Service office
Wildlife Habitat Incentives Program (WHIP)	High-priority fish and wildlife habitats.	Up to 75% cost-share for conservation practices under 5- to 10-year agreements.	NRCS state or local office

References

On-line sources

- Conservation Commission of Missouri. 2002. Questions about native warm-season grasses. <http://www.conserva.state.mo.us/landown/grass/questions/>
- Environmental Media. n.d. American grasslands free teaching guide. http://www.envmedia.com/guides/grasslands/edu-inf-2tallgrass_prairie.htm, http://www.envmedia.com/guides/grasslands/edu-inf-3mixed_prairie.htm, and http://www.envmedia.com/guides/grasslands/edu-inf-4shortgrass_prairie.htm [Accessed 20 December 2004].
- Natural Resources Conservation Service. 2002. Plant Materials Center. <http://plant-materials.nrcs.usda.gov>.
- Natural Resources Conservation Service, Wisconsin. Prairie restoration seeding. 1999. <http://www.wi.nrcs.usda.gov/technote/notes/atn5.pdf>
- The Nature Conservancy. 2002. Berkshire taconic landscape. <http://www.lastgreatplaces.org/berkshire/index.html>
- Nebraska Game and Parks Commission. n.d. Warm season grasses for wildlife. <http://www.ngpc.state.ne.us/wildlife/grass.html> [Accessed 30 May 2002].
- Prairiesource.com. Newsletter resource for information about prairies. 2002. <http://www.prairiesource.com>.
- Tennessee Conservationist Magazine. 1999. The return of native grasses to Tennessee. http://www.state.tn.us/environment/tn_consv/archive/grass.htm
- University of Minnesota Extension Service. 2003. Plants in prairie communities. <http://www.extension.umn.edu/distribution/horticulture/DG3238.html>
- . 1994. Warm season grasses and wildlife. Maryland Department of Natural Resources, Annapolis, MD.
- . 2000. Native plants: Warm season grasses, flowers, and legumes. Natural Resources Conservation Service, Washington, DC.
- Abouguendia, Z.M. 1995. Seeded native range plants. Grazing and Pasture Technology Program, Regina, SK, Canada.
- Brown, R.W. and M.C. Amacher. 1999. Selecting plant species for ecological restoration: a perspective for land managers. pps 1-16 *in* L.K. Holzworth and R.W. Brown, editors. Revegetation with native species. Rocky Mountain Research Station, Fort Collins, CO.
- Capel, S. 1995. Native warm season grasses for Virginia and North Carolina: benefits for livestock and wildlife. Virginia Department of Game and Inland Fisheries, Richmond, VA.
- Davis, K.M., J.M. Englert, and J. L. Kujawski. 2002. Improved plant materials released by NRCS and cooperators through September 2002. NRCS National Plant Materials Center, Beltsville, MD.
- Fuhlendorf, S.D. and D.M. Engle. 2004. Application of the fire-grazing interaction to restore a shifting mosaic on tallgrass prairie. *Journal of Applied Ecology* 41: 604-614.
- Kurtz, C. 2001. A practical guide to prairie reconstruction. University of Iowa Press, Iowa City, IA.
- Moore, K.J. and B.E. Anderson, editors. 2000. Native warm-season grasses: research trends and issues. American Society of Agronomy, Madison, WI.
- Moore, P. n.d. Increase quail numbers through native warm season grasses. Virginia Department of Game and Inland Fisheries.
- Packard, S. and C.F. Mutel. 1997. The tallgrass restoration handbook: for prairies, savannas, and woodlands. Island Press, Washington, DC.
- Shaw, N.L. and B.A. Roundy. 1997. Proceedings: using seeds of native species on rangelands. Society of Range Management 50th Annual Meeting. USDA Forest Service Rocky Mountain Research Station. Ogden, UT.
- Shirley, S. 1994. Restoring the tallgrass prairie: an illustrated manual for Iowa and the Upper Midwest. University of Iowa Press, Iowa City, IA.
- Taylor, P.A. 1996. Easy care native plants: a guide to selecting and using beautiful American flowers, shrubs, and trees in gardens and landscapes. H. Holt, New York, NY.
- Wasowski, S. 2002. Gardening with prairie plants: how to create beautiful native landscapes. University of Minnesota Press, Minneapolis, MN.

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8737 Colesville Road, Suite 800
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(301) 588-8994

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Primary authors: Maureen B. Ryan and Raissa Marks, Wildlife Habitat Council. Drafts reviewed by: Rob Pauline, Wildlife Habitat Council; Charlie Rewa, Natural Resources Conservation Service; Jerry Kaiser, Elsberry Plant Materials Center; Aaron Jeffries, Missouri Department of Conservation; Keith Jackson, Missouri Department of Conservation; John Leif, Rose Lake Plant Materials Center; and Dave Burgdorf, Rose Lake Plant Materials Center.

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