
# Wildlife Considerations When Haying or Grazing Native Warm-Season Grasses

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Native warm-season grasses (NWSG) are recommended for livestock forage as well as cover for various wildlife species. However, the value of NWSG as forage or as cover varies greatly depending on management. This fact sheet summarizes various strategies for managing NWSG as forage for livestock and the associated implications for select wildlife species.

Photo credit, Heather Inman

## Implications of Haying NWSG on Wildlife

NWSG can provide large yields (4-5 tons dry weight per acre) of high-quality hay. However, like all grasses, NWSG must be harvested at the appropriate time or hay quality will be reduced. To achieve an optimum balance of quality and quantity, all grasses should be hayed when flowering heads begin to appear. This stage of growth is called the boot stage.

Tall fescue and orchardgrass are the dominant perennial cool-season grasses (CSG) used in livestock forage systems across the Mid-South. They are similar in growth pattern and timing of maturity. The optimum time to harvest these grasses in the Mid-South is late April through mid-May. However, in practice, this is rarely done as most hay producers cut perennial cool-season grass hay for the first time in mid-May through early June, well after seedheads develop. Phenology of growth and maturity differs among NWSG. Switchgrass and eastern gamagrass are the earliest to mature, flowering in mid- to late May. Big and little bluestem and indiangrass develop later, usually mid- to late June. Thus, bluestems and indiangrass can be harvested for the first time later in the growing season (mid- to late June) than CSG (late April to mid-

May) or switchgrass and eastern gamagrass (mid- to late May). The timing of haying has important implications for wildlife, especially nesting birds.

*Figure 2. Haying during the nesting season can lead to population declines of grassland songbirds, such as this grasshopper sparrow.*

Grassland songbirds require grasslands (including hayfields and pastures) for nesting and rearing young. They do not nest in woods. Grassland songbirds are migratory (eastern meadowlarks are relatively short-distance migrants). Those that nest in the Mid-South include eastern meadowlark, grasshopper sparrow, Henslow's sparrow and dickcissel. They return from wintering areas in April and nesting begins in early to mid-May. On average, a minimum of 23 days is required from nest initiation until young fledge and leave the nest. Thus, haying before early to mid-June will destroy initial nesting attempts. Grassland songbirds attempt to nest two or three times during the spring and summer, depending on species. Initial attempts are most important for sustaining populations, but second and third attempts are critical to maintain populations of some species, especially Henslow's sparrows.

Northern bobwhite also nest in grasslands. The primary nesting season for bobwhites in the Mid-South is May through August. Nesting activity peaks in June and a few nests may be initiated as early as April and as late as September. Thus, haying at any time could have a negative impact on bobwhite nesting success. Recently

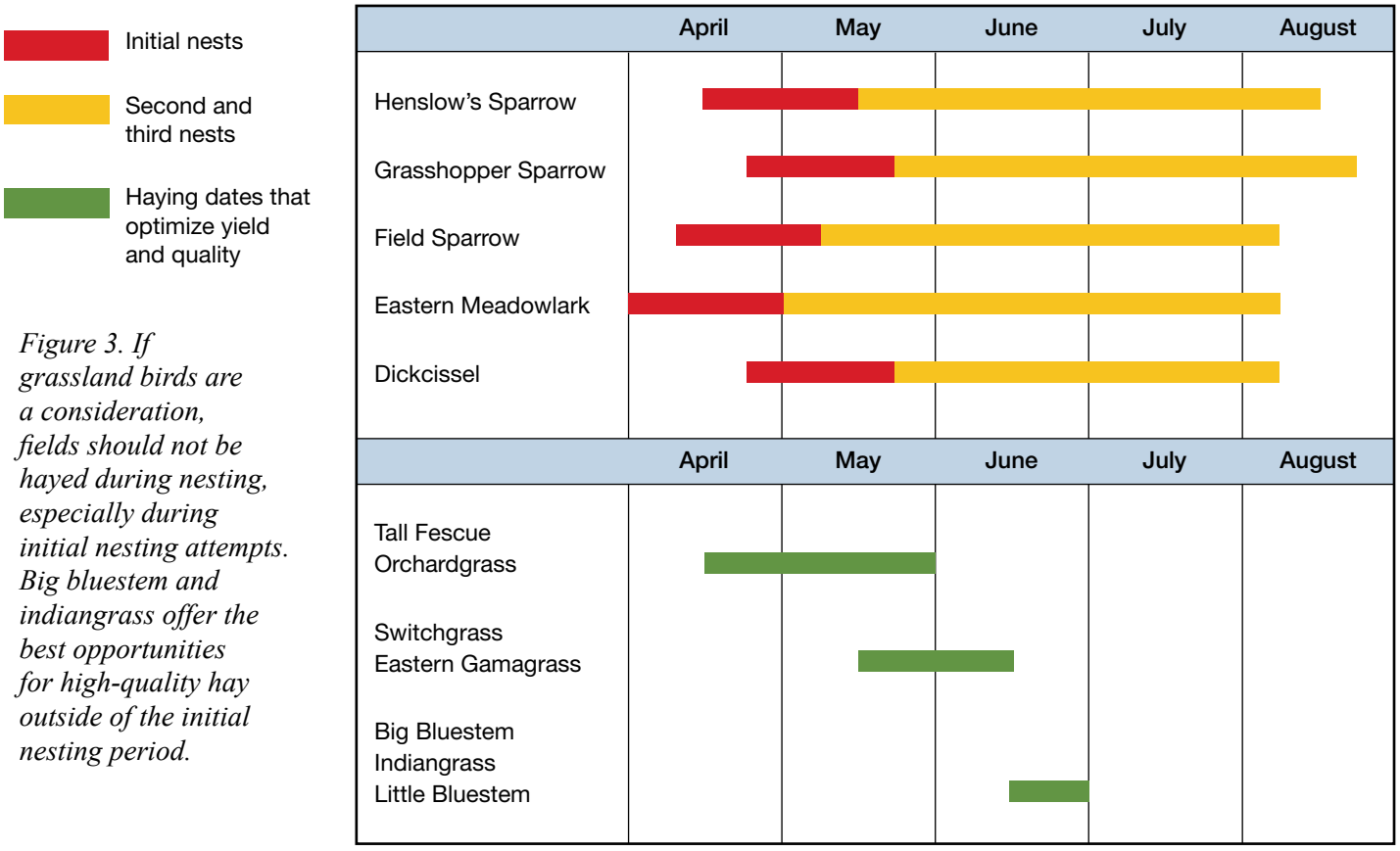


*Figure 3. If grassland birds are a consideration, fields should not be hayed during nesting, especially during initial nesting attempts. Big bluestem and indiangrass offer the best opportunities for high-quality hay outside of the initial nesting period.*

hayed NWSG fields (one to four weeks post-harvest), however, can provide suitable cover for bobwhite chicks to forage, especially if various forbs, such as ragweed and red clover, are present. These forbs enhance cover for broods and attract insects that chicks require for food. Haying removes dense vegetation and opens the structure at ground level, which facilitates movement and feeding across the field. Cutting height should not be below 8 inches to facilitate grass regrowth and cover. It is important to understand that the structure of NWSG near ground level is much more open and conducive to movements and feeding of bobwhite broods than the uniformly dense structure of tall fescue or orchardgrass, whether hayed or not.

Although June through August is the primary period for nesting and brood-rearing for bobwhite and grassland songbirds have finished nesting and brood-rearing by August, haying should not be conducted in August or September if wildlife is a consideration. If the initial hay harvest is conducted this late, hay quality will be exceptionally poor. Further, grass regrowth will not be sufficient to provide winter cover, which is an important consideration for resident birds, such as northern bobwhite, as well as migrating and wintering sparrows (see below).

The majority of white-tailed deer in the Mid-South are born mid-May to mid-June. Deer do not typically fawn in CSG hayfields because the structure is not tall enough, but they may select relatively tall NWSG hayfields for fawning. Fawns remain hidden and still for the first couple of weeks of life. The doe visits the fawn periodically during the day to nurse, but fawns do not begin to travel with does until they are about 2 weeks old. Thus, haying from mid-May through late June is most likely to disrupt or kill fawns lying in the field. If white-tailed deer is a focal wildlife species, haying switchgrass by mid-May would be less likely to disrupt, injure or kill fawns than haying other native grasses later in summer. Haying in mid-May also would remove fawning cover and force does to use other areas.

Eastern cottontails ("rabbits") may use NWSG hayfields for nesting, foraging and loafing. Cottontails may use CSG or NWSG, but the more open structure of NWSG at ground level coupled with better overhead cover make NWSG more attractive to rabbits. Rabbits generally begin breeding in February in the Mid-South and continue through September. However, most young are born during March through July. Females may have seven litters per year. Similar to bobwhite, haying at any time can be detrimental to the reproductive success of rabbits; however, prolific breeding helps offset failed attempts. Young remain in nest for nearly three weeks until weaned. Haying only once per year is an important consideration if eastern cottontail is a focal species.

*Figures 4a and 4b. Structure at ground level is a major consideration for several wildlife species, such as northern bobwhite. The open structure presented by NWSG (left) allows movement and feeding within the field, whereas the structure provided by tall fescue (right), orchardgrass and bermudagrass restricts use by many species.*

*Figures 5a and 5b. Eastern cottontails may use NWSG hayfields for nesting (left) and winter cover (right), provided there is sufficient overhead cover.*

Both CSG and NWSG are usually hayed twice during spring and summer. Frequency of mowing affects the number of nesting attempts and nesting success as well as subsequent winter cover. Haying NWSG past early August does not allow sufficient regrowth to provide suitable cover for birds during fall and winter. A variety of migrating and wintering sparrows (including white-crowned sparrow, white-throated sparrow, Lincoln's sparrow, savannah sparrow, field sparrow, Vesper sparrow and fox sparrow) and other songbirds feed and roost in NWSG hayfields during fall and winter if there is sufficient overhead cover. Grass cover at least 18 inches tall is generally required to attract these migrating and wintering birds. If hayed in late May and again in late June or early July, eastern gamagrass and switchgrass could be hayed twice during the growing season and likely produce enough winter cover for birds, but nesting success would be sacrificed. Thus, forage producers who want to integrate bird conservation with forage management should consider growing bluestems and indiangrass and hay those fields only once per growing season. This strategy would allow grassland birds an initial nesting attempt and provide sufficient regrowth for winter cover.

*Figures 6a and 6b. The big bluestem/indiangrass field on the left was hayed twice with the second cutting in September. The big bluestem/indiangrass field on the right was hayed once in late June. The regrowth from September until dormancy is not enough to provide winter cover, whereas the regrowth from late June until dormancy provides good winter cover for grassland birds.*

## Harvesting Switchgrass for Biofuel

Switchgrass also is being used as a biofuels crop. Switchgrass harvest for biofuels is completed in November after the grass is dormant. However, it is possible to harvest switchgrass for livestock hay in May and harvest the regrowth the following fall and winter as a biofuel. The subsequent biofuels harvest yield may be reduced slightly, but the trade-off for a large yield of high-quality hay may be worth the reduction in biofuels yield. If a hay cutting is completed, nesting success will be sacrificed as discussed earlier. However, if switchgrass is only harvested in fall and winter for biofuels, then nesting will not be impacted. The timing of a biofuels harvest can impact winter cover, just as the timing of haying can impact nesting cover. If a biofuels harvest is implemented in November, winter cover is eliminated. If harvest is delayed until late winter, migrating and wintering birds and other wildlife may use the cover throughout winter. Delaying switchgrass biofuels harvest until late winter should not reduce yield significantly unless snowpack or other weather events causes the switchgrass to lay over near the ground such that it cannot be harvested with equipment.

## Implications of Grazing NWSG on Wildlife

The primary implications of grazing NWSG on wildlife are related to structural characteristics of the available cover. Grazing is typically initiated in late April or early May when NWSG height is approximately 15 inches tall. If grazing is initiated earlier, grass growth and livestock performance may be reduced. If grazing is initiated later, the grass will be overmature and stemmy; thus, not as palatable and less nutritious. Grass height should be maintained between 14-30 inches tall, depending on species, for optimum productivity and to provide sufficient structure for nesting birds.

Grassland songbirds tend to select grasslands with average structure not taller than about 36 inches for nesting. Thus, consistent grazing at moderate stocking rates (2.25 animal units per acre) through the growing season is preferable to high-intensity, short-rotational grazing for grassland songbirds. This strategy also is preferable for northern bobwhite because consistent grazing also creates more open structure at ground level, facilitating movement and feeding through the pasture, while maintaining overhead cover. Relatively open structure at ground level also is advantageous for grasshopper sparrow and eastern meadowlark. Further, livestock density required to maintain a 14- to 30-inch forage canopy height for season-long grazing does not impact nest success through nest trampling.

Short-term grazing of switchgrass during the early portion of the growing season followed by cessation of grazing to allow regrowth for a biofuels harvest is possible. Structure for nesting during the grazing period should be sufficient, but grass height and density quickly increase (within two weeks) after grazing ceases, decreasing the attractiveness of the site for nesting by some species and for brooding northern bobwhite. Grazing throughout the growing season is recommended where bird conservation is a consideration.

*Figures 7a and 7b. NWSG grazed properly looks differently than the intensively grazed CSG, which is ubiquitous across the Mid-South region. Notice the height of the forage and the open space near ground level. This type of structure is critical if wildlife is a consideration. The presence of various forbs, such as this red clover and ragweed, not only adds livestock forage value, but also enhances the structure and food availability for wildlife.*

*Figures 8a and 8b. Eastern meadowlark (left), northern bobwhite (right) and grasshopper sparrow all construct their nests on the ground. Nests are usually made of dead grass leaves from the previous year.*

Duration of grazing is an important consideration for continued grass productivity as well as winter cover for migrating and wintering birds. Optimally, NWSG should not be grazed past early August to allow sufficient growth for winter cover. At this point, livestock grazing NWSG can be moved to CSG pasture that has rested through the summer.

## Using Prescribed Fire to Manage NWSG Forages

Prescribed fire is often used late in the dormant season (late March or early April in the Mid-South) to stimulate grass growth and improve forage quality in NWSG forage stands. Prescribed fire also removes accumulated dead plant material (litter) and creates more open conditions at the ground level, which is important for several wildlife species, including northern bobwhite, grasshopper sparrow, wild turkey and eastern cottontail.

Several species, including eastern meadowlark, Henslow's sparrow, grasshopper sparrow, northern bobwhite and eastern cottontail, typically use dead grass leaves from the previous year's growth to construct their nests. Thus, only a portion of fields should be burned each year to ensure optimal nesting conditions.

## Landscape Considerations

No discussion of grasslands and associated wildlife would be complete without mentioning area requirements. Most grassland bird species require relatively large tracts of grasslands. Small fields in a landscape dominated by forest will not attract species such as eastern meadowlark and grasshopper sparrow, regardless of grass type or management. Field size also is influential. Henslow's sparrows and eastern meadowlarks may be found in relatively small fields (10-20 acres and larger), whereas grasshopper sparrows are found more often in larger

*Figure 9. Prescribed fire rejuvenates NWSG growth and enhances the structure at ground level for several wildlife species, including northern bobwhite.*

*Figure 10. Grassland birds require open landscapes. Do not expect to find grassland birds using small fields in areas dominated by forest.*

fields. Nonetheless, occurrence of these species is much greater in open landscapes as opposed to predominantly forested landscapes.

## Conclusions

Forage producers who have an interest in wildlife have management options using NWSG that can enhance habitat for various wildlife species. Producers should realize that trade-offs must be made if wildlife is a consideration. Multiple hay cuttings and intensive long-duration grazing that leaves low residual heights, as are customary with tall fescue and bermudagrass pastures, are not possible if wildlife is a consideration. However, large yields of high-quality hay should be expected with NWSG. Timing of management is the key. The greatest opportunity for wildlife and NWSG forage production is through grazing. Regardless of species (big and little bluestem, indiangrass, switchgrass and eastern gamagrass), moderate season-long grazing provides excellent habitat for grassland songbirds and northern bobwhite. Cattle weight gains are considerably greater grazing NWSG (1-2 pounds average daily gain) during summer than CSG (0.4-0.5 pounds average daily gain). Moreover, if CSG pastures are rested through the summer, they are in better shape for grazing at the end of the summer.

**Refer to the following publications for additional information on producing and managing native warm-season grasses for livestock, wildlife and biofuels.**


Ashworth, A.J., P.D. Keyser, F.L. Allen, G.E. Bates, and C.A. Harper. 2012. Intercropping legumes with native warm-season grasses for livestock production in the Mid-South. UT Extension, SP 731-G. 8 pp.

Bates, G.E., P.D. Keyser, C.A. Harper, and J.C. Waller. 2007. Using switchgrass for forage. University of Tennessee Extension, SP 701-B. 4 pp.

Birckhead, J.L. 2012. Avian habitat response to grazing, haying, and biofuels production in native warm-season forages in the Mid-South. Thesis. University of Tennessee. 61 pages.

Doxon, E.D., P.D. Keyser, G.A. Bates, C.A. Harper, and J.C. Waller. 2011. Economic implications of growing native warm-season grasses for forage in the Mid-South. UT Extension, SP 731-E. 7 pp.

Harper, C.A., G.E. Bates, M.P. Hansbrough, M.J. Gudlin, J.P. Gruchy, and P.D. Keyser. 2007. Native warm-season grasses: Identification, establishment, and management for wildlife and forage production in the Mid-South. UT Extension, PB 1752. 189 pp. ISBN 978-0-9795165-0-4

Harper, C.A. and P.D. Keyser. 2008. Potential impacts of switchgrass grown for biofuels on wildlife. UT Extension, SP 704-A. 4 pp.

Keyser, P.D., G.E. Bates, J.C. Waller, C.A. Harper, and E. Doxon. 2011. Grazing native warm-season grasses in the Mid-South. UT Extension, SP 731-C. 8 pp.

Keyser, P.D., G.E. Bates, J.C. Waller, C.A. Harper, F. Allen, and E.D. Doxon. 2011. Producing hay from native warm-season grasses in the Mid-South. UT Extension, SP 731-D. 8 pp.

Keyser, P.D., C.A. Harper, and G.E. Bates. 2012. Competition control in native warm-season grasses grown for livestock forage in the Mid-South, SP 731-F. 12 pp.

Keyser, P.D., C.A. Harper, G.E. Bates, J.C. Waller, and E.D. Doxon. 2011. Native warm-season grasses for Mid-South forage production. UT Extension, SP 731-A. 8 pp.

Keyser, P.D., C.A. Harper, G.E. Bates, J.C. Waller, and E. Doxon. 2011. Establishing native grass for livestock forage in the Mid-South. UT Extension, SP 731-B. 8 pp.

Waldrop, T.A. and S.L. Goodrick. 2012. Introduction to prescribed fire in southern ecosystems. USDA Forest Service, Southern Research Station. Asheville, NC.


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Support for this publication was provided by the Natural Resources Conservation Service through a Conservation Innovation Grant.

SP 731-D (Rev.) 06/15 500 15-0196 E12-4915-00-006-15