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Management Considerations for Grassland Birds in Northeastern Haylands and Pasturelands

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Introduction

Grassland birds are a suite of species whose ecology and natural history are intimately tied to habitats dominated by grasses and forbs, with little or no woody vegetation. Although all species use grasslands, the habitat requirements of the different species vary from the bobolink, which prefers grass-dominated fields, to the horned lark, which requires a significant proportion of bare ground, to the sedge wren, which uses moist fields that may even hold standing water. This Wildlife Insight focuses on those species that solely use grassland habitats, in particular the bobolink and Savannah sparrow, two species that are commonly found in working agricultural grasslands and serve as models for how agricultural practices can provide benefits for grassland birds. Although grasslands provide foraging habitat for cavity-nesting species, such as the American kestrel, eastern bluebird, and tree swallow, emphasis is on management practices for those species whose entire life history is dependent on grasslands.

In the Northeastern United States, the presence of grassland birds is a relatively new phenomenon. As most of the region was forested at the time of European colonization, habitat for these species was limited. Although these species have probably always been present in the region, historical populations were likely small and localized. Beaver activity, agricultural practices by Native Americans, natural disturbances (fire, hurricanes, ice storms, etc.), and remnant savannahs and barrens all provided habitat for these specialists. However, as land clearing for agriculture began in the 1600s, populations of these species found suitable habitat in the Northeast, and their populations likely reached peaks in the region in the late 1800s and early 1900s.

Since that time, grassland bird populations have declined as a result of decreased habitat quantity and quality. In the Northeast, the acreage of agricultural land has steadily declined since the late 1800s. More than any other factor, this loss of habitat has likely been the primary factor in long-term population declines for these species. More recently, two other factors have negatively impacted habitat quality for grassland birds. First, related to the decline of the agricultural industry, northeastern grasslands have become increasingly fragmented. As farms are abandoned, forest succession and development have led to landscapes with varied land uses. This spatial pattern has led to habitat patches that are either unsuitable for species that require large acreages of grassland or decreased habitat quality as a result of more edges and greater predation pressure. Second, earlier and more frequent hay harvests do not provide sufficient time for birds to complete their nesting cycle. In a 2001 survey, more than 70 percent of Vermont dairy farmers stated that they cut their fields earlier and more frequently than 30 years ago. In fact, about 50 percent cut their fields earlier and more frequently than just 10 years ago. This is due in part to improvements in fertilizers and pest control as well as increased use of alfalfa as a forage crop, which can withstand earlier and more frequent harvests (Troy et al. 2005).

As a result of these changes in habitat quality and quantity, populations of grassland birds in the Northeast, such as the Savannah sparrow (fig. 1), have declined dramatically since the mid-1960s. Population trends for grassland birds in the U.S. Fish and Wildlife Service's Region 5, which extends from Virginia north through Maine, are negative for 8 of 10 species. Population declines of more than 80 percent have been documented for eastern meadowlark, vesper, grasshopper, and Henslow's sparrows over the last 40

Figure 1 Savannah sparrow

Photo courtesy of Noah Perlut, University of Vermont

years. Because of these significant population declines, grassland bird populations have been targeted as priorities for three physiographic regions in the Northeast through the Partners in Flight Bird Conservation Plans. However, most of the suitable habitat for grassland birds is held in private ownership. Thus, the long-term viability of their populations will be dictated by management activities on farms and other privately owned grasslands.

Grassland birds and agriculture—an intimate connection

The habitat requirements of grassland birds are diverse (see NRCS Fish and Wildlife Habitat Management Leaflet Number 8, Grassland Birds, available online at ftp://ftp-fc.sc.egov.usda.gov/WHMI/WEB/pdf/GRASS1.pdf; however, several key habitat characteristics are common to all of these specialists.

- Grassland birds tend to show higher densities in fields that are dominated by grasses. Thus, pure stands of alfalfa and row crops support lower abundances of grassland birds. Additionally, fields dominated by goldenrod and thistle show lower densities.
- Most species of grassland birds will cease to use fields in which there is encroachment of woody plants. Thus, if fields are left uncut for 3 to 5 years, colonization by shrubs and saplings will lead to a gradual decrease in habitat quality for these grassland birds.
- Many grassland birds are area sensitive. Thus, management of habitat for grassland birds on parcels of grass less than 25 acres will result in lower species diversity, as many of the species that require larger patches will not be present. However, 10-acre fields will still support some of the more common species of grassland birds.
- The composition of the landscape surrounding the field is also important. Fields that are surrounded by forests and developments support lower densities of grassland birds. Management practices to improve habitat quality for grassland birds will be most successful in agricultural landscapes.

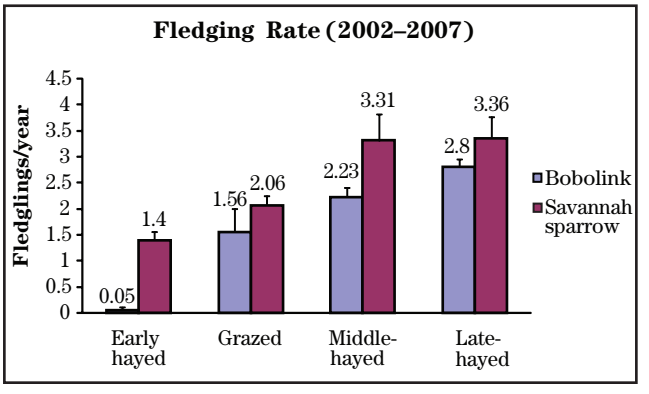
Current agricultural practices, particularly pasturing and forage harvest, are initiated in spring when forage quality is highest. This is the time of year when grassland birds begin their nesting activities; thus, there is an inherent conflict between agricultural management and grassland bird conservation. Although some farmers may not have the flexibility to alter their management practices, there are a number of opportunities to maintain or improve habitat quality for grassland birds while simultaneously retaining the economic value of working agricultural landscapes. Many of the decisions will be specific to the objectives and management goals of the landowner and land manager. However, with a diversity of management options available, opportunities exist in nearly all situations for improving habitat quality for grassland birds.

Demographic responses to changes in management intensity

The production of hay for livestock forage crops has led to the creation of vast acres of habitat for grassland birds. Although many species are attracted to these areas for nesting, the value of the habitat is determined by the way in which it is managed. The primary determinant of habitat quality is the intensity of cutting and grazing. This research focused on the effects of these two management practices on bobolinks and Savannah sparrows. Although responses to management will vary by species, bobolinks and Savannah sparrows are good indicators of the effects of agricultural management on the grassland bird community as a whole (Zalik and Perlut 2008).

A primary finding is the strong correlation between management intensity and two critical population parameters: birth rate and survival rate. Fields cut early in the nesting season (prior to June 12) show both low birth and survival rates of adults, especially when there are second and third cuts throughout the nesting season. By contrast, fields cut after August 1 show much greater birth rates and survival rates. Rotationally grazed pastures and fields cut for the first time during the middle of the breeding season (June 21–July 10) show intermediate values (fig. 2). Thus,

Figure 2 Fledging rates of bobolinks and Savannah sparrows based on haying and/or grazing times



for bobolinks and Savannah sparrows, fields managed intensively throughout the nesting season are unlikely to support populations that are viable in the long term, whereas grazed fields and fields cut later in the nesting season can provide adequate reproductive success to enable populations to sustain themselves over time (fig. 3).

Timing of management activities

The nesting phenology of grassland birds varies regionally, with birds nesting earlier in more southerly latitudes and later further north. Additionally, weather and management activities in the previous year can also influence timing of nesting activities. Figure 4 shows the nesting phenology of bobolinks and Savannah sparrows breeding in a hayfield in Vermont, which was cut in August, after the breeding season. The

Figure 3 Survival rates of female and male Savannah sparrows and bobolink based on haying and grazing times

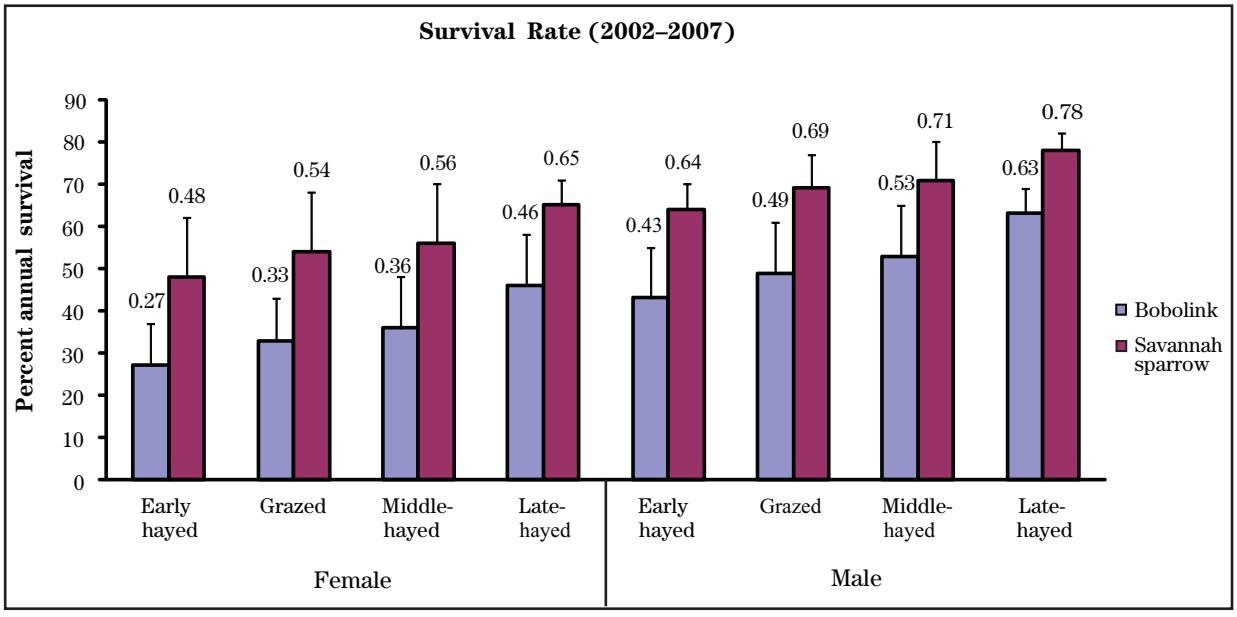
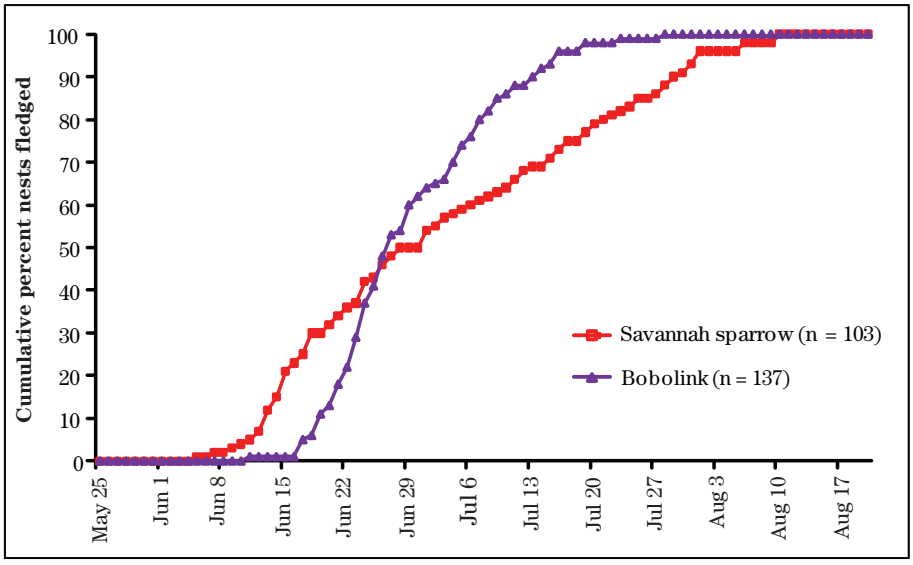


Figure 4 Cumulative nests fledged by Savannah sparrows and bobolinks cut in August after breeding season



graph enables a manager to assess what proportion of a nesting population has fledged young by a particular date. For Savannah sparrows, the earliest observed fledging date was June 5, and the latest was August 10. For bobolinks, the earliest fledging date observed was June 11, and the latest was July 28. For example, if a farmer was planning a first cut on June 15, nearly 25 percent of Savannah sparrow nests would have fledged young, but only about 1 percent of bobolink nests would have fledged young. Additionally, if a farmer wanted to delay cutting to allow for a particular proportion of nests to fledge young, the graph can be used in a similar way. For example, to enable 70 percent of the Savannah sparrow nests to fledge young, cutting could occur about July 1, whereas cutting would need to be delayed until about July 13 for about 70 percent of bobolink nests to fledge. Importantly, the ability of these birds to fly once they leave the nest is limited.

Although this figure accurately represents the time at which young birds leave the nest, an additional 7 to 10 days may be necessary for them to be able to fly well enough to escape mowing machinery.

The goals of the farmer are the primary driver as to whether cutting can be delayed. Although the timing of cutting is critical to the nesting success of grassland birds, many farmers have limited flexibility in their ability to delay cutting because of reduced forage quality. Crude protein content of forage decreases by 0.05 to 0.3 percent with each day harvest is delayed. Variability in forage protein content is related to forage crop, weather, and soil characteristics. Further, protein requirements for livestock vary depending on size, age, breed, stage of development, and condition of the animal (particularly whether the animal is lactating). Generally, protein requirements are greatest for milking dairy cows and lower for dry dairy cows, beef cows, horses, and sheep. Thus, farmers with livestock with lower protein demands will have more flexibility in delaying their harvest to allow nesting success of grassland birds. Where possible, delay until mid-July, after most of the nesting activity of grassland songbirds is complete. However, harvests in early July will still allow for some reproductive success. For fields cut after the nesting season in mid-August, there may be markets for low-quality hay such as bedding, mulch, barriers for erosion control and, perhaps in the future, biofuels.

Late-cut refuges

Although many of the decisions about timing of cutting are made with respect to forage quality, forage quantity is also an important consideration. For farmers with relatively constant herd sizes and forage demands, consistent harvest of excess hay can have financial implications, particularly with rising fuel costs. If farmers are consistently producing more hay than can be used by the herd, there may be opportunities to forego harvesting forage on wet sites or sites with low soil fertility to provide habitat for songbirds. This strategy can allow harvest on the most productive sites while delaying cuts on less productive sites that still harbor nesting birds. Further, if only a portion of a field needs to be cut, harvesting only the outside edges of the field maintains tall grass and nesting cover in the center of the field where nesting density is generally greatest. One important consideration in this management strategy is the strong fidelity of grassland birds to nesting sites. In Vermont, more than 90 percent of bobolinks and Savannah sparrows returned to the field in which they nested in the previous year. As a result of this site faithfulness, over time, late-cut refuges will attract more birds, which will make populations vulnerable to changes in management. Consequently, if farmers switch to a late haying strategy on a particular field, it is best to maintain this strategy over the long run. There is evidence that grassland birds can nest successfully in relatively small patches of late-cut hayfields, especially if these are embedded in a larger agricultural landscape. If farmers can create small refuges on their farm, the best strategy is to select areas in which there is significant bird activity. Bobolinks are highly noticeable black, white, and yellow songbirds with a conspicuous flight display. Their activity patterns can be used to indicate suitable nesting habitat for numerous grassland species, which can then be designated as a late-cut site. Late-cut patches should be as large as possible (a minimum of several acres in size), away from forested edges that attract predators, and managed consistently from year to year. These areas can be set aside in fields with lower productivity to minimize loss of forage (Masse, Strong, and Perlut 2008). For example, wet portions of fields may be cut later in the nesting season to allow successful reproduction of grassland birds. Note, however, that fields that are wet enough to support primarily sedges or reed canarygrass generally support a lower diversity of grassland birds. Late-cut refuges may be particularly useful for farmers that have rare species on their property. Upland sandpipers (fig. 5), short-eared owls, and grasshopper and Henslow's sparrows have shown steep declines throughout much of their range in the United States, and landowners are encouraged to work with NRCS wildlife biologists, local Audubon chapters, or bird clubs to assess whether these species are present on their property.

Figure 5 Upland sandpipers

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Delayed second cuts

By more fully assessing the requirements of forage quality and quantity for the herd, there may be additional avenues that are available for farmers to develop and maintain nesting habitat for grassland birds. The typical nesting cycle for grassland birds is about 42 days, with up to 7 to 10 days of additional time necessary for young to fly well enough to evade harvest machinery. Because most hay cutting cycles are 35 to 42 days, there is insufficient time for birds to successfully raise young between harvests. This is especially true for species like bobolink, which will not come back to nest on cut fields until the grass has grown tall enough to provide nesting cover (approximately 14 days). Thus, there may be opportunities for farmers to cut hay early in the season and delay their second cut by approximately 65 days (14 days for regrowth plus 42 days nesting cycle plus 9 days for young to develop flight capabilities). This strategy may be used in situations where farmers need some high-quality forage, but might have uses for lower quality late hay for dry cows or horses. Because of the delay in the second harvest, there will also be increases in volume of the harvest, so this should be taken into consideration in management plans. However, on fields that are highly productive, a third cut with high-forage quality may be possible in the fall. To make this practice fully functional, two additional considerations are important. First, the early cut should be no later than June 1; completion of cutting in May will lead to greater nesting densities of grassland birds. If cutting is delayed into mid-June, the field will not be recolonized by bobolinks during that nesting season. Second, accounting of the 65-day delay should be initiated at the time of the last management activity on the field. Thus, if manure or lime is applied to the field following cutting, the 65-day delay should start from the time of fertilizer application to initiation of the second cut. As such, it is important to apply lime or manure as close to the time of the first harvest as possible to maximize the window of opportunity for renesting; within 1 to 3 days is optimal (Zalik and Strong 2008).

In Vermont, the NRCS has formalized delayed second cuts into their Environmental Quality Incentives Program (EQIP), such that farmers receive a $135 per acre incentive payment (as of 2010) each year for 3 years for a delayed second cut. Farmers are required to enroll parcels of 20 or more contiguous acres, with all management activities related to the first cut completed by June 2. Other requirements include limited reed canarygrass and blocky field shape to minimize edge.

Grazing

Reproductive success of bobolinks and Savannah sparrows is greater in pastures than in early cut fields, but lower than in fields that are cut from late June through the end of the season. In general, the intensity of grazing is negatively correlated with the reproductive success of grassland birds. As stocking and rotation rates increase, the chance that nests will be trampled or abandoned as nesting cover is decreased through grazing becomes greater. Typical rotation periods of 25 to 30 days are not long enough to allow nesting by grassland birds, as most songbirds have nesting cycles of 42 days. The simplest solution to providing habitat for grassland birds in a grazing system is to leave fallow paddocks. If pasture availability and forage demands allow this strategy, siting fallow paddocks centrally, away from farm buildings and forested edges in areas with minimal encroachment by shrubs will provide the best nesting habitat. These sites can be mowed after the nesting season to provide low-protein forage for dry cows, beef cattle, or bedding. To maximize reproductive success by grassland birds, keeping paddocks free from livestock for 60 to 65 days will allow for sufficient time to enable reproductive success, assuming the paddock was grazed in April or early May, prior to the return of migrating birds. If the paddock remained fallow from the beginning of the growing season, then grazing, mowing, or clipping can begin in early to mid-July. Similarly, if clipping or mowing is necessary to improve forage quality within grazed paddocks, it is best to delay this operation until mid-July when most nesting activity has been completed. Overall stocking rates of one head per acre are optimal to prevent overgrazing. Allowing grazing to approximately 5 inches will also prevent overgrazing and leave some nesting

cover for grassland birds. Thus, light grazing to reduce the probability of trampling or abandonment of nests will provide the best habitat in pastures (fig. 6).

Landowners with limited demands for forage

For landowners that are not producing forage for livestock, there are substantially more options that balance management objectives with birds' habitat requirements. For landowners that may own large (20 to 30-acre) parcels that are in early successional habitat, managing for grassland birds is generally straightforward. Cutting after the breeding season (August 15) maintains the habitat in early successional conditions while allowing sufficient time for birds to complete their nesting cycle. To maintain optimal conditions, it is best if cuts are conducted annually and the hay is removed. This keeps encroachment by shrubs to a minimum and provides better conditions for growth of grass in the spring. If stubble is not removed, forbs tend to out-compete grasses, and fields take longer to green up in the spring and are not as attractive to grassland birds when they first arrive on the breeding grounds. Potential conflicts may arise if landowners are reliant on farmers for maintaining their grassland, as the forage may be important to the farmer's herd. In these cases, landowners may be able to arrange for later cutting dates if the farmer has uses for lower quality forage. Alternatively, the landowner may investigate some of the cost-share programs administered by the NRCS such as the Wildlife Habitat Incentives Program (WHIP). WHIP provisions vary from State to State, but landowners may receive a 75 percent cost-share from the NRCS for implementing a delayed cutting practice on their property to enhance habitat for grassland birds and other wildlife.

Landscape and field configuration

Many species of grassland birds are area sensitive, such that they require fields that are substantially larger than a single territory to induce settlement in a patch. Thus, the larger the size of the field, the more likely grassland birds will use the patch for nesting. Although minimum patch sizes for grassland birds vary from region to region, as a general rule, fields of 20 to 25 acres that are generally square to circular in shape provide suitable habitat for grassland birds (fig. 7). Long, narrow fields contain substantial edge habitat and may not attract nesting birds. Research has shown that birds generally avoid nesting within 98 to 164 feet of wooded edges, thus, fields must be greater than 328 feet wide to provide nesting habitat. Landscape patterns are also important. Most research has shown that if agricultural habitats are the predominate land use in the area, birds will use smaller fields as nesting habitat. Again, definition of the landscape varies from region to region, but research suggests that evaluation of the surrounding 150 to 200 acres around a hayfield or pasture provides a good assessment of the landscape. If this area is predominately forested or developed, the density of grassland birds will be diminished, relative to landscapes that are dominated by agriculture.

Figure 6 Grassland birds show moderate reproductive success on rotationally grazed pastures.

Photo courtesy of Dr. Allan Strong, University of Vermont

Figure 7 Management for grassland birds will be most successful in landscapes dominated by agriculture.

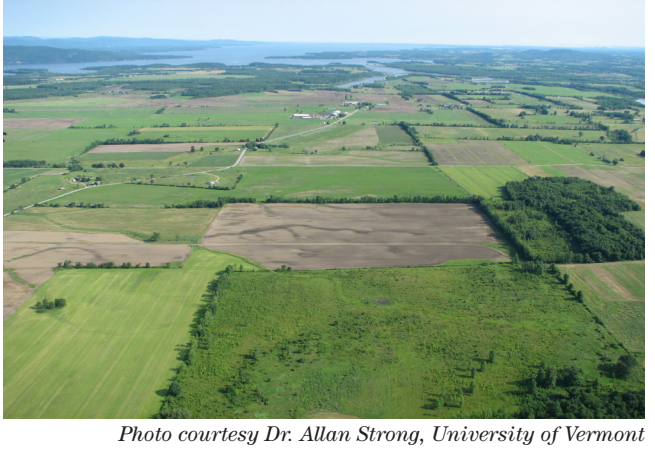
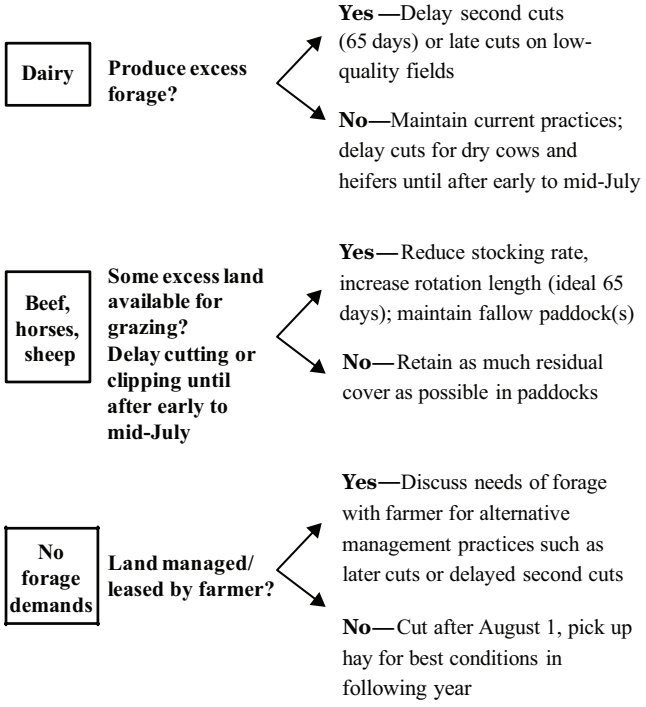


Photo courtesy Dr. Allan Strong, University of Vermont

Summary

There are a variety of options available to farmers and other landowners that can provide high-quality habitat for grassland birds. Because each landowner has different goals and objectives for their land, there is no single formula that can be applied to all situations. Farmers must address their own forage needs relative to the requirements of their herd and characteristics of their land. Flexibility will be important, but careful assessment of forage needs versus herd requirements may lead to unexpected benefits such as reduced fuel and storage costs. The strategies presented here are merely guidelines, and variability with respect to characteristics of the farm and the region will also need to be considered. A summarization of the basic management considerations provides simple guidelines for farmers and land managers (fig. 8). Landowners interested in managing their property for grassland birds are encouraged to contact their local USDA NRCS Service Centers and work with their local District Conservationist to create management plans that fit their individual needs.

Figure 8 Simple decision tree for farmers and land managers considering bird-friendly management practices



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