



Research Brief for Resource Managers

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Using fire and grazing to promote bird diversity

Finn C. Pillsbury, James R. Miller, Diane M. Debinski, and David M. Engle. 2011. Another tool in the toolbox? Using fire and grazing to promote bird diversity in highly fragmented landscapes. Ecosphere 2(3): article 28. <http://www.esajournals.org/doi/pdf/10.1890/ES10-00154.1>

Remnant grasslands in the tallgrass prairie region have become increasingly fragmented and homogenized as settlement and agriculture erode their borders. This change in the landscape, and changes to disturbance regimes (including fire and grazing) have negative consequences for many species, including grassland birds.

The management treatments used in this study were motivated by **research that has shown an increase in the population size and diversity of grassland bird species when a fire-grazing interaction is used in the Western tallgrass prairie**. Pillsbury and colleagues hypothesized similar responses would be observed in this study using 13 pastures in southwestern Iowa and northwestern Missouri. The research team compared three management strategies and their effect on grassland bird species richness and density in fragmented landscapes. One of three treatments was applied to each site: patch-burn grazing (historic disturbance- burning different patches each year with free access by cattle), grazed and burned (one complete burn with free access by cattle), and burned only (complete burn). There was a three-year-fire-return interval for all treatments, with a portion of the patch-burned pasture burned every year.

Management Implications

- Patch-burn grazing may effectively create variable forage height and maturity that can benefit grassland bird species though stocking rates must be carefully determined to ensure sufficient residual biomass
- The necessary low stocking rate makes this approach more appropriate on public lands and private recreational lands where profit from livestock is not the main driver
- Grassland bird response to management of grassland structure may remain limited due to factors in the surrounding landscape

Researchers thought that variation in “visual obstruction”, or a diversity of grass heights that included taller, thicker forage, would play a large role in which bird species were present in each treatment. The assumption was that patch-burn grazing would have the greatest range of vegetation height and maturity and would support the highest diversity of grassland bird populations.

Although **bird species’ richness and diversity were not significantly different among treatments, the authors did observe differences in bird community structure**. Birds found in shorter, thin pastures, such as the Grasshopper Sparrow and Eastern Meadowlark were present in the patch-burned grazed areas

whereas birds found in tall, dense pastures such as Sedge Wren, Common Yellowthroat, Dickcissel, and Bobolink, were present in the burned-only areas. Grazed and burned pastures were found to overlap with the other two treatments. One possible explanation for **the reduction in visual obstruction and structural heterogeneity in the patch-burned treatments is the decrease of taller forage resulting from mild overgrazing**, suggesting the stocking rate may have been too high.

The authors also examined the effects of fragmentation, a process found by previous studies to “decrease abundance, nest success, and nest density for many grassland bird species” as patch size decreases and “edges” increase. Pillsbury et al. found that **bird species associated with taller vegetation were also associated with a reduction in landscape fragmentation**. Therefore, those species found in shorter pastures (Grasshopper sparrow and Eastern Meadowlark) may also be less sensitive to fragmentation than others.

Though earlier research suggests that patch-burn grazing enhances species richness, it's important

to note that these studies were conducted on much larger pastures within extensive grasslands typified by western tallgrass prairies, such as the Flint Hills of Kansas.

The reduction in pasture size and the fragmentation of grazing lands in our eastern tallgrass prairies may limit the applicability of other studies to our ecoregion. As the authors themselves admit, “efforts to promote avian diversity in fragmented landscapes are, by their very nature, a daunting challenge.”

To address this important issue on our increasingly fragmented grassland landscapes, future research will continue to focus on patch-burn grazing, but will likely include a reduction in stocking rate to achieve the desired diversity of forage heights and maturity found to benefit grassland bird species in other studies. Reducing stocking rates alone may not produce the same results as other studies, however. As this study highlights, **conducting research specific to our climate and landscape is the only way to explore best practices for our fragmented eastern tallgrass prairie region.**