Grazing Management Practices for Grassland Bird Breeding Habitat in the Shortgrass Steppe

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Figure 1. Thick-billed Longspur, Grasshopper Sparrow, and Horned Lark in Weld County, Colorado. Photo by David A. Leatherman.

Rangeland Resources Research in the Shortgrass Steppe

In eastern Colorado, livestock production operations maintain large areas of shortgrass prairie for native vegetation, biodiversity, and wildlife habitat. However, balancing agricultural production with conservation remains challenging in complex rangelands. Ongoing long-term research near Nunn, Colorado has shed light on interactions among grazing management strategies, grassland bird habitat, and climatic variability[1]. This research provides information for livestock managers to help improve rangeland health[2], livestock productivity[3], and grassland bird conservation[4].

The United States Department of Agriculture - Agricultural Research Service's Central Plains Experimental Range (CPER) has been a home for research on rangeland beef production and soilplant communities since it was established in 1937 in response to the Dust Bowl. For eighty years, CPER scientists have worked to improve rangeland management for beef cattle production. In recent years, scientists have also focused on supporting habitat for grassland-breeding birds of the shortgrass steppe. Among these bird species are thick-billed longspur (Rhynchophanes mccownii), grasshopper sparrow (Ammodramus savannarum), and horned lark (Eremophila alpestris) (Fig. 1). Using long-term studies coproduced with rangeland stakeholders[5], scientists at CPER determined how grazing management strategies create different types of vegetation structure, which in turn support habitat needs of grassland birds.

Ecological Sites

https://esis.sc.egov.usda.gov

Loamy Plains

Site ID: R067BY002CO

https://edit.jornada.nmsu.edu/cat alogs/esd/067B/R067BY002CO

Sandy Plains

Site ID: R067BY024CO

https://edit.jornada.nmsu.edu/cat alogs/esd/067B/R067BY024CO

Salt Flat

Site ID: R067BY033CO

https://edit.jornada.nmsu.edu/cat alogs/esd/067B/R067BY033CO



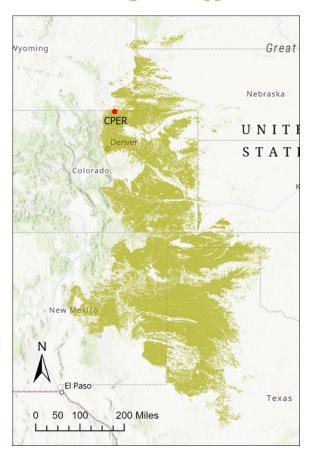
Grassland Birds of the Shortgrass Steppe

The thick-billed longspur is an eastern Colorado grassland bird in significant population decline. In terms of abundance and range size, this species is declining faster than most other grassland-breeding birds in North America [6]. Thick-billed longspurs arrive to Colorado in April from their wintering grounds in the southwestern United States and northern Mexico and stay until they complete their nesting cycle by August. Thick-billed longspurs nest on the ground in very low stature (~1.5") vegetation (Fig. 2), which can be maintained by heavy grazing. This vegetation type is usually dominated by perennial warm-season grasses such as blue grama (Bouteloua gracilis) and buffalograss (Bouteloua dactyloides)[7, 8].

Year-long rest from grazing can reduce longspur abundance by allowing the vegetation to grow too tall [9]. Furthermore, if repeated over multiple years, lack of grazing early in the growing season can enable coolseason grasses to increase in abundance relative to the warm-season shortgrasses [8] which reduces habitat for and abundance of longspurs [6, 9].

A second bird species influenced by grazing management in the shortgrass steppe is the horned lark. It is one of North America's most widespread grassland birds. Horned lark breeding habitats are threatened primarily by grassland conversion for development and other losses or changes in grassland habitats. While horned larks are generalists, meaning they are able to nest successfully in both low and medium structure vegetation, they benefit from the same type of grazing management as longspurs because horned larks occur at highest densities in low-structure vegetation dominated by warm-season shortgrass [7,9].

CPER Location & Extent of Shortgrass Steppe



Thick-billed Longspur on Buffalograss



Photo by David A. Leatherman



The grasshopper sparrow has also experienced significant declines over the past 70 years [10]. Unlike the thick-billed longspur and horned lark, the grasshopper sparrow requires tall, perennial bunchgrasses for successful nesting [7]. In eastern Colorado, grasshopper sparrows do best in grasslands with a vegetation height of ~7.5" [11]. In highly productive sites that support western wheatgrass (*Pascopyrum smithii*) and needle-and-thread (*Hesperostipa comata*) with a perennial warm-season shortgrass understory such as Sandy Plains [12] and Salt Flat [13] ecological sites, plants are tall enough to support grasshopper sparrows under normal (i.e., moderate stocking) grazing management (Fig. 2). However, significant rest from grazing is needed to produce appropriate vegetation structure in less productive sites [7], such as Loamy Plains [14].

Western meadowlark (*Sturnella neglecta*) and the Colorado state bird, lark bunting (*Calamospiza melanocorys*), are also considered grassland habitat generalists, but they typically utilize taller-structured vegetation than horned larks for nesting. Unlike our three species of focus, which respond reliably to local shifts in vegetation structure, western meadowlark and lark bunting appear to be influenced more strongly by environmental features, like soils or topography, than by grazing management. In addition, their breeding abundances may be driven by the effects of both local and broad-scale rainfall patterns. For example, the interannual nomadic behavior of lark bunting may be associated with the degree to which rainfall in a given location is greater than the average across their range [6]. Therefore, grazing management for vegetation structure alone may not sufficiently address all species' habitat needs in the shortgrass steppe.

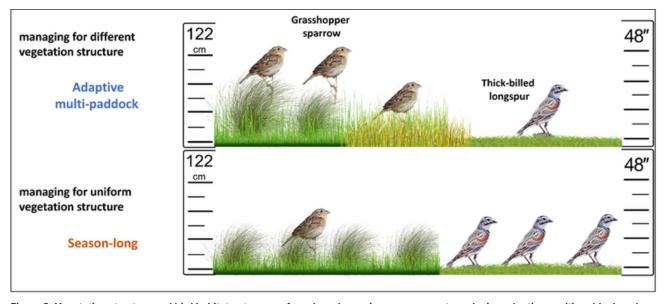


Figure 2. Vegetation structure and bird habitat outcomes of ranch-scale grazing management employing adaptive, multi-paddock and traditional, season-long grazing strategies. Traditional, season-long grazing refers to grazing management where cattle are kept in a single pasture for the entirety of the growing season. Adaptive multi-paddock (rest-rotational grazing) refers to management where cattle are adaptively rotated through multiple pastures throughout the growing season, with some pastures rested. The number of individuals per species indicates relative density per area, while the rulers show approximate vegetation heights as driven by grazing strategy and plant community type. A more productive plant community with a taller structure is shown on the left, whereas a less productive one with a shorter one is shown on the right [1]. Photo by David A. Leatherman.



What Should Managers Do?

Grassland habitat loss, fragmentation, and degradation (e.g., woody encroachment and homogenization of vegetation structure) are the primary reasons for the decline in all the birds mentioned [15]. Here, we show that grazing management can be used to help create and maintain habitat for specific species. One of the most important lessons learned is that in the shortgrass steppe, as in other parts of the Great Plains like the tallgrass prairie, a wide variety of vegetation types are needed to support and enhance habitat for a diverse variety of grassland birds [16]. One grazing management approach alone may not be sufficient to generate this diverse mix of vegetation structures and plant community types. For example, to support thick-billed longspurs and grasshopper sparrows at the ranch scale, it may be necessary to include paddocks with long-term heavy grazing and paddocks with season-long rest. Moreover, other factors such as local and broad-scale precipitation also impact management outcomes. Results from CPER suggest managers could refine grazing management to align with soil types (i.e., ecological sites) and recent precipitation conditions to generate the variety in vegetation across the landscape on which the grassland bird community depends.



Location: 23E (Heavy-grazing, Loamy Plains paddock at CPER). Photo by E.J. Raynor.

Further Reading

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