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A PRELIMINARY SURVEY OF SOUTHEAST NEBRASKA GRASSLAND HABITAT AND POTENTIAL HENSWOW'S SPARROW HABITAT

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INTRODUCTION

The decline in numbers of Henslow's Sparrows in North America (Sauer et al. 2001) is generally considered to be due to reduction in the extent of its preferred breeding habitat, "relatively large fields consisting of tall, dense grass, a well-developed litter layer, standing dead vegetation, and sparse or no woody vegetation" (Herkert et al. 2002). Since 1985, however, the Conservation Reserve Program (CRP) has allowed payments to landowners by the United States Department of Agriculture (USDA) through the Farm Service Agency (FSA) to idle croplands and to seed them to various grasses. This has provided habitat that appears to have stabilized Henslow's Sparrow numbers in some parts of the breeding range (Herkert 1997; Herkert et al. 2002; Reinking 2002; McCoy 2000). Nebraska has 472,000 hectares (1,166,000 acres) of CRP grassland, about four times more than the remaining area of tallgrass prairie (Steinauer and Collins 1996), but most is aging, unmanaged, and less attractive to most grassland birds (Negus 2005).

To better understand the occurrence of Henslow's Sparrow in Nebraska, we surveyed grasslands south and east of Lincoln from May to August 2006. The survey goals were to search for grassland sites that might provide suitable nesting habitat, count Henslow's Sparrows at each site, and use point counts to estimate abundance of Henslow's Sparrows in this region.

METHODS

Location of potential Henslow's Sparrow habitat

The study area covered southeast Nebraska south and east of Lincoln, and included all of Otoe, Johnson, Nemaha, Pawnee, and Richardson Counties, the eastern edge of Gage County, and the southeastern corner of Lancaster County (Figure 1). This area contains a large number of noncontiguous grasslands of varying quality. The largest tallgrass prairie tract in the study area contains some 1400 hectares (3460 acres) in and around Burchard Lake WMA, but is of "fairly low quality", with "very low forb diversity" and "common to abundant cool season grasses" (Steinauer 2003). Geographic Information System (GIS) data layers representing grassland tracts greater than 20 hectares (50 acres) in the study area were provided by Andy Bishop (U.S. Fish and Wildlife Service, Grand Island). In addition, maps of CRP-Managed Access Program (CRP-MAP) areas for each county were used to locate grassland tracts.
I stratified sites as suitable or unsuitable by starting with 279 grassland tracts and then deductively eliminating sites judged as having a lower likelihood of having Henslow's Sparrows. This was done by examining each site from county roads. Sites were judged as unsuitable simply by noting the absence of standing dead material (dead grasses from previous summers), a key breeding habitat requirement of Henslow's Sparrow. In most cases this process was straightforward, as such grasslands were grazed, hayed, or burned during the previous summer or early spring just prior to the evaluation. Sites that had extensive encroachment by woody plants such as Eastern Red-Cedar (Juniperus virginiana), small trees such as Green Ash (Oleaceae fraxinus), dense stands of weeds, or sites with homogeneous stands of European Smooth Brome (Bromus inermis) were also judged unsuitable.

Clearly, this stratification process depends heavily on the judgment of the observer regarding Henslow's Sparrow habitat, and thus introduces bias into the results. This search was designed as a pilot study to obtain baseline information regarding Henslow's Sparrow numbers and distribution; resources were not available for a complete search of every site.

Data collection

Two types of data were collected: 1) simple counts of Henslow's Sparrows found at each location during walk-in inspections, and 2) data derived from point counts. Walk-in inspections involved searching the entire site for areas of suitable habitat for singing birds and observing behavior of any birds found. Wherever Henslow's Sparrows were found, the location was recorded using a handheld Global Positioning System (GPS), and the area around the birds was checked for extent of occupation and simple counts of singing Henslow's. In July and August, sites with Henslow's Sparrows as well as additional sites without sparrows were selected.
randomly from a list of 49 sites (see RESULTS) and were checked using point counts. These counts were conducted at least twice during the breeding season, ending in mid-August.

Point transects were arranged systematically along straight lines within each grassland tract. Points were located at least 90 meters (220 feet) from field perimeters on a grid and points were placed along gridlines 180 meters (440 feet) apart. I recorded all birds during a four minute count. Counts were not run, however, if wind was generally above about 25 km (16 miles) per hour, or the temperature rose above 29° Celsius (84° Fahrenheit).

RESULTS

Grassland Tract Selection

A total of 279 grassland sites were investigated for potential Henslow's Sparrow breeding habitat. Sixty-three sites were judged as suitable. After obtaining permission from landowners, many of these 63 sites were checked on foot. Within each site, all parts of the site that were judged as potentially suitable habitat were searched carefully for Henslow's Sparrows. During this process, the list of 63 sites was reduced to 49, usually because of minimal or absent ground litter cover or high content of clover or alfalfa, features not readily visible from the earlier roadside evaluations. A few were not checked for lack of landowner permission. The final 49 sites were distributed among the counties as follows: 2 in Otoe, 1 in Lancaster, 8 in Gage, 13 in Johnson, 17 in Pawnee, 8 in Richardson, and none in Nemaha.

Sites with Henslow's Sparrows

Only 2 grassland sites had Henslow's Sparrows by mid-August that could be presumed to have bred, and only 5 of the 49 sites deemed suitable had Henslow's Sparrows at all. Of these 5 sites, 2 had Henslow's Sparrows only in the spring, heavy grazing in July eliminated the sparrows at another, and by August only 2 sites still held Henslow's Sparrows. A total of 45 birds was observed at the 5 sites (Table 1); 18 of these were found on point counts and the remainder were found while the observer was walking between points or during searches conducted in May and June.

Sites 1 and 2, located 5 miles north and 2 miles west of Tecumseh and 5.5 miles south and 5 miles west of Tecumseh respectively, had sparrows in late May and early June, but these had gone by mid-July. These birds may have been migrants. Habitat at both sites appeared unchanged in mid-July except for normal growth; due to dry conditions in the study area, growth was minimal, however. Site 1 was hayed sometime after mid-July and before mid-August, but, as already noted, the sparrows had probably departed prior to haying.

Site 5, Pawnee Prairie WMA, also had sparrows in early June and 2 were still present July 9 at the same places as in early June; a complete search was not done July 9, however, as aggressive bulls were in the area. A large number of cattle
FIGURE 2. Grassland tracts >20 hectares (50 acres) in southeast Nebraska in dark gray; visited tracts are in light gray; numbers indicate sites where Henslow’s Sparrows were found in 2006.

was present by mid-July, when the unburned south part of the WMA containing the sparrows was grazed and trampled. No Henslow’s Sparrows were present 16 July, presumably as their habitat had been destroyed.

Sites 3 and 4, located 4 miles north and one mile east of the east edge of Table Rock and 5.5 miles south and one mile east of Crab Orchard respectively, had sparrows from early June through mid-August (Site 3 was not checked in early June). Interestingly, numbers of sparrows increased at both sites, with mid-August counts of 11 at Site 3 and 10 at Site 4. These were all singing males, and thus the increase was not attributable to the presence of juveniles. At both sites, the areas occupied in mid-July were expanded in mid-August, rather than new areas within the overall site being established. Similar increases in late summer have been observed previously at major sites in Kansas (Zimmerman 1993) and Oklahoma (Reinking et al. 2000), and are possibly examples of conspecific attraction (Ahlering and Faaborg 2006), a phenomenon previously noted in Baird’s Sparrow (Ahlering 2005) and other grassland birds (Green et al. 2002).

Interestingly, all Henslow’s Sparrows found in this study were at or near the highest elevation within each site; none were found in draws or low areas. This finding is similar to that of Negus (2005), who found Henslow’s Sparrows on hilltops where vegetation was less dense than in valleys.
TABLE 1. Counts of Henslow’s Sparrows at 5 sites 29 May-13 August 2006.

<table>
<thead>
<tr>
<th>County</th>
<th>Site</th>
<th>29 May</th>
<th>2-3 June</th>
<th>16 &amp; 22 July</th>
<th>13 Aug</th>
<th>Max count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnson</td>
<td>1</td>
<td>8</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Johnson</td>
<td>2</td>
<td>X</td>
<td>9</td>
<td>0</td>
<td>X</td>
<td>9</td>
</tr>
<tr>
<td>Pawnee</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td>4</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Pawnee</td>
<td>4</td>
<td>X</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Pawnee</td>
<td>5</td>
<td>X</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

X = no count

DISCUSSION

Henslow’s Sparrows were found at only five sites during the survey. While some Henslow’s Sparrows were certainly not detected because of survey limitations, it is apparent that the species is neither common nor widespread in southeast Nebraska. The relatively small number of fields possessing suitable habitat is likely the primary factor limiting the number of Henslow’s Sparrows in this region. Improvement of conservation lands for Henslow’s Sparrow will likely benefit an entire suite of grassland birds.

Although habitat preferences of Henslow’s Sparrow are well known (Herkert et al. 2002), there are two major problems in determining management of grasslands in order to enhance numbers of breeding birds, especially in Nebraska, where most grasslands are privately-owned. These are (1) low site fidelity, and (2) the disjunction of the usually-practiced annual grassland management procedures with the longer-term changes necessary for development of suitable habitat.

In many cases involving preservation or management of habitat for certain bird species, the target bird species return each year to the same site. This is generally not true for grassland birds, most notably Henslow’s Sparrow (Herkert et al. 2002; Reinking et al. 2000). Thus there is no guarantee that effort and expense spent maintaining what might appear to be suitable breeding habitat will be rewarded if the birds do not return. Of interest in this respect were experiments carried out with Baird’s Sparrows in North Dakota (Ahlering 2005). Because of strong conspecific attraction in grassland sparrows, some sites are abandoned as birds gravitate to areas occupied by experienced birds that continue to sing and thus attract conspecifics well into the breeding season. This effect may have occurred in this study as well. Ahlering (2005) found that Baird’s Sparrows could be attracted to areas of suitable but unoccupied habitat by playing taped songs. These taped songs attracted birds that then bred successfully. Because only a small percentage of Nebraska grasslands are in public hands and presumably more amenable to management for Henslow’s Sparrows, this technique might allow the use of fewer sites or possibly smaller areas of managed grassland to maintain or enhance existing numbers of Henslow’s Sparrows.
Of course, the technique described above is still dependent on existence of suitable habitat, albeit somewhat less of it. Grassland management techniques for Henslow's Sparrow are well-known and may be summarized as follows (extracted from Herkert 1998, revised 2002):

1. provide at least 25 hectares (60 acres) of contiguous grassland, more if not within a grasslands landscape,
2. avoid disturbance (burning, mowing) on an annual basis,
3. leave occupied grasslands undisturbed 15 April-15 September,
4. provide dense and tall (>5 feet) grassy vegetation,
5. remove woody vegetation taller than the grassy vegetation,
6. native grasses and forbs should comprise at least part of the vegetation mix.

Most grassland managers achieve these objectives by inter-seeding desired species and using prescribed burns on a rotating basis. A grassland should be divided into at least three equal areas, one burned each year. This allows at least two years of undisturbed growth, which provides sufficient standing dead stalks and ground litter to attract Henslow's Sparrows, as well as limiting encroachment of woody vegetation. The management techniques listed above suggest at least 25 hectares (60 acres) of contiguous grassland is required for Henslow's Sparrow use, but the exact figure is not well-characterized (Herkert 1998, revised 2002). If rotational burning is used, it would be advisable to use a total minimum area of about 80 hectares (200 acres), divided into 3 parts, to meet the minimum suggested.

A recent modification of rotational burning, called patch burn grazing (PBG; Fuhlendorf and Engle 2001, Vermeire et al. 2004) attempts to mimic historical modification of prairies by lightning-caused fires and bison grazing. It involves rotational burning as described above, but grazing cattle are allowed access to the entire area, but spend most of their time in the most recently-burned sections. This practice promotes grassland heterogeneity, which in turn allows the entire suite of native grassland species to coexist in the area (Fuhlendorf et al. 2006).

Since 1985, setting aside significant areas of poorer-quality cropland and seeding them to grassland in the Federal (USDA) CRP program has provided an opportunity to provide more habitat for Henslow's Sparrows. Initially, fields in the program were seeded to homogeneous stands of European Smooth Brome combined with various legumes (Negus 2005); such fields, if unmodified, are not attractive to Henslow's Sparrows. Indeed, of more than 45,000 hectares (111,200 acres) of CRP grassland enrolled in Gage, Johnson, and Pawnee Counties in 1986-1993, more than 80% was planted to European Smooth Brome (Taylor 2000). This increase of brome grassland has possibly resulted in increases of Greater Prairie-Chicken (Tympanuchus cupido) (Taylor 2000), but has likely had limited benefit for the Henslow's Sparrows, other grassland birds, and other native organisms.

An important modification of the CRP rules involved generous incentive payments for "mid-contract management", which encouraged mowing, grazing, burning, or disking/interseeding to promote habitat diversity (Negus 2005). These practices must be used at least once during the CRP contract, but only on a maximum of one-third of a field in any one year (Negus 2005). Interseeding CRP fields with native species as part of mid-contract management seems to have
improved attractiveness of CRP grasslands to Henslow's Sparrows. This study has shown that numbers of Henslow's Sparrows will utilize such fields. Indeed, in this study the only two sites (sites 3 and 4 in Table 1) with Henslow's Sparrows by mid-August were CRP grasslands with significant native grass species present.

Most remaining tallgrass prairie in Nebraska is in private ownership and is managed for grazing or haying; such grasslands are generally not attractive to Henslow's Sparrows. Sullivan (2005) studied the use of such prairies by grassland birds in Pawnee County and the Denton Hills, just southwest of Lincoln, the latter area including Spring Creek Prairie. Prairies were ranked according to their natural purity with the highest ranking assigned to sites with little exotic invasion, high diversity, and high-quality forbs. Henslow's Sparrows were found at three locations (Burchard Lake WMA, Pawnee Prairie WMA, and Spring Creek Prairie) and at private grasslands adjacent to them. Analysis of vegetation at these sites and comparison with sites that did not have Henslow's Sparrows showed Henslow's Sparrows preferred sites with greater litter depth and standing residue. This comports with previously published information (Herkert et al. 2002).

Analysis of Sullivan's data shows no significant differences between Henslow's Sparrow habitat on public lands and that on adjacent private lands, although it was noted by Sullivan that Henslow's Sparrows found on private grassland adjacent to the west side of Burchard Lake NWR occupied pasture with "abundant grass and forb cover", suggesting that the grasslands studied were generally lightly grazed. Such light grazing is unusual on privately-owned grasslands, although studies in Missouri have shown that Henslow's Sparrows will use lightly grazed (>30.4 cm vegetation height) pastures (Skinner 1975).

CONCLUSION

This study found that availability of suitable habitat is a major factor limiting the range and numbers of Henslow's Sparrows in Nebraska. Even if the relatively limited areas of publicly-owned prairies were managed for the full suite of grassland birds, including Henslow's Sparrow, the total available area would still be small. It is obvious that the greatest potential lies in managing privately-owned grazed grasslands for the benefit of the grassland-bird suite. Clearly, current management systems will not change unless improved economics and long-term benefits to grassland quality can be demonstrated. Fortunately, research on patch burn grazing is showing great promise in fulfilling these requirements. We urge grassland managers to give patch burn grazing techniques serious consideration.

ACKNOWLEDGMENTS

We thank Joel Jorgensen for providing technical and GIS assistance and Andy Bishop for providing GIS data that were used for this survey. This study was funded by Nebraska Game and Parks with State Wildlife Grant money.
LITERATURE CITED


