

OBSERVATIONS ON HABITAT SELECTION BY HENSLOW'S SPARROW IN BROOME COUNTY, NEW YORK

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ABSTRACT

Observations were made at thirty-five field sites in Broome County, New York, between May and August, 1982 to document the range of habitat selection by Henslow's Sparrow (*Ammodramus henslowii*). Five habitat variables were studied and avian conspecifics were noted. Henslow's Sparrows inhabited a range of tall herbaceous communities in a variety of moisture regimes. They inhabited only large fields with virtually no woody invasion, with an average distance to horizon in excess of 10.25 kilometers. Only one field under cultivation held Henslow's Sparrows. The remaining three occupied sites were in ungrazed pasture. It appears that Henslow's Sparrow is an obligate grassland species which requires a set of environmental conditions that are uncommon in Broome County.

INTRODUCTION

Henslow's Sparrow is an uncommon and little known breeder in New York State (Bull, 1974, p. 579). It inhabits open fields and grasslands and seems to prefer wet fields with dense herbaceous cover (Graber *in* Bent 1965). Apparent widespread declines in this species have raised concerns about its status, and it is now listed as a species of concern by the New York State Department of Environmental Conservation.

The purpose of this study was to document the range of habitat selection by Henslow's Sparrow in Broome County, and to suggest reasons for its irregular and sparse distribution.

METHODS

This study took place in Broome County, New York (Figure 1), which is almost entirely within the Susquehanna hills region of the Appalachian upland. This land is predominantly hilly with moderate slopes ranging from 9 to 18 percent. Except for lowlands along major rivers, the land has only fair agricultural potential and about 50% of the land is used for farming, primarily dairy. The remainder is covered by mixed-hardwood forest in various seral stages (Thompson 1966).

Thirty-five open field areas were studied between May and August of 1982. Five habitat variables: field size, ground cover, woody emergents, soil moisture and distance to horizon were evaluated at each site and recorded on observation sheets. Other bird species inhabit-

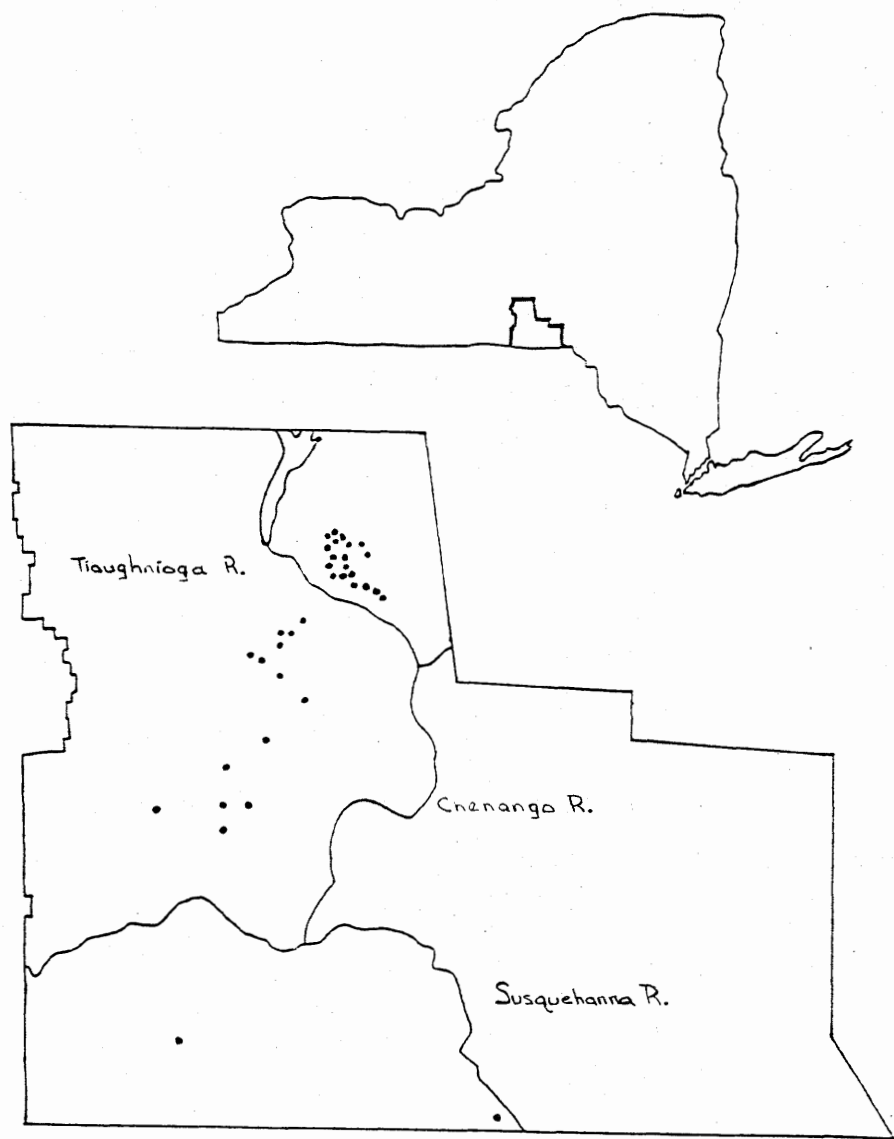


Figure 1. Broome County, New York and location of study sites.

ing the sites were also noted when observed. Some sites with a higher potential of containing Henslow's Sparrow were located through study of 7½-minute topographic maps and through contacts with persons familiar with Henslow's Sparrow. The entire set of sites selected is a sample of the range, but not the relative abundance of field-types encountered. For this reason no county population estimate can be made. The selected sites were searched by walking a zig-zag pattern through the field, stopping every 50-100 meters and listening for singing males for approximately five minutes. The presence of singing males was considered evidence of breeding activity.

Searching was done during daylight hours and during periods of fair weather (lack of heavy rain, fog, or high winds). Sites occupied by singing males were visited more than once to ensure that territories were being held. Some sites where Henslow's Sparrows were not observed were re-visited to confirm that they were not occupied.

Field dimensions were obtained from topographic maps and visual estimates. Distance to horizon was calculated to the nearest kilometer in all cardinal directions (due north, south, east, and west) and were averaged for each site. Horizon distances less than one kilometer were recorded as one kilometer. Distances too long to be measured from topographic maps (>10 km) were estimated conservatively. Horizon distances greater than 30 kilometers were recorded as 30 kilometers. These limits were used as a practicality and to limit the statistical effect of extremely short or long distances.

Only the dominant plant species were recorded. No attempt was made to do a complete plant inventory at each site. Plants were classified by species, height and general abundance. Woody invasion was described qualitatively as "none," "widely scattered," "scattered," and "heavy," with corresponding approximate percentages.

Soil moisture was determined qualitatively by direct observation of standing water or saturated soils. The presence of sedges and the degree of clumping or tussock formation were also used as general indicators of soil moisture.

RESULTS

Four of the 35 sites studied contained singing male Henslow's Sparrows. Detailed descriptions of these sites are contained in Appendix A. At Site 5, three singing males were observed. Two of these were seen with females. At Site 29, two singing males were heard, one of which was observed. At Site 30, one singing male was observed and at Site 31, at least six singing males were heard, one of which was observed.

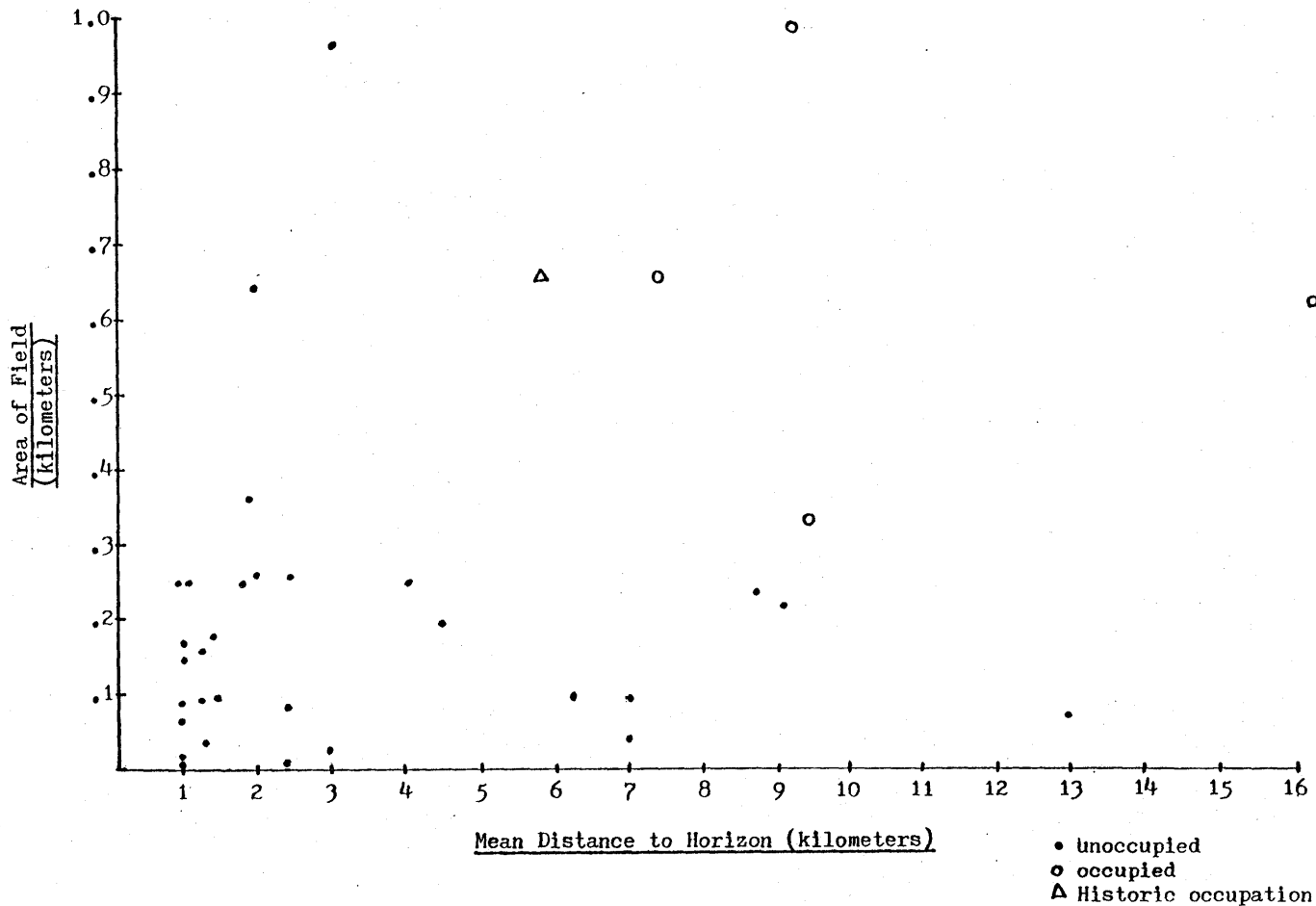


Figure 2. Field size and horizon distance plotted against Henslow's sparrow occupancy.

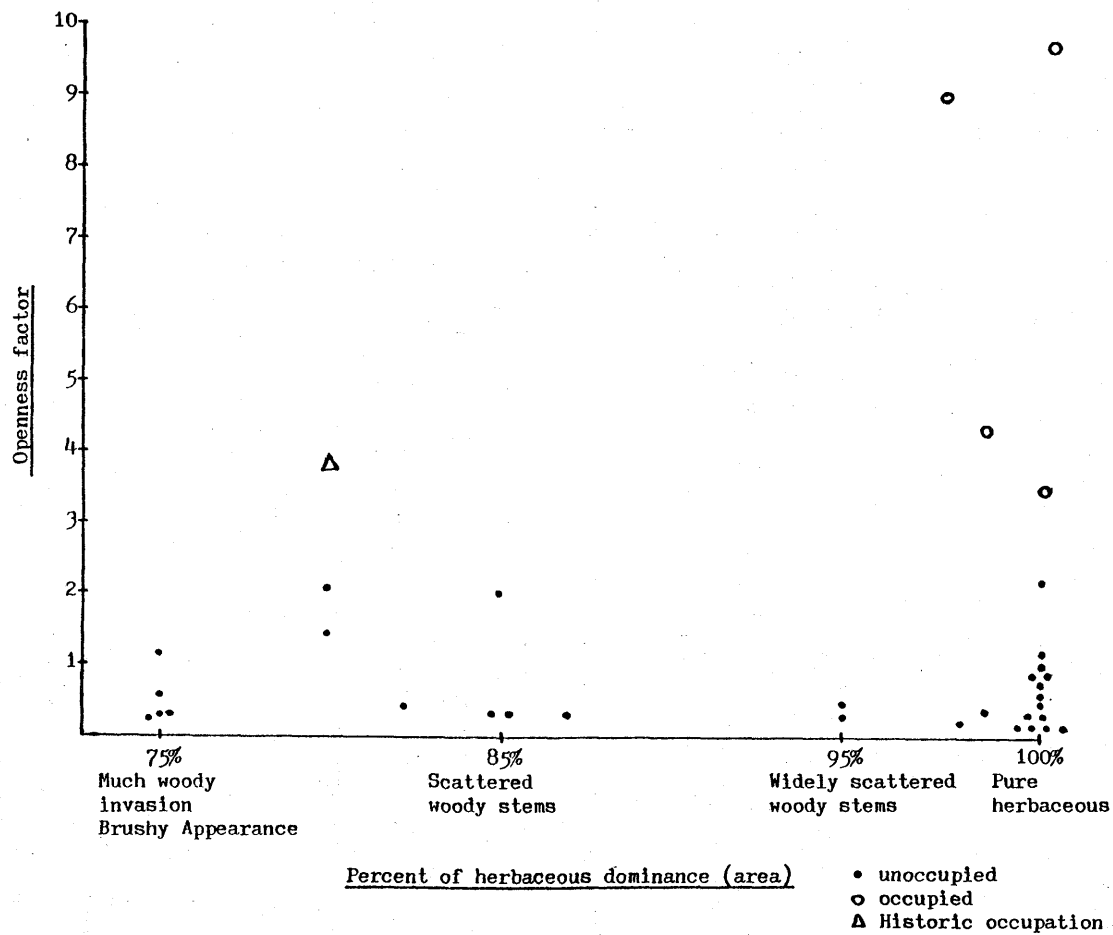


Figure 3. Site openness factor and herbaceous dominance plotted against Henslow's sparrow occupancy.

The estimated field areas of occupied sites were .64, 1.0, .36 and .64 km², with a mean of .66 km². This was significantly greater ($p < .001$) than the mean field area of unoccupied sites, which was .19 km². The mean distances to horizon of occupied sites were 7.3, 9.0, 9.1 and 15.6 km, averaging 10.25 km. This was significantly greater ($p < .001$) than the mean distance to horizon of unoccupied sites, which was 3.3 km. These two variables are plotted in Figure 2, with occupied sites indicated.

Of the variables studied, field area, horizon distance and percent of herbaceous cover were most apparently related to the distribution of Henslow's Sparrow. A useful indicator of habitat suitability can be derived by multiplying the field area and the horizon distance of each site to obtain an "openness factor." The mean openness factor of occupied sites was 8.03, significantly greater than the mean openness factor of unoccupied sites, which was 0.76. Of the 35 sites, the four occupied sites ranked among the top five in openness, with the lowest having a value of 3.3. The unoccupied site which ranked fourth was known to be occupied previously, but may now be unsuitable because of invasion by woody plants (Figure 3). Woody invasion of occupied sites was either nonexistent or limited to a few very widely scattered, low *Crataegus*, *Cornus* or *Rubus* spp, comprising less than 2% of the total area.

Henslow's Sparrows were found in a variety of moisture regimes. Site 31 was dry and well drained with no moist areas. Sites 29 and 30 were primarily dry with occasional moist, sedge dominated spots and Site 5 had up to 30% of its area seasonally or continually moist with considerable sedge and grass clumping.

Three of the occupied sites were in ungrazed pasture and the fourth was in a field of Timothy (*Phleum pratense*). All of the occupied sites were heavily dominated by grasses and most contained sedges. Beyond this, there was no apparent correlation between herbaceous species composition and site occupancy (Appendix B).

Song Sparrows (*Melospiza melodia*) were observed at or along the edges of 17 sites and were always associated with woody invasion. Only one Song Sparrow was observed in an area inhabited by Henslow's Sparrow. It was not seen on subsequent visits. Bobolinks (*Dolichonx oryzivorus*) were observed at 13 sites which had a variety of horizon distances, field sizes and degrees of woody invasion, including two sites which were occupied by Henslow's Sparrows. Savannah Sparrows (*Passerculus sandwichensis*) were observed at six sites, including three of the sites occupied by Henslow's Sparrow. The vegetative cover at the remaining three sites occupied by Savannah Sparrows closely resembled the occupied Henslow's sites.

DISCUSSION

The limited number of occupied sites makes significant quantitative analysis difficult, but some patterns of habitat use and non-use can be seen.

The four occupied sites had a set of characteristics quite unlike most of the unoccupied ones. The occupied sites were all very large fields and were on or near hilltops with sweeping panoramic views to distances in some directions of over 35 kilometers. Sites in valley bottoms, with hills or treelines rising all about, were never occupied. Even a single treeline or forest edge at a short distance may preclude occupancy. For example, at two occupied sites, adjacent areas which differed only in the presence of a treeline were unoccupied. This tendency to occupy very open, exposed sites is illustrated in Figure 2 with the occupied sites exhibiting a consistently higher openness factor than the unoccupied ones.

Almost any degree of woody invasion seems to decrease the suitability of an area for Henslow's Sparrow. All four occupied sites were either pure herbaceous communities or had only widely scattered, low (2-3 feet tall) woody stems. Several sites with long horizon distances or large areas and significant woody invasion were studied and found to be unoccupied. Baskett *et al.* (1980) concur with this and classify optimum Henslow's Sparrow habitat as having less than three shade-producing trees or shrub clumps per 50m².

Another example of the species' intolerance to woody invasion and short horizon distances is a site which was occupied in the mid 1970's (personal communication with Harriet Marsi, June, 1972, The Nature Conservancy, Binghamton, NY) but not during the study period. It had an openness factor comparable to the presently occupied sites (Figure 2), but had extensive woody invasion by small *Crataegus*, *Cornus* and *Acer* spp, which resulted in a distinctly brushy appearance (Figure 3). At this site, the only portion without significant woody invasion was the lower, downhill edge which had an openness factor of only 0.24.

The widely differing herbaceous species composition of occupied sites (Appendix A), other than a general dominance by grasses, suggests that sub-dominant species composition is of little importance in habitat selection. Although a diversity of sub-dominant forbs is considered a part of optimum Henslow's Sparrow habitat (Baskett *et al.* 1980), a lack of forbs does not preclude occupancy. One study site was a cultivated Timothy field with virtually no other plant species present. Other observers have noted that Henslow's Sparrow will nest in cultivated fields in Broome County, although ungrazed pas-

ture is more commonly used (personal communication with Mary Sheffield, June, 1982, New York State Federation of Bird Clubs, Binghamton, NY).

Baskett *et al.* (1980) also consider a diversity of vegetation heights necessary for optimum Henslow's Sparrow habitat. Their view is supported by the extensive use of emergent vegetation by singing male Henslow's Sparrows in this study. Where emergent vegetation was scarce or nonexistent, males would sing from below the grass line.

Grazed pasture was not used by Henslow's Sparrow in this study. Robins (1971) found that they prefer fields with dense herbaceous cover. For this reason, grazed pasture may not provide the amount of food or cover Henslow's Sparrows require.

Henslow's Sparrows did not exhibit a preference for moist sedge-dominated fields. Site 31, which had over six singing males, was very well drained and had no moist areas or sedges. The other three sites had varying amounts of moist, sedgy areas. However, no extremely wet areas with large amounts of standing water were occupied. A preference for the median range of moisture regimes was noted by Robins (1971) in his study of Henslow's Sparrow in Michigan.

Some observations were made on other passerine species at the sites to obtain an indication of comparative habitat use. Bobolinks appeared to use a wider range of the habitat variables studied. They were found in cultivated and fallow, herbaceous-dominated sites with a wide range of horizon distances and degrees of woody invasion.

Savannah Sparrows appeared to have the habitat requirements most similar to Henslow's Sparrows. The only observable difference was a tolerance by Savannah Sparrows of nearby treelines or forest edges that Henslow's Sparrows seem to lack. All the sites that were occupied by Savannah Sparrows but not by Henslow's Sparrows differed only in this respect.

Song Sparrows, unlike Savannah Sparrows and Bobolinks, did not exhibit any noticeable niche overlap with Henslow's Sparrows and in fact did not occupy any Henslow's Sparrow sites. They were found in those fields regardless of size or horizon distance which had enough woody invasion to create a brushy appearance. Since Henslow's Sparrows seem very intolerant of woody invasion, and since Song Sparrows require brushy vegetation, it appears that the presence of one species may indicate unsuitable habitat for the other.

CONCLUSION

Henslow's Sparrow appears to be a true grassland species in that it is found in large, pure or nearly pure herbaceous communities with long, unbroken views to the horizon. It is intolerant of woody inva-

sion and short horizon distances. It is apparently reluctant to use cultivated or grazed land. These factors may be the primary cause of its irregular occurrence in Broome County, where fields tend to be surrounded by woods, treelines, and hillsides, and when unused revert quickly to woody species. It appears that an openness factor, when considered with the amount of woody invasion, is a useful indicator of habitat suitability.

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APPENDIX A. HENSLOW'S SPARROW SITE INFORMATION

HENSLOW'S SPARROW SITE FORMS

Site: 5 Date: 29 May 1982
Field size: (several subsequent visits through 5 July)
800 m X 800 m, .64 km² Weather: Overcast, calm, 70° F.
Ground cover: Ungrazed pasture. Mainly grasses, broom straw. Mixed
forbs, goldenrod. Some sedges in wetter areas. Very dense.
Woody emergents: A few *Crataegus* and multiflora under 6'. Very
widely scattered.
Soil moisture: = 1/3 area is moist with some clumping evident. Some
spots of standing water.
Distance to horizon: 7.3km. Three sides open, one side brushy.
Openness factor = 4.67.
Other species: Savannah Sparrow, Bobolink seen on all visits. Eastern
Meadowlark on at least one visit. 1 Song Sparrow on one visit.
Henslow's Sparrows present: Two pair and one singing male observed.

Site: 29

Date: 5 July 1982

Field size:

Weather: Sunny, breezy, 80° F.

1 km X 1 km, 1 km²

Ground cover: 2/3 cultivated Timothy field (4' high), 1/3 old field (3' high). Very dense.

Woody emergents: In old field, some small (<5') and widely scattered multiflora. *Cornus* spp.

Soil moisture: some moist runoff channels and small soggy areas with a few sedges.

Distance to horizon: 9.0km. 3 sides open, 1 forest. Openness factor = 9.0.

Other species: Savannah Sparrows, Bobolink.

Henslow's Sparrows present: Two singing males heard, one of them was also seen. Both were near moist runoffs in Timothy when first heard. Birds also heard and seen by other observers in June, 1982.

Site: 30

Date: 30 July 1982 (also 7 August 1982)

Field size:

Weather: Sunny, breezy, warm, 75° F.

600 m X 600 m, 36 km²

Ground cover: Ungrazed pasture. Primarily Timothy and other grasses, 1-5' tall. Some Queen Anne's lace, sensitive fern, teasel, buttercups, goldenrod and sedges. Very dense.

Woody emergents: None except line of fence posts.

Soil moisture: Pretty well drained. Some sedges present and concentrated in a couple of soggy spots.

Distance to horizon: 9.1km. 1 side wooded, 3 sides open. Openness factor = 3.3.

Other species: Savannah Sparrow, Barn Swallows.

Henslow's Sparrows present: One male seen and heard.

Site: 31

Date: 30 July 1982

Field size:

Weather: Mostly cloudy, breezy, 78° F.

800 m X 800 m, .64 km²

Ground cover: Abandoned field. Primarily Timothy and other grasses. Various forbs and goldenrod. Much milkweed. 1-4' high. No sedges.

Woody emergents: Scattered, low *Cornus* spp.

Soil moisture: Very well drained. No moist areas.

Distance to horizon: 15.6km. 300° panorama. 60° grassy hillcrest. Openness factor = 10.0.

Other species: Eastern Meadowlark

Henslow's Sparrows present: At least 6 male Henslow's Sparrows heard. One was seen. Low side by treeline is unoccupied.