HENSLOW'S SPARROW AND GRASSHOPPER SPARROW: A COMPARISON OF HABITAT USE IN FINGER LAKES NATIONAL FOREST, NEW YORK

by Donald J. Smith and Charles R. Smith

The Grasshopper Sparrow and Henslow's Sparrow are uncommon grassland sparrows that breed in scattered locations throughout New York. The New York State Breeding Bird Atlas reported them in fifteen and seven percent of the blocks surveyed, respectively (Andrle and Carroll 1988). Historically Grasshopper Sparrows have occurred in the Finger Lakes Region of New York since before 1909, being described as a "common summer resident" by Reed and Wright (1909). Interestingly, Reed and Wright did not list the Henslow's Sparrow in their report. The first report of Henslow's Sparrow from the Finger Lakes Region was in 1916, and by 1919 it was known to breed in at least four locations in the Cayuga Lake Basin (Wright 1919). Wright's comments indicate that the lack of records before this time may have been due to the failure of local ornithologists to detect it, not its absence from the area.

Qualitative accounts have mentioned frequent periods of decrease and increase in the abundance of the two sparrows in New York (*Kingbird* 1955-1989). This is not surprising since both species' populations are reported to fluctuate widely for reasons that are not understood (Hyde 1939; Wiens 1969; Zimmerman 1988). Data from U.S. Fish and Wildlife Service Breeding Bird Survey routes have shown that both birds are declining significantly in New York State and throughout the Northeast (Robbins et al. 1986; Smith 1989). Both species have been either Blue List or Blue List Special Concern species since 1974 (Tate and Tate 1982; Tate 1986) and New York State Species of Special Concern since the early 1980s. Since 1965 these species have declined throughout the state, with Henslow's Sparrow showing a steeper rate of decline than Grasshopper Sparrow. In 1987 Henslow's Sparrow was listed among migratory nongame birds of management concern by the U.S. Fish and Wildlife Service (Office of Migratory Bird Management 1987; Smith 1992).

Within its geographic range Henslow's Sparrow has been reported to nest in a variety of habitats containing tall, dense, grassy vegetation (Smith 1968). Hyde (1939) describes a variety of habitats where Henslow's Sparrow commonly occurs: upland weedy hayfields or pastures without shrubs, wet meadows, drier areas of salt marshes, grassy fields, and sedgy hillsides with recently planted pine seedlings. Graber (1968) found that their habitat was usually quite dense from twelve inches to twenty-four inches off the ground, and added that the species "has adapted to living in unmowed hayfields." In New York Peterson (1983) found them in large, ungrazed fields, often on hilltops, with a variety of moisture regimes and no woody invasion. Henslow's Sparrow

is not typically associated with grazed areas (Peterson 1983; Zimmerman 1988), although they often can survive quite well in lightly grazed pastures (Skinner 1975).

Wiens (1969), in his three-year study, had four Henslow's Sparrow territories in the first and third year and none in the second year. He found that Henslow's Sparrow territories had a low percent cover of forbs, dense vegetation, a high effective vegetation height, little bare ground or low vegetation, and no trees, posts, or fence lines.

Grasshopper Sparrow, as reported by Eaton (1914), inhabits meadows, clover fields, and weedy fields usually on drier ground than Henslow's Sparrow. Grasshopper Sparrow is most common on managed grassland in the presence of clump-forming vegetation, including alfalfa, red clover, and lespedeza (Smith 1968). This preference for clump-forming vegetation has been confirmed by Whitmore (1981) and Janes (1983). Wiens (1969) found that Grasshopper Sparrow territories frequently contained patches of bare ground and very short vegetation; posts; fence lines; and occasional trees. Johnston and Odum (1956) found the birds in fields with as much as ten percent shrub cover, although more detailed studies have found that percent cover of shrubs within territories is usually closer to one percent (Janes 1983; Whitmore 1981).

The effects of grazing on the Grasshopper Sparrow differ from area to area. In Arizona grazing excluded the birds (Bock and Webb 1984), but in West Virginia (Whitmore 1981), North Dakota (Kantrud 1981; Renken and Dinsmore 1987), Florida (Delany et al. 1985), and Missouri (Skinner 1975), moderate grazing never decreased and usually increased the density of Grasshopper Sparrows. This is consistent with the observation that Grasshopper Sparrows prefer fields with bunchgrass interspersed with open ground (Janes 1983). This habitat is found in Arizona only in ungrazed areas, because cattle quickly reduce the bunchgrass to below an acceptable density. In the eastern U. S. light grazing creates patches of shorter vegetation usually not present in ungrazed grasslands, encouraging Grasshopper Sparrows; but heavy grazing still can reduce the grass below an acceptable height and density, leading to the loss of the birds.

Because both Henslow's and Grasshopper sparrows are declining in the Northeast, a better understanding of land uses compatible with the needs of these grassland birds is necessary for conservation planning. The occurrence of both Grasshopper and Henslow's sparrows in Finger Lakes National Forest (FLNF) provided an opportunity to study these birds on regularly grazed and managed grassland in Seneca and Schuyler counties in the Finger Lakes Region of New York. Based on preliminary observations, we suspected that territories of Henslow's Sparrow would have taller vegetation and a smaller percent cover of goldenrod than those of Grasshopper Sparrow. We also suspected that Henslow's Sparrows might be found in larger pastures and pastures that had higher productivity (as defined below).

Study Area and Methods

FLNF is a 13,232-acre area managed for multiple uses including recreation, logging, and grazing. A diversity of habitats are maintained through grazing, mowing, controlled burning, and logging (Adkinson 1945; USFS 1986). Thirty-three areas totaling about 1838 acres are designated cattle pastures. These pastures vary in size from twenty to three hundred and ten acres, and each is completely fenced. Each year about 1800 beef and dairy cattle graze the pastures from May 15 until October 15. Each pasture is not pure grassland, because vegetation types within the fenced areas can include as much as thirty-six percent shrubland and forest, as well as frequent hedgerows. The pastures are stocked such that only sixty percent of the annual production of vegetation is consumed by the cattle (USFS 1986). This results in large areas of high grass that support populations of Eastern Meadowlark, Bobolink, Savannah Sparrow, Grasshopper Sparrow, and Henslow's Sparrow. As part of a comprehensive inventory of bird species diversity for FLNF, all thirty-three pastures were surveyed during the summer of 1989.

The territories of five Henslow's and eleven Grasshopper sparrows were visited from July 26 through August 3 to analyze vegetation. Observations on breeding territories were possible this late in the season due to the very wet months of May and June, which seemed to delay nesting, and the fact that the sparrows also have a protracted breeding season that normally extends into the month of August (Smith 1968; Robins 1971a, 1971b). Vegetation analysis used the following procedures. Two observers located singing, territorial male birds. One watched the bird while the other approached, causing it to fly. The original perch and the location where the flushed bird first landed were marked. With the original perch as the starting point, a fifty-meter tape was laid out in the direction the flushed bird flew. The height of the vegetation was measured at one-meter intervals along the tape. The percent cover of grass, goldenrod, sedge, and woody vegetation inside the square was visually estimated by two observers, always D.J. Smith and one other. The goldenrod and perennial stems also were counted.

Results

Grasshopper Sparrows were found in twenty-four of the thirty-three pastures, while Henslow's Sparrows were found in only five pastures. Henslow's Sparrow occurred together with Grasshopper Sparrow in three of the five pastures. The smallest pasture containing each species, or the minimum pasture size, was twenty-seven acres for Grasshopper Sparrow and seventy-four acres for Henslow's Sparrow. The discovery of Grasshopper Sparrow on a pasture of twenty-seven acres allows us to say little about the minimum area required, because this was the smallest pasture available in FLNF. The absence of Henslow's Sparrow in areas of less than seventy-four acres may be more meaningful, however, because eight smaller pastures representing a wide range

of productivity were surveyed, and none contained Henslow's Sparrow.

The average productivity rating for pastures containing Henslow's Sparrow was significantly lower than for pastures containing Grasshopper Sparrow. The average height of the vegetation on Henslow's Sparrow territories also was found to be significantly greater than vegetation height on Grasshopper Sparrow territories. Further analysis showed that the height of the vegetation on the territories was significantly positively correlated with the productivity rating of the pasture in which the territory was located, indicating that the greater the productivity index, the taller the vegetation.

The two species of sparrows did not seem to choose their breeding locations based on the time since the area was last mowed, because both species bred freely on pastures mowed from one to six years earlier (mowing dates from J. Fiske, pers. com.). For Henslow's Sparrow, two isolated territorial males and a colony of two or three territories were located in pastures mowed the previous year. The other two pastures containing birds were mowed in 1984 and 1985. Grasshopper Sparrows were found in pastures mowed last in 1978, and in pastures mowed every year during 1982-1988.

Discussion

The significantly different mean grass heights confirm that Henslow's Sparrow prefers taller vegetation. This result agrees with the findings of Skinner (1975) and Wiens (1969), who found Henslow's Sparrow inhabiting taller vegetation than Grasshopper Sparrow.

In Kansas Zimmerman (1988) found that Henslow's Sparrow did not breed in areas that were burned the preceding spring or moderately grazed the preceding summer. Based on this, he concluded that any practice that reduced the standing dead vegetation in a field could eliminate Henslow's Sparrow.

Our findings of Henslow's Sparrow in grazed pastures that were mowed the previous year differ from the observations of Zimmerman. The grazing intensities observed by Zimmerman may have been higher than those seen in our study, accounting for the absence of Henslow's Sparrow from his sites. The mowing discrepancy may be explained by one of two hypotheses. First, our later seasonal work gave the vegetation a chance to regrow and allowed the birds to move into these newly regrown areas after losing or raising their first brood. Robins (1971a) found that most Henslow's Sparrows in Michigan raise two or three broods, defend territories for as long as two months, and frequently change the location of their territories during the breeding season. A second hypothesis is that mowing during late July and August and removing the cattle in mid-October, as practiced in FLNF, allows time for vegetation to regrow partially before winter, possibly providing enough residual cover in spring to attract Henslow's Sparrows. Zimmerman's studies also were of the western subspecies of Henslow's Sparrow, which may differ in its habitat requirements than the

eastern form.

Kantrud (1981) found Grasshopper Sparrow densities to be low in hayfields mowed the previous year. Although we have no data on the relative densities of the birds in our study, the pattern of occurrence at FLNF does not indicate that time to last mowing is important in the choice of nesting location by Grasshopper Sparrow.

It is worth noting that two pastures containing thirty hectares (about seventy-four acres) of grassland were the smallest areas used by Henslow's Sparrow. This result corresponds directly with the observations of Zimmerman (1988) in Kansas, who recommends that management to encourage Henslow's Sparrow should be carried out on plots of at least thirty hectares. These values also fall within Samson's (1980) estimate of ten to one hundred hectares (24.7 to 247.1 acres) as the minimum area required to support a viable breeding population of Henslow's Sparrow. Peterson's (1983) study in Broome County, New York, found that Henslow's Sparrow occurrence was related to unobscured, visual distance to the horizon, a measure strongly correlated with grassland area. These apparent minimum area requirements are far from proven and may not hold for all regions where Henslow's Sparrow occurs. Older accounts reported about twelve pairs living in four hectares (9.9 acres) of dense grass in Pymatuning Swamp in northwestern Pennsylvania and four pairs in a field of only 3.6 hectares (8.9 acres) (Graber 1968). The indications from recent work that size is important in habitat choice by Henslow's Sparrow may be confounded by the fact that the species is declining. During periods of decline, a species is less likely to saturate the available habitats and may only occupy the highest quality sites (O'Connor 1981), giving an inaccurate impression of the range of habitats it may occupy at higher population densities.

Conservation Implications

The existing pasture management scheme, which has been in place for at least fifteen years, produces usable habitat for both Henslow's and Grasshopper sparrows in FLNF. This demonstrates a land use compatible with the needs of both Henslow's and Grasshopper sparrows. Maintenance mowing done in mid-August allows the birds to raise their first broods undisturbed, while still leaving enough time for regrowth to provide standing dead vegetation the following spring. Grazing is a cost-effective method for maintaining the early stage of succession required by these birds. The stocking rate of 0.05 to 0.10 head of cattle per acre permits vegetation to grow to the height preferred by Henslow's Sparrow and still maintains habitat suitable for Grasshopper Sparrow.

Ironically, the future of Henslow's and Grasshopper sparrows, and possibly other species of grassland birds, may be tied to the economics of the dairy industry. In New York State the dairy industry continues to decline. The number of dairy cows in the state has dropped from 915,000 in 1981 to 775,000 in 1991,

contributing to an overall decline in the total number of cattle in the state from 1,831,000 to 1,550,000 head over the same time period. With this decline has come a decrease in demand for pasturage in FLNF and a decrease in total area of land under pasture throughout the state from 845,341 acres in 1981 to 730,296 acres in 1990 (NYASS 1991). The fees paid by the Hector Grazing Association for grazing rights help pay for the cost of managing FLNF (USFS 1986). If the number of cattle and corresponding income from fees are reduced, some important management decisions will have to be made. Presently, grazing keeps the pastures in an early successional stage. With a loss of grazing, more frequent mowing will be necessary to maintain the grassland. This will put additional stress on the budget and limited manpower and may not create the same habitat structure that results from grazing. In the end, some pastures may need to be abandoned and allowed to grow up. With the 1976 mandate of the National Forest Management Act to preserve diversity in national forests (Bean 1983), managers face the challenge of maintaining a viable population of Henslow's Sparrows in FLNF.

Our study characterizes habitats that may support breeding populations of Henslow's Sparrow in the context of an agricultural landscape. Productivity and minimum pasture size do not necessarily predict the presence or absence of Henslow's Sparrow, which is not surprising given its reputation for irregular occurrence (Peterson 1983; Robins 1971a; Wiens 1969), but these variables can help managers begin to identify potential breeding sites.

The large number of pastures containing Grasshopper Sparrow and the number of individuals observed indicate that the species currently is doing well in FLNF. The present management regime does not seem to be in conflict with this species. Their requirements of less productive land and smaller minimum area, coupled with their relative abundance, seem to assure their persistence. In spite of this, a loss of grazing still could have a negative effect on the Grasshopper Sparrow, because some authors report an absence of Grasshopper Sparrows on ungrazed or idle pasture (Skinner 1975). Absence of grazing could reduce habitat suitability, leading to a reduction in the density of Grasshopper Sparrows. Another effect of a reduction in the demand for pasturage could be a decision to allow some of the pastures to revert to trees and shrubs, also reducing the size of the Grasshopper Sparrow population in FLNF. Despite these potential decreases in numbers, we feel that by preserving suitable areas of grassland for Henslow's Sparrow, Grasshopper Sparrow should remain because such areas usually can provide habitat for both species. In this way, by managing for the rarer Henslow's Sparrow, both of these New York State Species of Special Concern should remain part of FNLF's diverse avifauna.

Additional field studies at other sites are essential to achieve a more comprehensive understanding of the habitat requirements of Henslow's and Grasshopper sparrows in the Northeast. Active management of grassland

habitats will be necessary to maintain areas suitable for these sparrows and other grassland birds. Otherwise, the processes of commercial land development and ecological succession will gradually eliminate grasslands from the landscape. Carefully managed grazing, such as in FLNF, is a viable, cost-effective management option for providing habitat for Henslow's and Grasshopper sparrows. In the absence of field studies and active management, continued recognition of the precarious status of Henslow's and Grasshopper sparrows through various state and federal "listing" exercises will do little for their conservation.

References

Adkinson, L.B. 1945. *Community Use of Pastures on Hill Lands—The Hector Land Use Adjustment Project in Southern New York.* U.S. Dept. of Agriculture, Bur. of Agric. Econ. and Soil Conserv. Serv. Upper Darby, PA.

Andrle, R.F., and J.R. Carroll. 1988. *The Atlas of Breeding Birds in New York State.* Ithaca, N.Y.: Cornell University Press.

Bean, M.J. 1983. *The Evolution of National Wildlife Law.* New York: Praeger.

Bock, C.E., and B. Webb. 1984. Birds as Grazing Indicator Species in Southeastern Arizona, *J. Wildl. Manage.* 48(3):1045-1049.

Delany, M.F., H.M. Stevenson, and R. McCracken. 1985. Distribution, Abundance, and Habitat of the Florida Grasshopper Sparrow, *J. Wildl. Manage.* 49:626-631.

Eaton, E.H. 1914. *Birds of New York, Part 2*, Albany, N.Y.: University of the State of New York.

Graber, J.W. 1968. *Passerherbulus henslowii henslowii* Western Henslow's Sparrow, In *Life Histories of North American Cardinals, Grosbeaks, Buntings, Towhees, Finches, Sparrows and Allies*, ed. O.L. Austin, Jr. U.S. National Museum Bulletin No. 237, part 2, Washington, D.C.

Hyde, A.S. 1939. The Life History of Henslow's Sparrow *(Passerherbulus henslowii)*, Mus. Zool. Univ. Mich. Misc. Publ. No. 41.

Janes, J.W. 1983. Status, Distribution and Habitat Selection of Grasshopper Sparrows in Morrow County, Oregon, *Murrelet* 64:51-54.

Johnston, D.W., and E.P. Odum. 1956. Breeding Bird Populations in Relation to Plant Succession on the Piedmont of Georgia, *Ecology* 38:171-174.

Kantrud, H.A. 1981. Grazing Intensity Effects on the Breeding Avifauna of North Dakota Native Grasslands, *Can. Field Nat.* 95:404-417.

Kingbird. 1955-1989. Regional Reports for Region 3: Finger Lakes.

New York Agricultural Statistics Service (NYASS). 1991. New York Agricultural Statistics 1990-1991, New York State Dept. of Agric. and Markets, Division of Statistics, Albany, N.Y.

Office of Migratory Bird Management. 1987. *Migratory Nongame Birds of Management Concern in the United States: The 1987 List*, U.S. Fish and Wildlife Service, Washington, D.C.

O'Connor, R.J. 1981. Habitat Correlates of Bird Distribution in British Census Plots, *Studies in Avian Biology* 6:533-537.

Peterson, A. 1983. Observations on Habitat Selection by Henslow's Sparrow in Broome County, New York, *Kingbird* 33:155-164.

Reed, H.D., and A.H. Wright. 1909. The Vertebrates of the Cayuga Lake Basin, N.Y., *Proc. Amer. Phil. Soc.* 48(193): 370-459.

Renken, R.B., and J.J. Dinsmore. 1987. Nongame Bird Communities on Managed Grasslands in North Dakota, *Can. Field Nat.* 101: 551-557.

Robbins, C.S., D. Bystrak, and P.H. Geissler. 1986. *The Breeding Bird Survey: Its First Fifteen Years, 1965-1979*, U.S. Dept. Interior, Fish and Wildlife Service, Resource Publication 157, Washington, D.C.

Robins, J.D. 1971a. A Study of Henslow's Sparrow in Michigan, *Wilson's Bull.* 88(1): 39-48.

_____. 1971b. Differential Niche Utilization in a Grassland Sparrow, *Ecology* 52:1065-1070.

Samson, F.B. 1980. Island Biogeography and the Conservation of Nongame Birds, *Trans. N. Amer. Wildl. and Natu. Res. Conf.* 45:245-251.

Skinner, R.M. 1975. Grassland Use Patterns and Prairie Bird Populations in Missouri, In *Prairie: A Multiple View*, ed. M.K. Wali. Grand Forks: Univ. of North Dakota Press.

Smith, C.R. 1989. *An Analysis of New York State Breeding Bird Surveys 1966-1985*, Final Project Report, Contract No. C001667, New York State Department of Environmental Conservation.

_____. 1992. Henslow's Sparrow, *Ammodramus henslowii*. In *Migratory Nongame Birds of Management Concern in the Northeast*, eds. K.J. Schneider and D.M. Pence. Newton Corner, MA: U.S. Fish and Wildlife Service.

Smith, W.P. 1968. Eastern Henslow's Sparrow, In *Life Histories of North American Cardinals, Grosbeaks, Buntings, Towhees, Finches, Sparrows and Allies*, ed. O.L. Austin, Jr. U.S. National Museum Bulletin No. 237, part 2, Washington, D.C.

Tate, J. 1986. The Blue List for 1986, *American Birds* 40:227-236.

Tate, J., and Tate, J. 1982. The Blue List for 1982, *American Birds* 35:126-135.

U.S. Forest Service (USFS). 1986. *Land and Resource Management Plan: Finger Lakes National Forest*, USDA, Forest Service.

Whitmore, R.C. 1981. Structural Characteristics of Grasshopper Sparrow Habitat, *J. Wildl. Manage.* 45(3):811-814.

Wiens, J.A. 1969. An Approach to the Study of Ecological Relationships Among Grassland Birds, *Ornithol. Monogr.* 8.

Wright, A.H. 1919. Henslow's Sparrow in New York and Virginia, *Auk* 36:574-575.

Zimmerman, J.L. 1988. Breeding Season Habitat Selection by the Henslow's Sparrow *(Ammodramus henslowii)* in Kansas, *Wilson Bull.* 100(1):17-24.

DONALD J. SMITH graduated with honors from Cornell University in 1990. He is currently a graduate student at the University of Arizona, Tucson. **CHARLES R. SMITH** is a naturalist and conservationist who teaches at the Department of Natural Resources at Cornell University. He has been involved in studies of New York birds for nearly twenty years and serves as an advisor to several state and federal agencies on management and conservation of nongame birds. The authors would like to acknowledge the kind and enthusiastic assistance of the staff of the U.S. Forest Service, Finger Lakes National Forest. Elizabeth Domingue O'Neill provided valuable and dedicated assistance in the collection of field data. Financial support for this research was provided by an award from the Office of Resident Instruction, College of Agriculture and Life Sciences, Cornell University, to D. Smith, and through Hatch Project No. NYC-171401, U.S. Department of Agriculture, to C. Smith.