

FINAL REPORT ON THE HENSLOW'S SPARROW POPULATION IN MINNESOTA

1987

Conservation Biology Research Grants Program
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Henslow's Sparrow; name given in 1831 by John James Audubon for his friend John Stevens Henslow, professor of botany, Cambridge University, England. *Ammodramus* (am-ODD-rah-mus); genus name; Latin, from Greek *amos* meaning "sand" and *dramein* meaning "to run". Species name *henslowii* (HEN-slow-ih-eye) (J. Terres. 1982).

The primary objective of this study was to census the Henslow's Sparrow (*Ammodrammus henslowii*) population in O.L. Kipp State Park and to delineate those areas utilized for nesting and feeding so that Park personnel can evaluate the potential impacts of proposed development projects on the species.

Contact
Station -
Field - CS

Areas Hensland Sparrows
were present during
the 1987 breeding season

Headquarters
Field - HQ

Breeding Phenology

- 04 May - Five male and one female in Headquarters field (HQ).
- 05 May - Three males in Contact Station field (CS).
- 09 May - Second female seen in HQ.
- 17 May - First female seen in CS.
- 19 May - Five males in HQ. First call notes heard in southern HQ.
- 22 May - Male using stake as singing perch in HQ.
- 11 June - Female with large foodstuff in HQ.
- 13 June - Four males in CS; six males in HQ.
- 18 June - Adults actions indicate nestlings in CS, female agitated.
- 19 June - Song carries 150m +.
- 22 June - Male with large foodstuff in southern HQ, possibly a Viceroy caterpillar.
 - First fledgling seen in HQ.
 - Female with foodstuff by trees on western side of HQ.
- 26 June - New territory established in beginning of HQ.
- 07 July - Five males in contact station field.
 - Insect population substantial.
- 09 July - Land Rover and motorcycle drove through HQ.
 - Two territories displaced due to motorized intrusion.
- 27 July - Female in Second's territory with large grasshopper.
 - Male continues to sing while female call notes incessively.
- 29 July - Fledgling in contact station field.

04 August - Banded one of two fledglings in CS.
10 August - Singing has decreased considerably.
11 August - Male on west side of road call ~~noting~~.
14 August - Fledgling with male in HQ.
18 August - Male on west side of road singing.
 - Two fledglings in CS.
 - Grasshoppers and dragonflies numerous.
29 August - Only one singing male present in HQ.

1. O.L. Kipp Summary

Population census

Henslow's Sparrows are semi-colonial (Graber, 1968) yet most of the Minnesota records note only one or two individuals or pairs (Fall, 1982; Eckert, 1974; and the MOU files). During the 1987 breeding season, the Kipp Park population totaled thirteen males, ten females, and five young. Although the species establish ^{est} territories within loose colonies, boundaries were not always rigidly defended (J. Terres, 1982). I limited my definition of defended territories to those areas ~~that~~ ^{where} my presence resulted in call notes from the tenants. Only eleven breeding territories were active concurrently. The average territory size was 1-2 acres (2.4-5.9 Ha). During May and June, four males established territories in the Contact Station (CS) field. On 7 July, a fifth male arrived and began to sing in a previously unoccupied patch. Throughout the summer, I identified four females in this field. Non-singing birds in the presence of singing ones were designated as female. Eight males sang in the Headquarter's (HQ) field, but only six territories were defended at any one time. Females were present in all defended territories. On 22 June, two fledglings with adults flushed from the vegetation in the southern part of the HQ field. In addition, one fledgling flushed out of the CS field on 29 July and ~~two~~ two fluttered from this same area while banding efforts were attempted on 4 August. The fifth fledgling with an adult flushed from the northern end of the HQ field on 17 August.

The majority of the population was found to exist in the headquarters field with a density of one male per nine (9) acres (22.2 Ha). The contact station field had a density of one male per eight (8) acres (19.8 Ha). Although these areas represent a low density for this species, it is the highest reported density in the state.

Vegetation Composition Requirements

Henslow's Sparrows nest primarily in overgrown fields, weedy prairies, and wet meadows (Graber, 1968). Two overgrown fields in Kipp are utilized by the Henslow's Sparrow. Singing perches are an important part of the breeding habitat of the Henslow's Sparrow. (Hyde 1939; Robbins 1967; Graber 1968). Perches consist of standing vegetation, particularly forbs, above the surrounding vegetation. In the Headquarters field and in the Contact Station field Queen Anne's Lace (*Daucus carota* L.) and Goldenrod (*Solidago* sp.) were the dominant forbs. In addition, Common Mullein (*Verbascum thapsus*) was also utilized. Early in the season, last year's vegetative stocks were used as perches. Woody plants were dispersed throughout both fields. The two most common woody plants were the Box Elder (*Acer negundo*) and Green Ash (*Fraxinus pennsylvanica*). All of these species were used as singing perches throughout the summer.

Besides singing perches another important constituent of the habitat is a dense litter layer. Hyde (1939) states that the species builds its nest within the litter layer. At Kipp, Brome grass (*Bromus inermis*), Kentucky Bluegrass (*Poa pratense*), and Timothy (*Phleum pratense*) were the dominant species in this important layer in both fields. Quack grass (*Agropyron repens*) was also present in the HQ field, but it was not abundant.

Method Used for Delineation of Utilized Area

The Henslow's Sparrow is classified as a grassland species. At Kipp, they were found in the old fields designated CS and HQ on the attached map. They have been noted in the CS field since 1977. (Lesher per. comm., see Appendix A). During the summer the extent of their use of the available habitat was determined using a spot-mapping technique. The spot-map method involved establishing a grid system consisting of parallel lines forming a square. Stakes were placed at given intervals along each transect and were coded with a number corresponding to the transect line and a letter corresponding to the distance traveled from the beginning of the transect line. The distance between stakes and distance between transect lines were determined by the density and type of vegetation. In this study, both fields were transected using laths at 30.7m intervals. To begin, I established a grid system in the HQ field with 71 numbered laths. All areas where singing Henslow's Sparrows occurred during preliminary surveys were included. Instead of a grid system, I developed strip/belt transects in the CS field. Standing vegetation outlined the twenty 30.7m wide strips. I traversed the fields every three to four days and recorded the location of each singing male on a graph corresponding to the grid or transect system. If females and/or young were seen, their location was also noted. Symbolism ^s~~ism~~ recommended by the Inventory Techniques for Sampling Avian Populations was used. Early in the season only one field was censused per day, but as the season progressed both fields were surveyed daily.

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Impact of Disturbance

In the Contact Station field, the territories were established at the greatest distance from the road while still being on the top of the slope. Although no permanent road borders the Headquarter's field, a temporary one was made on 09 July. That evening marked the greatest disturbance in this field. A Land Rover and a motorcycle drove the length of the field. This caused a shift of two territories as noted in the July report. The tracks made by these motorized vehicles were still visible at the end of the season.

2. Other Henslow's Sparrow survey data

See Appendix A

3. Summary of People and Agencies

See Appendix B

4. Newspaper articles and news releases - public relations

See Appendix C

5. "Birders"

Due in part to the predictability of finding Henslow's Sparrows at O.L. Kipp State Park, it is a must stop for many Bird Watching Enthusiasts (Birders). Kipp is the only known breeding location in the state. Southeast Minnesota is the northwest extreme of the species breeding range. Not only Minnesota Birders but also many visitors coming from further west stop at the park to view the species. During the 1987 summer season, I spoke with an average of one couple per week donned with binoculars. One individual, from California, was very pleased to have the opportunity of seeing the Henslow's Sparrow. A copy of an excerpt from his thank you letter is enclosed. (See Appendix D). Birders make up an important part of the visiting population at O.L. Kipp State Park. I have learned, via Anne Marie Plunkett of the Rochester bird club, that at least two nationally known Birding Tours, the Will Russel and the Victor Emmanuel, guide visits to Kipp in search of this species.

6. Literature Search

See Appedix E

7. Future Censusing Procedures

Because of the secretive nature of the Henslow's Sparrow, it is easily overlooked by the average bird watcher. It will be important to have someone who is familiar with the species to monitor the population. Due to the limited area, less than 150 acres (370.5 Ha), censusing is a relatively straight forward procedure. Most territories were established in areas of the fields with the highest elevation. In future years, it will be possible to census the population by walking the crests of the hills of the fields and noting the number of singing birds. Singing appears to increase on drearier days, so these would be a first choice for censusing days. Otherwise, early morning is most appropriate. It is important not to count a singing individual until you have passed by the spot at which it is singing. This will help eliminate the problem of counting an individual more than once. The vocalizations of Henslow's Sparrow are ventriliquial and carry a considerable distance.

8. Recommendations for Maintaining Appropriate Habitat

The two most important constituents of the Henslow's Sparrow breeding habitat are the presence of ground litter and the presence of singing perches. The species build^{vs} ~~their~~ nest within the litter layer, ~~utilizing the material present in the nesting site~~. Adults forage within this stratum, and many of their prey species live within this layer. Therefore, maintenance of a litter layer is important. A singing perch is defined as a vegetative stock with a height greater than the surrounding vegetation. The male of the species maintains his territory by vocalizing while poised on these stocks. Song is the primary means of territorial defense.

Old field habitat is a very transitory habitat. The grasses are succeeded by forbs which are then replaced by woody plants. If maintenance of a grassland community is desired, control of these later stages in ecological succession is needed. Two methods, controlled burning and mowing, are proposed to slow down the rate of change. Burning would hinder the encroachment of forbs and woody vegetation ^{in addition to producing unfavorable results on the ground litter and singing perches.} Mowing, as an alternative, would still remove some of the singing perches but the amount of removal could be controlled. I would recommend that during the first year the edges of the fields be mowed. During subsequent years, patches scattered throughout the fields be mowed. Those portions with the highest density of forbs should be mowed (in a particular year). Scattered small plots amongst untouched areas would hopefully still leave enough appropriate habitat intact for nesting. The average sweep of the mower is two (2) meters wide and the turning radius is thirty-six (36) meters. Therefore, small plots less than one (1) acre or 2.4 hectares would be possible. No more than one (1) acre out of ten (10) acres should be mowed in a given year. The mowing should be done early in the spring (pre-April) or late in the fall (post-October). This would lessen the disturbance on the breeding activity.

Appendix A

OLD RECORDS OF HENSLOW'S SPARROWS AS FOUND IN THE MOU FILES

- 1930 September 15 - Hennepin county
(Bird-Lore Nov-Dec 1930)
- 1933 June 5 - Stearn county, St Cloud
(Flicker May 1939) *nest
- 1934 June 16 - Anoka county, Ironwood Lake
(Flicker Vol VI Oct)
- 1943 October 2-10 - Rice county, Nerstrand
(Flicker September 1957)
- 1947 June - Lac Qui Parle county
(Flicker December 1947) *nest
- 1947 July 3 - Winona county, St Charles
(A C nosinceystar!?)
- 1950 September 27 - Waseca county, Waseca
(C Everett)
- 1952 July 15 - Winona county, Winona
(Flicker March 1953)
- 1953 June 11 - Winona county, Winona
(Flicker September 1953) * 5 eggs
- 1953 June 14 - Winona county, Winona
(Flicker June 1954)
- 1953 September 19 - St Louis county, Virginia
(Flicker December 1954)
- 1956 July 20 - Winona county, Winona
(Flicker December 1956)
- 1957 Summer - Winona county
(Flicker September 1957)
- 1958 July 20 - Winona county, Winona
(Flicker September 1958)
- 1959 June 20 - Wilken county, Barnsville
(Ron Huber)
- 1959 June 27 - Mahnomen county, Waubun
(Flicker September 1959)
- 1960 June 25 - Winona county, Winona
(Ron Huber)
- 1974 April 27 - Blue Mound State Park, Rock county
(Loon vol 46, Kim Eckert)
- 1982 July 9 - Hyland Lake Park Reserve
(Loon vol 54, Bruce Fall)

OLD RECORDS OF HENSLOW'S SPARROW (other than in MOU files)

- 1898 June 6 - Kittson county
(Dr. Roberts)
- 1902 summer - Jackson county
(Dr. Roberts) *nest
- 1933 June 5 - Stearns county
(Dr. Roberts) *nest
- 1947 June 1 - Lac Qui Parle county
(Flicker 19:95 - Franklin Willis) *nest
- 1953 June 14 - Winona county, Winona
(Brother Theodore) *4 eggs & 5 eggs

Appendix A continued

OLD RECORDS OF HENSLOW'S SPARROW (other than in MOU files) continued

1955 summer - Winona county
 (Brother Theodore) 6 pair with 20 young
 1953,1954,1955 - Winona county, Whitewater WMA
 (William Longley) *3 nesting pairs
 1961 August 26 - Clay county, between Felton and Ulen
 (Ron Huber) *adult with one young
 1967 July 12 - East Burns Valley Road, Winona, Winona county
 (Fred Lesher)
 1969 July 7 - Apple Blossom Drive, North LaCrescent, Houston county
 (Fred Lesher) one adult
 1976 July 23 - Apple Blossom Drive, North LaCrescent, Houston county
 (Fred Lesher) 2-5 adults
 1976 July 25 - United Methodist Church Field, LaCrescent, Houston county
 (Fred Lesher) 2 adults

**** There are no winter records for the Henslow's Sparrow in Minnesota.****

HENSLOW'S SPARROW RECORDS, O.L. KIPP STATE PARK
 recorded by Fred Lesher of LaCrosse, Wisconsin

Year	Date	Location	Number seen and comments
1977	29 May	Contact Station Field	3
1978	22 May	Contact Station Field	1
1979	06 July	Contact Station Field	2
1980	22 May	Contact Station Field	2 Near pond, NW
	29 June	Contact Station Field	7 Accompanied by Don Bolduc and Bob Janssen, perhaps explaining greater number.
	06 July	Contact Station Field	2
1981	08 June	Contact Station Field	1
	08 August	Contact Station Field	3
1982	08 May	Contact Station Field	3
	30 July	Contact Station Field	3
1983	09 June	Contact Station Field	2
1984	21 July	Contact Station Field	2
	28 July	Contact Station Field	2
1985	27 July	Contact Station Field	1
1986	13 June	Contact Station Field	1 With K. Bolin
		Headquarter's Field	4 or 5
1987	19 June	Contact Station Field	6
	04 August	Contact Station Field	Banded 1 fledgling
	29 August	Contact Station Field	1

Appendix B

Summary of People and Agencies

Name : Bob Janssen
Agency : Minnesota Ornithologist Union - editor of "The Loon"
Reason : Possible sightings outside of Kipp
Result : Not personally, but reported one sighting
: Grace Backus
: Hiawatha Audubon Club
: Information about Brother Theodor
: Information in mail, information not received
: Opal Fitch
: Hiawatha Audubon Club
: Information about Brother Theodor
: She did not believe Brother Theodor had been to Kipp
: Rick Johnson
: Nature Conservancy
: Possible sightings on TNC land
: TNC Element Stewardship Abstract
: Tex Hawkins
: U.S. Fish and Wildlife - Winona
: Possible sightings on F&W lands
: Pointed out TNC area Henslow's were seen in past years
: Fred Lesher
: S.E. MN Birder
: Sightings for this year and previous years, banding
: None this year outside of Kipp, banded
: Anne Marie Plunkett
: MOU / S.E. MN Birder
: Featuring project in future "Loon"
: Henslow's sparrow project will be in next "Loon"
: Jon Peterson
: S.E. MN Birder / Breeding Bird Surveyor
: Possible other colonies
: No other colonies to his knowledge
: Bill Evans
: Breeding Bird Surveyor S.E. MN
: May have tape of call note of migrating Henslow's sparrow
: Have not received tape
: Ray Glassel
: Minnesota Birder
: Possible sightings
: No sightings this year, but mentioned previous years
: Kim Eckert
: Minnesota Birding Guide
: Early contact for any information
: Provided names and places of area birders
: Jim Fitzpatrick
: Master Bander - Hastings
: Possible sightings of Henslow's sparrow
: No sightings reported
: Bill Drazkowski
: Hiawatha Audubon Club
: Location of published picture of Henslow's sparrow
: Area now a housing development

Appendix B continued

:Dennis Pack
:Winona State University
:Mic for parabolic disk
:Gave model number for usable mic
:Dave Palmquist
:Whitewater State Park
:Presentation of project at WSP
:Presentation of project at WSP on 15 August
:Pat Papenfaus
:Wife of former resident's son
:Land use history
:Established contact with former resident
:Bruce Fall
:University of Minnesota - Biology Department
:Information about ground nesters
:Information about ground nesters and procedure for banding
:Henry Kyllingstad
:Birder
:Information about Pipestone birds - in fall 1974 "Loon"
:None seen in five years
:Eleanor Sandford
:Long-term resident of Kipp area
:Information about land use
:Informative about area but not specific field use
:Irene Woodard
:Former resident
:Information about land use
:Did not want to discuss past
:Howard Munson
:Birder and photographer
:Asked to photograph banding procedure
:Photographed banding procedure

Henslow's sparrow banded

DAKOTA, Minn. — Volunteers at O.L. Kipp State Park managed to capture and band one rare Henslow's sparrow last week as part of a summer-long study of a colony of the birds at the park.

The study is being conducted by Lynelle Hanson, a biology student, for the Minnesota Department of Natural Resources to establish data on the colony, which is the only known nesting site for Henslow's sparrows within the state.

Hanson's DNR study will end this year on Aug. 21. But she will be back at the park for the next two summers to continue studying the birds' behavior as part of her work toward a master's degree.

The one bird banded on Tuesday was corraled into a mist net by the volunteers. Hanson will be looking for the banded bird next year to see if it returns to the nesting site.

About a dozen of the sparrows, which are considered rare in Minnesota, nested at the park this summer.

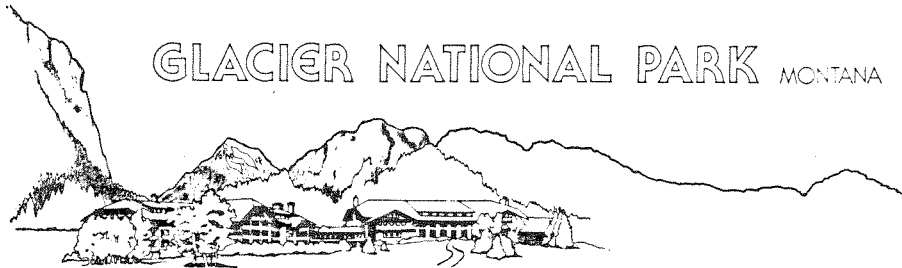
*Sun. Aug. 9, 1987
Winona Herald*

Guest speakers at Whitewater Park

Two guest speaker programs will be presented on Aug. 15 at Whitewater State Park.

Lynelle Hanson will give a slide presentation at Whitewater's office on grassland birds of southeastern Minnesota, including the rare Henslow's sparrow. Hanson has been studying Henslow's sparrows this summer at O.L. Kipp State Park. Group size is limited and reservations (507-932-3007) are needed.

Later the same day, Don DelGreco will introduce the butterflies of southeastern Minnesota. This program will be held in the picnic shelter starting at 8:30 p.m.



Aug. 19, 1987

Dear Linelle,

A note to let you know of my appreciation for your time and effort in taking my son Andy and I to look for birds at Beaver Creek and Kipp state parks. The Henslow's sparrows were especially appreciated. I hope your trapping/banding efforts were successful and that your project will result in a lasting impact to conserve the species and its habitat.

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SPECIFICALLY HENSLOW'S SPARROW

- Arnold, K.A. 1983. A new subspecies of Henslow's Sparrow (*Ammodramus henslowii*). Auk, 100:504-505.
- Borrer, D.J. and C.R. Reese. 1954. Analytical studies of Henslow's Sparrow songs. Willson Bull. 60:4.
- Eckert, K. 1974. Henslow's Sparrow and Bell's Vireo in southwest Minnesota. The Loon, 46:122-123.
- Fall, B.A., R.D. Eliason 1982. Henslow's Sparrow nest, Hennepin county. The Loon, 54:192.
- Graber, J.W. 1968. *Passerherbulus henslowii henslowii* Western Henslow's Sparrow. U.S. Nat. Mus. Bull. 237:779-788.
- Hyde, A. S. 1939. The life history of Henslow's Sparrow, *Passerherbulus henslowii* (Audubon). Mus. Zool. Univ. Mich. Misc. Publ. No. 41. 72pp.
- Opengari, B.J. 1980. Henslow's Sparrows in Alleghany County. The Raven, 51:15.
- Renkin, R.B., J.J. Dinsmore 1981. A Henslow's Sparrow in North Dakota. (other information unavailable)
- Robbins, C.S., D. Bystrak and P. Geissler 1986. The breeding bird survey: Its first fifteen years, 1965-1979. U.S. Dept. Int. Res. Publ. 157:115-116,147.
- Robins, J. D. 1967. Ecology of Henslow's Sparrow. Unpubl. M. S. thesis, Western Michigan Univ., Kalamazoo, Michigan.
- Robins, J. D. 1971. A study of Henslow's Sparrow in Michigan. Wilson Bull. 83:39-48.
- Robins, J.D. 1971. Differential niche utilization in a grassland sparrow. Ecol. 52:1065-1070.

SPECIES STATUS SHEETS

- Drilling, N. 1987. TNC Element Stewardship Abstract. The Nature Conservancy, 03/16/87.
- Pfannmüller, L. 1987. Species Status Sheet. Department of Natural Resources.

Appendix E continued

HABITAT OF HENSLOW'S SPARROW

- Cody, M.L. 1968. On the methods of resource division in grassland bird communities. *The Am. Nat.*, 102(924):107-147.
- Johnston, D.W., E.P. Odum 1956. Breeding bird population in relation to plant succession on the piedmont of Georgia. *Ecol.* 37(1):50-61.
- Mitchell, M.J. 1961. Breeding bird populations in relation to grassland succession on the Anoka Sand Plain. *The Flicker*, December pp102-108.
- Mitchell, R. 1985. Characteristics of summer habitats of selected nongame birds in Missouri. Research Bulletin 1056. UM-Columbia.
- Sampson, F.B. 1980. Island biogeography and the conservation of nongame birds. Forty-Fifth No. *Am. Wldlf. Conf. Trans*, 45:245-251.
- Sampson, F.B. 1980. Island biogeography and the conservation of prairie birds. Missouri Coop. Wldlf. Resch. Unit.
- Skinner, R.M., T.S. Baskett, M.D. Blenden. 1984. Bird habitat on Missouri prairies. Terrestrial Series #14. Missouri Depart. of Cons.
- Wiens, J.A. 1974. Habitat heterogeneity and avian community structure in North American grasslands. *The Am. Midl. Nat.* 91(1):195-213.
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- Wiens, J.A. 1973. Pattern and process in grassland bird communities. *Ecol. Monogr.*, 43:237-270.
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TERRITORY INFORMATION

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- Odum, E.P. and E. Kuenzler 1955. Measurement of territory and home range size in birds. *Auk*, 72:128-137.
- Orians, G.H. and M.F. Willson 1964. Interspecific territories of birds. *Ecol.* 45(4):736-745.
- Schoener, T.W. 1968. Sizes of feeding territories among birds. *Ecol.* 49(1):123-141.

SPECIFICALLY HENSLow'S SPARROW

- Arnold, K.A. 1983. A new subspecies of Henslow's Sparrow (*Ammodramus henslowii*). Auk, 100:504-505.
Two subspecies of Henslow's sparrow are recognized: [*Passerherbulus*] *h. henslowii*, the western form, and *A. h. susurrans*, the eastern form. A new subspecies *houstonensis* with a very restricted range is proposed.
- Borrer, D.J. and C.R. Reese. 1954. Analytical studies of Henslow's Sparrow songs. Willson Bull. 60:4.
Audio-spectrographic analysis of the Henslow's Sparrow song revealed it was made up of many notes and not just the two or three often referred to in the literature.
- Eckert, K. 1974. Henslow's Sparrow and Bell's Vireo in southwest Minnesota. The Loon, 46:122-123.
Author states knowledge of only three records of the sparrow outside of southeastern Minnesota. This sighting was made at Blue Mounds State Park in Rock county.
- Fall, B.A., R.D. Eliason 1982. Henslow's Sparrow nest, Hennepin county. The Loon, 54:192.
Henslow's Sparrow nest with four six-day-old young was found in Hyland Lake Park Reserve in southern Hennepin county on 9 July 1982.
- Graber, J.W. 1968. *Passerherbulus henslowii henslowii* Western Henslow's Sparrow. U.S. Nat. Mus. Bull. 237:779-788.
A brief overview of the Western Subspecies of Henslow's Sparrow as contributed to The Life history of North American cardinals, etal by Bent, 1968.
- Hyde, A. S. 1939. The life history of Henslow's Sparrow, *Passerherbulus henslowii* (Audubon). Mus. Zool. Univ. Mich. Misc. Publ. No. 41. 72pp.
One of the first comprehensive investigations of the Henslow's Sparrow's life history. The study was conducted in southern Michigan. A extensive bibliography is also included.
- Opengari, B.J. 1980. Henslow's Sparrows in Alleghany County. The Raven, 51:15.
Author discovered Henslow's Sparrow while doing a Breeding Bird Survey south of Covington, Virginia.
- Renkin, R.B., J.J. Dinsmore 1981. A Henslow's Sparrow in North Dakota. (other information unavailable)
Although Henslow's Sparrow occur only accidentally in North Dakota, author discovered a singing male.

Appendix(E continued)

Robbins, C.S., D. Bystrak and P. Geissler 1986. The breeding bird survey: Its first fifteen years, 1965-1979. U.S. Dept. Int. Res. Publ. 157:115-116,147.

Henslow's Sparrows deserve special attention because of their preferred nesting habitat: fields that have been idle for several years, often with a sprinkling of young, woody growth. This habitat is not only transitory but it is becoming less frequent because comparatively few fields are permitted to lie idle for a sufficient number of years. The number of observations was too small in most States and strata to produce significant trend data; however, only 10 States and strata showed an increasing tendency compared with 25 that exhibited a decreasing tendency.

Robins, J D. 1967. Ecology of Henslow's Sparrow. Unpubl. M. S. thesis, Western Michigan Univ., Kalamazoo, Michigan.

The ecology of the Henslow's Sparrow was the focus of the author's graduate work. The paper covered basic breeding biology.

Robins, J. D. 1971. A study of Henslow's Sparrow in Michigan. Wilson Bull. 83:39-48.

In Michigan, Henslow's Sparrow breeds in areas characterized by (1) herbaceous cover (usually grasses or sedges), (2) the presence of litter, (3) an intermediate range of moisture, and possibly (4) the presence of singing perches in the spring.

Territories appeared to be established and maintained exclusively by song. Average territory size was 0.8 acres.

Nests were built of dead grasses.

Robins, J.D. 1971. Differential niche utilization in a grassland sparrow. Ecol. 52:1065-1070.

Abstract. Henslow's Sparrow (*Ammodramus henslowii*) is a secondary sexually monomorphic breeding bird in meadows, hayfields, prairies, grasslands, and some croplands in eastern North America. Foraging behavior during the nestling period involved no intersexual differences in prey selection, and both sexes were opportunistic in food choice. Sexual spatial partitioning of feeding niche was accomplished by adults foraging in different directions and at different distances from the nest. Males, which defend the territories alone, forage at greater distances from the nest than females. Females forage closer to the nest and in different areas than males, which enhance survival of young because females do most of the feeding and all brooding of the young.

Sutton, G.M. 1959b. The nesting fringillids of the Edwin S. George Reserve, southeastern Michigan IV. Jack Pine Warbler, 37:127-151.

Besides discussing characteristics of the species, the author notes the decrease in numbers during the 14-year period of the study beginning in 1934.

HABITAT OF HENSLOW'S SPARROW

Cody, M.L. 1968. On the methods of resource division in grassland bird communities. *The Am. Nat.*, 102(924):107-147.

This paper is concerned with the distributions of bird species in grassland communities and the associated differences in feeding habits. There is some evidence that interspecific competition is an important factor in the local distribution of animals both within and among habitats. These studies suggest that the persistence of species in a particular habitat will be determined in part by the ecological differences between them.

Johnston, D.W., E.P. Odum 1956. Breeding bird population in relation to plant succession on the piedmont of Georgia. *Ecol.* 37(1):50-61.

Bird populations exert their effect on ecological succession. Most species have a definite range of occurrence. Species composition and density varied with changing successional stages.

Mitchell, R. 1985. Characteristics of summer habitats of selected nongame birds in Missouri. Research Bulletin 1056. UM-Columbia.

The characteristic most consistently describing habitat around song perches were no woody stems greater than or equal to 2.5cm dbh (always 0/ha), few or no woody stems less than 2.5 cm dbh (0/ha, never greater than 100). and dense ground vegetation (greater than 95%, never less than 90) of intermediate height (0.20-0.40 m, never less than 0.10 or greater than 0.50). Another important feature was dense litter coverage (greater than 95%, never less than 25).

Sampson, F.B. 1980. Island biogeography and the conservation of nongame birds. Forty-Fifth No. *Am. Wildl. Conf. Trans.*, 45:245-251.

Abstract: During the last decade, the theory of island biogeography proposed by MacArthur and Wilson in 1967 has emerged as the conceptual focal point in the design of preserves for wildlife. The theory proposes the relatively constant number of species held by an island reflects a dynamic equilibrium between rates of immigration and extinction influenced by island area and distance between islands. An important achievement has been the extensive application of the island theory to the design of refuges for tropical birds to include which species will be maintained and for how long. Many aspects of avian use of prairies have been examined in detail.

Skinner, R.M., T.S. Baskett, M.D. Blenden. 1984. Bird habitat on Missouri prairies. Terrestrial Series #14. Missouri Depart. of Cons.

Study showed lightly grazed and idle grasslands were preferred management practices. Henslow's Sparrow were seen on spring-burned prairie by mid-July and were common on undisturbed grassland even if it had been disturbed the previous year.

Appendix E continued

Wiens, J.A. 1973. Interterritorial habitat variation in Grasshopper and Savannah Sparrows. *Ecology*. 54(4):877-884.

Abstract: Individual variation in features of habitat structure among territories of breeding grasshopper sparrows and savannah sparrows in a southern Wisconsin grassland was examined. Grasshopper sparrow territories established late in the breeding season were larger than those occupied earlier. In savannah sparrows, time of establishment had no significant effect upon territory size, but variation in the amount of grass cover was highly correlated with size differences. There was considerable inter-territorial variation in habitat feature in both species, but patterns relating to territory size, position in the breeding population, and time of territory establishment were well-defined in savannah sparrows, whereas grasshopper sparrow territories generally showed little systematic pattern of variation. Although these species occupied similar habitat situations after breeding populations stabilized in mid-June, they initially established territories in quite different portions of the habitat spectrum.

Wiens, J.A. 1973. Pattern and process in grassland bird communities. *Ecol. Monogr.*, 43:237-270.

Abstract: Variations in abundance and distribution of bird species and avifaunal and community organization at regional, local, and within-plot levels were studied during 1969 and 1970 at a shortgrass prairie in Colorado and during 1970 at six additional International Biological Program (IBP) grassland sites. Patterns were generally not distinct at the regional level, although low rainfall sites tended to support fewer individuals and less biomass than more mesic sites. The dominant bird species were widely distributed, but 70% of all species recorded were present at only one of the seven sites. Local plot-to-plot differences, associated with grazing intensity were considerably more important than the regional differences.

Zimmerman, J.L. 1987. Breeding season habitat selection by the Henslow's Sparrow (*Ammodramus henslowii*). Scientific Papers presented at the 105 Stated Meeting of the AOU.

Abstract. Spring burning preempts settling by Henslow's Sparrow on tallgrass prairie in the Flint Hills Upland of Kansas. Territories were mapped on four unburned watersheds (total of 211 ha) on the Konza Prairie Research Natural Area, Kansas during the breeding seasons of 1985 and 1986. Vegetation was compared for area within territories and for area excluded from territories. Males establish territories in patches with greater coverage by standing dead vegetation, lesser coverage by woody vegetation, and taller live grasses. It is hypothesized that the primary ultimate cause for this proximate selection is the depressing effect of standing dead vegetation on aboveground biomass productivity which results in a more open substrate for this ground-dwelling species.

TERRITORY INFORMATION

Nice, M. Morse. 1941 The role of territory in bird life. The Am. Midl. Nat. 26(3):441-487.

The theory of territory in bird life is briefly this: that pairs are spaced through the pugnacity of males towards others of their own species and sex; that song and display of plumage and signals are a warning to other males and an invitation to a female; that males fight primarily for territory and not over mates; that the owner of a territory is nearly invincible in his territory; and finally that birds which fail to obtain territory form a reserve supply of which replacements come in case of death of owners of territories.

Odum, E.P. and E. Kuenzler 1955. Measurement of territory and home range size in birds. Auk, 72:128-137.

At some time during the annual cycle, most vertebrates restrict their activities to a definite area which may be termed the home range. If all or part of the home range is defended against the individuals of the same species, the guarded area is called a territory, according to current usage. A method for standardizing measurements of territories is proposed.

Orians, G.H. and M.F. Willson 1964. Interspecific territories of birds. Ecol. 45(4):736-745.

Abstract. Territories of birds, usually defended against conspecific individuals, are sometimes defended against individuals of other species. Since such behavior is demanding both of time and energy, natural selection should favor ecological divergence, the establishment of overlapping territories, and the reduction of aggression. Lack of divergence in modes of exploitation could mean that insufficient time has elapsed for the changes to be completed or that the environment imposes some limitation preventing the evolution of the required degree of divergence. Such environmental limitation can be predicted in (a) structurally simple environments, (b) when feeding sites are strongly stratified in structurally complex vegetation, or (c) when the presence of other species in the environment prevents divergence in certain directions. The known cases of interspecific territoriality in birds are analyzed and shown to be largely in accordance with these predictions, although several cases of overlapping territories in situations where interspecific territoriality has been predicted provide relationships worthy of further study. We suggest that Darwinian selection at the level of the individual permits an understanding of the known structure of avian communities and that there is no need at present to invoke new selective mechanism at the level of the community or ecosystem.

Appendix E continued

Schoener, T.W. 1968. Sizes of feeding territories among birds. *Ecol.* 49(1):123-141.

Abstract: This analysis deals with size variations in the breeding territories of land birds which obtain most of their food on the territory.

For the species studied as a whole, territory size shows a strong positive relationship to body weight. Predators tend to have larger territories than omnivores or herbivores of the same weight, presumably due to the relatively denser food of the latter species. The home ranges of raptors inhabiting two areas were found to be significantly correlated with an index of the numerical density of their prey and in one area with raptor weight. Higher clutch size is not significantly associated with larger territories in any category of birds tested. The number of individuals defending the territory and the number feeding the young are probably not correlated with territory size.

The exponential relationships between body weight of the consumer and three dependent variables - food biomass consumed per unit time, average prey weight and territory or home range size - are used to derive three predictions : a) Heavier predators take fewer individuals per unit time than lighter species; b) If certain restrictions are satisfied, the collective biomasses in a given large area increase as individual biomasses become larger for omnivorous species and decrease as individual biomasses increase for predators; c) For predators, the density of acceptable and accessible food in biomass per unit area decreases as the weight of the consumer increases.

Territory or home range size increases more rapidly with body weight for predators than for omnivores or herbivores. This relationship holds true for both birds and mammals and presumably reflects a rapidly decreasing food density for predators of increasing weight.

BEAVER CREEK STATE PARK
BREEDING BIRD SURVEY
1987

The surveys were conducted on 20 May, 2 & 3 June, and 8 & 9 June.

Louisiana Waterthrush, Cerulean Warbler, Acadian Flycatcher, and Blue-gray Gnatcatcher were the target species.

SPECIES LIST

Order Ciconiiformes

Family Ardeidae

Great Blue Heron (*Ardea herodias*)

Order Anseriformes

Family Anatidae

Wood Duck (*Aix sponsa*)

Order Falconiformes

Family Accipitrinae

Broad-winged Hawk (*Buteo platypterus*)

Red-tailed Hawk (*Buteo jamaicensis*)

Family Falconidae

American Kestrel (*Falco sparverius*)

Order Galliformes

Family Phasianidae

Ruffed Grouse (*Bonasa umbellus*)

Order Charadriiformes

Family Charadriidae

Killdeer (*Charadrius vociferus*)

Family Scolopacidae

Common Snipe (*Gallinago gallinago*)

Order Columbiformes

Family Columbidae

Mourning Dove (*Zenaidura macroura*)

Order Cuculiformes

Family Cuculidae

Black-billed Cuckoo (*Coccyzus erythrophthalmus*)

Yellow-billed Cuckoo (*Coccyzus americanus*)

Order Strigiformes

Family Strigidae

Great Horned Owl (*Bubo virginianus*)

Order Apodiformes

Family Apodidae

Chimney Swift (*Chaetura pelagica*)

Family Trochilidae

Ruby-throated Hummingbird (*Archilochus colubris*)

Order Coraciiformes

Family Alcedinidae

Belted Kingfisher (*Ceryle alcyon*)

Order Piciformes

Family Picidae

Red-headed Woodpecker (*Melanerpes lewis*)

Red-bellied Woodpecker (*Melanerpes carolinus*)

Yellow-bellied Sapsucker (*Sphyrapicus varius*)

Downy Woodpecker (*Picoides pubescens*)

Hairy Woodpecker (*Picoides villosus*)

Northern Flicker (*Colaptes auratus*)

Pileated Woodpecker (*Dryocopus pileatus*)

Order Passeriformes

Family Tyrannidae

Eastern Wood-Pewee (*Contopus virens*)

Acadian Flycatcher (*Empidonax virescens*)

Least Flycatcher (*Empidonax minimus*)

Eastern Phoebe (*Sayornis phoebe*)

Great Crested Flycatcher (*Myiarchus crinitus*)

Family Hirundinidae

Tree Swallow (*Tachycineta bicolor*)

Northern Rough-winged Swallow (*Stelgidopteryz serripennis*)

Bank Swallow (*Riparia riparia*)

Barn Swallow (*Hirundo rustica*)

Family Corvidae

Blue Jay (*Cyanocitta cristata*)

American Crow (*Corvus brachyrhynchos*)

Family Paridae

Black-capped Chickadee (*Parus atricapillus*)

Tufted Titmouse (*Parus bicolor*)

Family Sittidae

White-breasted Nuthatch (*Sitta carolinensis*)

Family Troglodytidae

House Wren (*Troglodytes aedon*)

Winter Wren (*Troglodytes troglodytes*)

Family Muscicapidae

Blue-gray Gnatcatcher (*Polioptila caerulea*)

Eastern Bluebird (*Sialia sialis*)

Veery (*Catharus fuscescens*)

Wood Thrush (*Hylocichla mustelina*)

American Robin (*Turdus migratorius*)

Family Mimidae

Gray Catbird (*Dumetella carolinensis*)

Northern Mockingbird (*Mimus polyglottos*)

Family Bombycillidae

Cedar Waxwing (*Bombycilla cedrorum*)

Family Vireonidae

Yellow-throated Vireo (*Vireo flavifrons*)

Warbling Vireo (*Vireo gilvus*)

Red-eyed Vireo (*Vireo olivaceus*)

Family Emberizidae

Blue-winged Warbler (*Vermivora pinus*)

Yellow Warbler (*Dendroica petechia*)

Yellow-rumped Warbler (*Dendroica coronata*)

Black-throated Green Warbler (*Dendroica virens*)

Cerulean Warbler (*Dendroica cerulea*)

American Redstart (*Setophaga ruticilla*)

Ovenbird (*Seiurus aurocapillus*)

Louisiana Waterthrush (*Seiurus motacilla*)

Mourning Warbler (*Oporornis philadelphia*)

Common Yellowthroat (*Geothlypis trichas*)

Scarlet Tanager (*Piranga olivacea*)

Northern Cardinal (*Cardinalis cardinalis*)

Rose-breasted Grosbeak (*Pheucticus ludovicianus*)

Indigo Bunting (*Passerina cyanea*)

Rufous-sided Towhee (*Pipilo erythrophthalmus*)

Chipping Sparrow (*Spizella passerina*)

Clay-colored Sparrow (*Spizella pallida*)

Field Sparrow (*Spizella pusilla*)

Song Sparrow (*Melospiza melodia*)

White-throated Sparrow (*Zonotrichia albicollis*)

Red-winged Blackbird (*Agelaius phoeniceus*)

Common Grackle (*Quiscalus quiscula*)

Brown-headed Cowbird (*Molothrus ater*)

Northern Oriole (*Icterus galbula*)

Family Fringillidae

American Goldfinch (*Carduelis tristis*)

REGULAR SPECIES

All species recorded at Beaver Creek occur regularly in Minnesota.

The nomenclature, sequence, and taxonomy of this list is according to the sixth edition of the A.O.U. Check-list, published in 1983.

Park frequency definitions are according to "A Birder's Guide to Minnesota" revised second edition by Kim R. Eckert.

Status in Minnesota is according to "Minnesota Birds, Where, When, and How Many" by Janet C. Green and Robert B. Janssen.

Column A : Frequency in park

- C : relatively easy to see/hear in habitat and in season
- U : usually harder to see/hear
- R : normally difficult to see/hear unless "staked-out"
- NB : nonbreeding but seen/heard during migration

Column B : Area found in park

- AC : along creek
- OH : overhead
- EO : end openings
- EV : everywhere in park
- HO : heard only
- BR : by bridge
- PL : in parking lot
- AT : along trail
- TXC : where trail crosses creek
- IC : near interpretive center
- CA : in campground

Column C : Status in Minnesota

- M : migrant
- SR : summer resident
- WC : winter casual
- WV : winter visitor
- PR : permanent resident
- WR : winter regular
- CM : casual migrant
- WA : winter accidental
- SRinHC : summer resident in Houston County
- CWV : casual winter visitor
- VORR : visitor outside regular range

Column D : Position on tape

A composite tape of pre-recorded songs of species seen/heard was made to assist in the survey and to familiarize the park staff with the birds found in the park.

COMMON NAME	A	B	C	D
Great Blue Heron	U	AC	M&SR	--
Wood Duck	U	AC	M&SR;WC	--
Broad-winged Hawk	U	OH	M&SR	58
Red-tailed Hawk	C	OH	M,SR&WV	57
American Kestrel	U	EO	M&SR;WR	59
Ruffed Grouse	C	EV	PR	37
Killdeer	U	EO	M&SR;WC	74
Common Snipe	U	HO	M&SR;WR	75
Mourning Dove	U	HO	M&SR;WR	62
Black-billed Cuckoo	U	EO	M&SR	63
Yellow-billed Cuckoo	R	HO	M&SR	64
Great Horned Owl	U	EV	PR;WV	60
Chimney Swift	C	BR,PL	M&SR	71
Ruby-throated Hummingbird	U	AT	M&SR	--
Belted Kingfisher	U	AC	M&SR;WR	66
Red-headed Woodpecker	U	EO	M&SR;WR	32
Red-bellied Woodpecker	C	EV	PR;CM&WR	33
Yellow-bellied Sapsucker	U	AT	M&SR;WC	34
Downy Woodpecker	C	EV	PR	35
Hairy Woodpecker	U	EV	PR	36
Northern Flicker	C	EV	M&SR;WA	30
Pileated Woodpecker	U	EV	PR	31
Eastern Wood-Pewee	C	AT	M&SR	20
Acadian Flycatcher	R	TXC	SRinHC	3&6
Least Flycatcher	C	AT&PL	M&SR	21
Eastern Phoebe	C	PL&IC	M&SR	19
Great Crested Flycatcher	U	AT	M&SR	22
Tree Swallow	C	PL&BR	M&SR	68

Northern Rough-winged Swallow	C	AT	M&SR	69	
Bank Swallow	U	AT	M&SR	70	
Barn Swallow	C	PL	M&SR	67	
Blue Jay	C	EV	PR&RM	28	
American Crow	C	EV	M&SR;WR	54	
Black-capped Chickadee	C	AT	PR	55	
Tufted Titmouse	R	AT	PR;CWV	56	
White-breasted Nuthatch	C	AT	PR;WV	29	
House Wren	C	PL&AT	M&SR	17	
Winter Wren	NB	AT	M&SR;WC	--	
Blue-gray Gnatcatcher	C	PL&AT	M&SR	4&5	
Eastern Bluebird	C	PL&EO	M&SR;WC	12	
Veery	U	AT	M&SR	43	
Wood Thrush	U	AT	M&SR	44	
American Robin	C	EV	M;SR&WV	9	
Gray Catbird	C	AT	M&SR;WA	18	
Northern Mockingbird	R	CA	M&SR	--	
Cedar Waxwing	C	PL	M;SR&WV	45	
Yellow-throated Vireo	U	PL	M&SR	48	
Warbling Vireo	C	PL&BR	M&SR	47	
Red-eyed Vireo	U	PL	M&SR	46	
Blue-winged Warbler	R	AT	M&SR	51	
Yellow Warbler	C	PL&AT	M&SR	15	
Yellow-rumped Warbler	NB	PL	M&SR;WA	50	
Black-throated Green Warbler	NB	AT	M&SR	49	
Cerulean Warbler	R+	TXC	M&SR	2&7	
American Redstart	C	EV	M&SR	11	
Ovenbird	U	AT	M&SR	41	
Louisiana Waterthrush	R-	TXC	M&SR	1&8	

Mourning Warbler	NB	AT	M&SR	51	
Common Yellowthroat	U	IC	M&SR	53	
Scarlet Tanager	U	AT&EO	M&SR	72	
Northern Cardinal	C	EV	PR;VORR	38	
Rose-breasted Grosbeak	C	PL&EV	M&SR	23	
Indigo Bunting	C	AT&EO	M&SR	16	
Rufous-sided Towhee	C	IC	M&SR;WC	24	
Chipping Sparrow	C	PL	M&SR	26	
Clay-colored Sparrow	U	EO	M&SR	73	
Field Sparrow	C	EO	M&SR;WA	27	
Song Sparrow	C	AT	M&SR;WR	14	
White-throated Sparrow	NB	EO	M;SR&WV	25	
Red-winged Blackbird	C	AT&PL	M&SR;WR	13	
Common Grackle	C	PL&IC	M&SR;WR	40	
Brown-headed Cowbird	C	PL&AT	M&SR;WC	42	
Northern Oriole	C	PL&EV	M&SR;WA	39	
American Goldfinch	C	EV	M&SR;WR	10	