Winter Movement and Habitat Use by Harris' Sparrow, Zonotrichia querula (Nuttall)

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INTRODUCTION

Harris' sparrow, *Zonotrichia querula* (Nuttall), has been the subject of little scientific investigation in its winter range. The winter range was mapped and described by Swenk and Stevens (1927) as principally south from southeastern Nebraska to central Texas, roughly between longitudes 94° and 98°. The area is about 200 miles wide by 900 miles long and the center of population may well be located in north-central Oklahoma. Park (1936), Harkins (1937), Steelman and Herde (1937), Baumgartner (unpub. MS) and Baepler (1956) worked with this species but little data is available on its winter activity.

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This is a report on a study of the winter activity of Harris' sparrow from 30 October 1961 to 10 May 1962 near Stillwater, Payne County, Oklahoma.

Materials and Methods

One hundred and fifteen individual birds within a wintering population of this species were banded and feather marked. The extent and frequency of movements were studied by field observations and trapping at five trap stations (Figure 1).

Modified government sparrow traps were used at four trap stations while a three-leaf-clover trap and a 6 × 6 × 6 foot house trap were used at a fifth station. All three types are described by Lincoln (1947) and operated upon the principle of a funnel entrance opening at ground level. Grain sorghum scattered in and around the trap was used for bait.

The birds were banded with standard aluminum bands, size 1A, issued by the Federal Fish and Wildlife Service.

Each station was assigned a particular color and color-marking was done using a dyed extraneous feather cemented to the shaft of a main retrice as described by Baumgartner (1938).

Twenty-five of these birds were further marked for individual recognition using additional color combinations.

Traps were visited twice daily and the entire study area and adjacent habitats were censused bi-weekly.

No attempt was made to sex the birds since external differences in sexes are not apparent. They were recorded as immature and adult, using plumage characteristics.

The study area consisted of approximately 480 acres bounded on the east by a reservoir and on the west by an expanse of grassland. A small wooded ravine led from the study area both north and south, providing a natural travelway for birds leaving the study area.

This locality was originally tallgrass prairie dissected by small timbered ravines and intermittent streams. Cultivation, real estate development and reservoir construction had divided the area into the following habitat types on the basis of vegetation and land use:

(1). Tallgrass Prairie: The open grassland areas including an old lake bed in the process of secondary succession (50%).

(2). Residential-Subdivision: Land dissected by streets, staked-out lots, and new home construction. Some old residences with well developed lawns were included here (35%).

(3). Timbered Ravine: Wooded ravines, containing intermittent streams with much upper and lower story cover (5%).

(4). Disturbed-Cultivation: All old fields or areas disturbed by cultivation. This included two old farmstead sites (5%).

(5). Lawn-Cultured: Large cultured or semi-cultured acreages including well developed planting of trees and shrubs and open lawn areas (5%).

Results

The first Harris' sparrows were seen on 3 November 1961 and the traps were put into operation on 6 November 1961 at stations A, E, F and H. A total of 115 birds was banded and marked at these stations.

Of these, 99 were newly banded and 16 were return birds banded by Baumgartner (unpub. MS) at station A in previous years.

The largest number (33) of birds trapped for the first time was during November. In December, the number dropped to 29 and in January to 12. In February the number increased to 17 then declined through March, April and May to 12, 10 and 2 birds respectively.

Table II presents a summary of 80 field counts in the study area. In the table each month is divided into four periods equivalent to one week.

Trap and census records shown in Tables I and II indicated that the majority of migrants arrived during weeks two and three of November, then declined in number as they spread out in search of permanent winter habitat or migrated further south during December. The population was stable during January and February. In late March a slight increase in numbers suggested that a small spring migration movement occurred. This movement was much less conspicuous than the fall movement. Numbers then declined steadily until only a few scattered individuals remained in May (last birds observed on 8 May).

These data indicate that the winter residence period of Harris' sparrow may be generally divided into three periods: (1) a fall settling period of relatively mild weather, in which the birds arrive, and shift about seeking permanent winter habitat or push further south. (2) A midwinter stable period in which the birds establish their local winter range. (3) A spring period characterized by changeable weather during which considerable restlessness is indicated by birds shifting habitat and apparent seasonal northward movement. No fixed dates are suggested for these divisions from year to year for the onset and duration of a given period is dependent upon numerous factors including, chiefly, weather conditions.

Twenty-three birds were banded and marked at station F throughout the fall period. The number of birds declined here until 4 December, when only four birds were present, and after 24 December, this area was deserted with the exception of four one-day records on 6 and 11 January, 12 February and 18 March 1962. Station F served only as a temporary habitat, for fall arrivals, from which they spread into other areas.

It was possible to determine the fate of these birds with some accuracy. Twelve birds trapped during November repeated a few times, then disappeared, evidently moving further south or far enough from the study area that they were never seen again. The remaining fourteen (54%) moved to adjoining habitat and established residence for the winter, based upon trap and sight records over a minimum period of three months.

At station A, 17 birds were marked and 12 (71%) established permanent winter residence. At station E, 24 birds were marked and 23 became residents, showing various exchange patterns between stations A, E, H^1 and H^2.

A period of continous snow and freezing weather 5 to 9 January 1962 marked the decline of new birds trapped and the end of the fall period.

Winter period—This period extended from 10 January 1962 to 15 March 1962 until increased numbers indicated the onset of spring migration.

At station A, 10 new birds and one return all established winter residence, while at Station E, 13 new birds and two returns were trapped, seven of which established winter residence.

During January, field observations and trap data indicated 21-24 birds in A, E, and H^2 areas. Eighteen of these birds remained as resi-

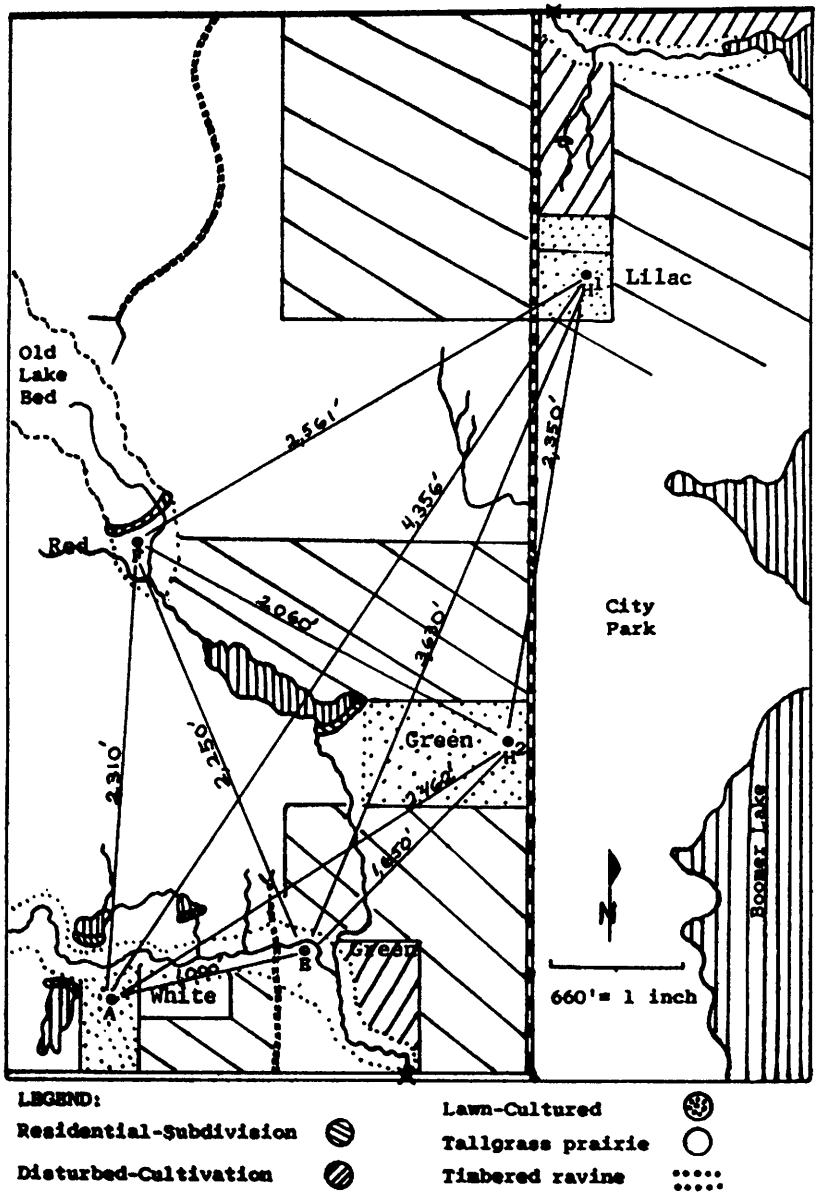

Figure 1. A map of the general study area showing the distribution of habitat types and the location of trap stations. Linear distances between trap stations are indicated.

TABLE I. A SUMMARY OF 115 HARRIS' SPARROWS BANDED AND MARKED DURING THE STUDY.

Month	Return Birds	New Adults	Total Adults	Immature	Total Birds	Percent Adult	Percent Immature
November	3	4	7	26	33	21.2	78.8
December	8	4	12	17	29	41.4	58,6
January	2	1	3	9	12	25.0	75.0
February	3	6	9	8	17	53.0	47.0
March	0	7	7	5	12	58.4	41.6
April	0	3	3	7	10	30.0	70.0
May	0	0	0	2	2	00.0	100
TOTAL	16	25	41	74	115	35.7	64.3

TABLE II. HARRIS' SPARROW BY WEEKLY CENSUS.

Period	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
I	9	38	25	25	20	20	6
II	110	31	21	21	20	27	0
III	117	28	23	20	31	17	0
IV	34	27	23	20	34	9	0
TOTAL	270	124	92	86	105	73	6

dents. Sixteen of these were color marked. Twenty new birds were banded and marked here throughout the remainder of the winter period, indicating a marked local shifting from one habitat to another during the midwinter stable period.

Spring period—This period began in mid-March and extended throughout the duration of the study. Twenty-five new birds were trapped and marked, of which only five were ever trapped or identified again. Lack of trap repeats and sight records indicated a temporary status. These birds were probably spring migrants moving through the study area or local birds from nearby areas, stimulated to move by pre-migratory excitement.

Among 115 birds, 17 (14.8%) were fall migrants and 18 (15.6%) were spring migrants, exhibiting no exchange movement and remaining no longer than one month. Forty-eight became residents. Thirty-two birds moved into the study area during the midwinter stable period and 17 of these remained as residents while 15 moved out again.

Table III summarizes the extent and frequency of movement for resident birds throughout the entire study. Movements were taken from trap records in chronological order and in some instances, a full 0.5-mile movement was broken into two 0.25-mile movements when birds visited an intermediate station; thus fewer 2,000- to 3,000-foot movements are indicated than actually occurred. The birds ranged normally up to 700 ft around the trap station and this distance was added to the linear distance between traps.

TABLE III. DISTANCE AND FREQUENCY OF WINTER MOVEMENT FOR A RESIDENT POPULATION OF HARRIS' SPARROWS.

MONTH	Marked Birds Present	Linear Distance of Movement in Feet			
		1000-1500	2000-3000	3000-5000	5000 plus
November	16	0	0	0	0
December	41	33	2	0	0
January	48	67	10	1	2
February	58	55	15	2	0
March	62	23	3	0	0
April	63	15	5	0	0
May	63	4	0	0	0

TABLE IV. ACTIVITY AND EXTENT OF MOVEMENT FOR FIFTY-TWO RESIDENT HARRIS' SPARROWS.

Number of Birds	Stations Visited	Distance in Feet
18	E - A	1,200-1,500
17	E - A - H^3	1,200-3,000
9	E - H^3	1,500-2,000
2	A - H^3	2,500-3,000
2	E - H^3 - H^1	1,500-5,000
1	E - A - H^1	1,200-5,000
1	F - A - E - H^3	1,200-3,000

Movements of 1,000 to 1,500 ft were most frequent; 2,000 to 3,000 ft were fewer, while only four records of movements beyond 3,000 ft were recorded. The frequency of movement was greatest during the severe weather months of January and February.

A summary of activity for 52 resident birds, survivors of the entire winter from stations A, E, F and H^3, is shown in Table IV. The distance between traps can be seen in Figure 1.

Certain individuals were trapped mainly at one station but all visited other areas. Eighteen birds (34.6%) exhibited regular movements of 1,200 to 1,500 ft, 30 birds (57%) revealed regular movements of 1,200 to 3,000 ft while four birds (7.7%) showed movement of 5,000 or more feet. Of 52 birds, 29 visited two stations, 20 visited three stations and three visited four stations.

Repeats at two trap stations 1,000 to 2,700 ft apart, on the same day occurred 17 times. Eleven individually marked birds were observed to make daily movements of 1,000 to 2,700 ft.

The longest record of movement obtained in this study occurred during the fall settling period, when one 1.5-mile and one 2.3-mile movement were noted. Neither bird had established winter residence.

Harris' sparrows were concentrated in the timbered ravine habitat, ranging daily from 0.25 to 0.5 mile along the ravine, frequenting brush piles, vine-covered trees and thickets. The birds ranged into weed patches, eating the seeds of various forbs such as sunflower and pigweed. Occasionally they ranged over expanses of open area to visit the lawn-cultured habitat of stations H^1 and H^3. They were never found in the tallgrass prairie and were observed in the residential areas only during a period of severe weather when several birds were observed eating in back yard feeders.

SUMMARY

1. The bulk of the birds arrived during the second and third weeks of

November (early date 3 November 1961); the number declined to a stable number during December, January and February. During March, a slight increase in numbers indicated the spring migration, after which the population declined to a last observation date on 8 May 1962.

2. Winter residence was separated into three periods; fall settling, midwinter stable and the spring period. Fixed dates cannot be set, as weather factors are not static from year to year.

3. Harris' sparrows did not always remain in the winter habitat in which they first established residence. One such habitat was completely deserted after six weeks of continuous use.

4. Local shifting of birds from one habitat to another was apparent during the midwinter period, with many birds actually establishing residence in a new habitat.

5. The frequency of movement increased from November to a peak in January and February, after which it declined.

6. Among resident birds, regular movements of 1,000 to 3,000 ft were found in 57.7%; 1,000 to 1,500 ft were found in 34.6% and 7.7% exhibited movements of 3,000 or more feet.

7. Movements were largely restricted to timbered ravine habitat, the birds moving up and down the ravine and out into the associated weed patches and disturbed-cultivation habitat daily. No birds used the tallgrass prairie and only occasionally did they visit residential areas in times of severe ice and snow.

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