

FINAL PERFORMANCE REPORT



Federal Aid Grant No. F16AF01216 (T-94-R-1)

Henslow's Sparrow Breeding Distribution in Oklahoma

Oklahoma Department of Wildlife Conservation

April 1, 2017 – March 31, 2018

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State: Oklahoma

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Grant Program: State Wildlife Grants

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Grant Dates: April 1, 2017 – March 31, 2018

Principal Investigator: Dan L. Reinking, Sutton Avian Research Center

A. ABSTRACT:

The Henslow's Sparrow (*Ammodramus henslowii*) is a rare, local, and apparently declining grassland bird species that has nested in several counties in northeastern Oklahoma. The last (and only) major survey to identify the breeding range of Henslow's Sparrows in Oklahoma took place in 1996 and documented the species in six counties. The Oklahoma Comprehensive Wildlife Conservation Strategy identified Henslow's Sparrow as a priority species for which more information was needed. This report summarizes the results of surveys conducted during the 2017 nesting season to provide current breeding distribution information for Henslow's Sparrows in Oklahoma. We found Henslow's Sparrows at 23 point-count locations, all in only one county out of the seven counties that were surveyed. Many of these birds occupied private lands that were managed for cattle grazing using a patch-burn management technique.

B. OBJECTIVE:

Survey sites historically occupied by Henslow's Sparrows and locate current, potentially occupied sites within the breeding range of Henslow's Sparrows in northeastern Oklahoma. Document their presence or absence through standardized roadside point counts.

C: INTRODUCTION:

The Henslow's Sparrow (*Ammodramus henslowii*; Figure 1) nests and forages in natural grasslands and pastures in the Midwestern and Eastern U.S. and Canada (Herkert et al. 2002). Its estimated North American population is approximately 400,000 individuals, or one-seventy-fifth the size of its congener the Grasshopper Sparrow (*Ammodramus savaanarum*) with an estimated population of 30 million birds (Partners in Flight Science Committee 2013). Declines and extirpations have been observed in portions of its range over the past three decades, leading to concern over its population status (Pruitt 1996). The Region 3 office of the U.S. Fish and Wildlife Service (USFWS) has the lead role in assessing the federal status of Henslow's Sparrow, and has categorized it as a Species of Concern (USFWS 1997). They cited insufficient population trend information due to limitations in monitoring this species using Breeding Bird Survey (BBS) data, and a westward shift in breeding range and population density potentially offsetting eastern declines as impediments to higher categorization as Threatened or Endangered. They also identified concerns about habitat loss and harmful changes in habitat management, as well as insufficient population trend data as reasons warranting continued attention to the status of this species.

The history of Henslow's Sparrow in Oklahoma is relatively recent. A comprehensive 1992 publication about Oklahoma's birds relegated the Henslow's Sparrow to an appendix entitled "Stragglers in Oklahoma" (Baumgartner and Baumgartner). Prior to the first confirmed nesting of Henslow's Sparrows in Oklahoma in 1987 (Verser 1990), less than twelve reports of occurrences existed for the state. In 1992, the Sutton Avian Research Center documented a substantial breeding population of Henslow's Sparrows

(roughly estimated at three thousand singing males, or potentially 1.5% of the North American population assuming one female per male) on The Nature Conservancy's Joseph H. Williams Tallgrass Prairie Preserve (hereafter Tallgrass Prairie Preserve, or Preserve) in Osage County, Oklahoma (Reinking and Hendricks 1993, Reinking et al. 2000). Although this area fell outside of the widely published breeding range of the Henslow's Sparrow at the time, the population on this single Preserve represented one of the most significant breeding populations known in North America (Figure 2).



Figure 1. Henslow's Sparrow in Osage County, Oklahoma. Standing dead grasses from previous growing seasons are a key component of Henslow's Sparrow breeding habitat in Oklahoma tallgrass prairie. Photo by Dan L. Reinking.



Figure 2. Breeding distribution of Henslow's Sparrow based on USGS Breeding Bird Survey data for the period 1985–1996 (from Herkert 1998).

Tall, dense native grasses with a well-developed litter layer characterize Henslow's Sparrow breeding habitat in Oklahoma. These conditions are found in tallgrass prairie in the absence of recent fire or heavy grazing by large herbivores. Research in Osage County, Oklahoma showed that a minimum of two full growing seasons were required following a fire to provide habitat suitable for Henslow's Sparrow occupancy during the breeding season (Reinking 1997, Reinking et al. 2000).

The Tallgrass Prairie Preserve was established in 1989, and it took several years for active fire and grazing management to be implemented across the Preserve, resulting in ideal breeding habitat for Henslow's Sparrows throughout much of the Preserve in the early to mid-1990s. Since that time, habitat management objectives involving prescribed fire and grazing practices have reduced the total amount of suitable Henslow's Sparrow breeding habitat on the Preserve in any given year, resulting in far fewer detections on the BBS route that passes through the Preserve (Figure 3), although the Preserve still hosts a nationally significant breeding population (Figure 4). In addition to the large population recorded on the Tallgrass Prairie Preserve, scattered smaller sub-populations and individuals were documented during the breeding season at other sites in Osage County and in five other counties in northeastern Oklahoma from the late 1980s to 2001 (Verser 1990, Seibert and Loyd 1993, Reinking 1997, 2004, Reinking et al. 2000).

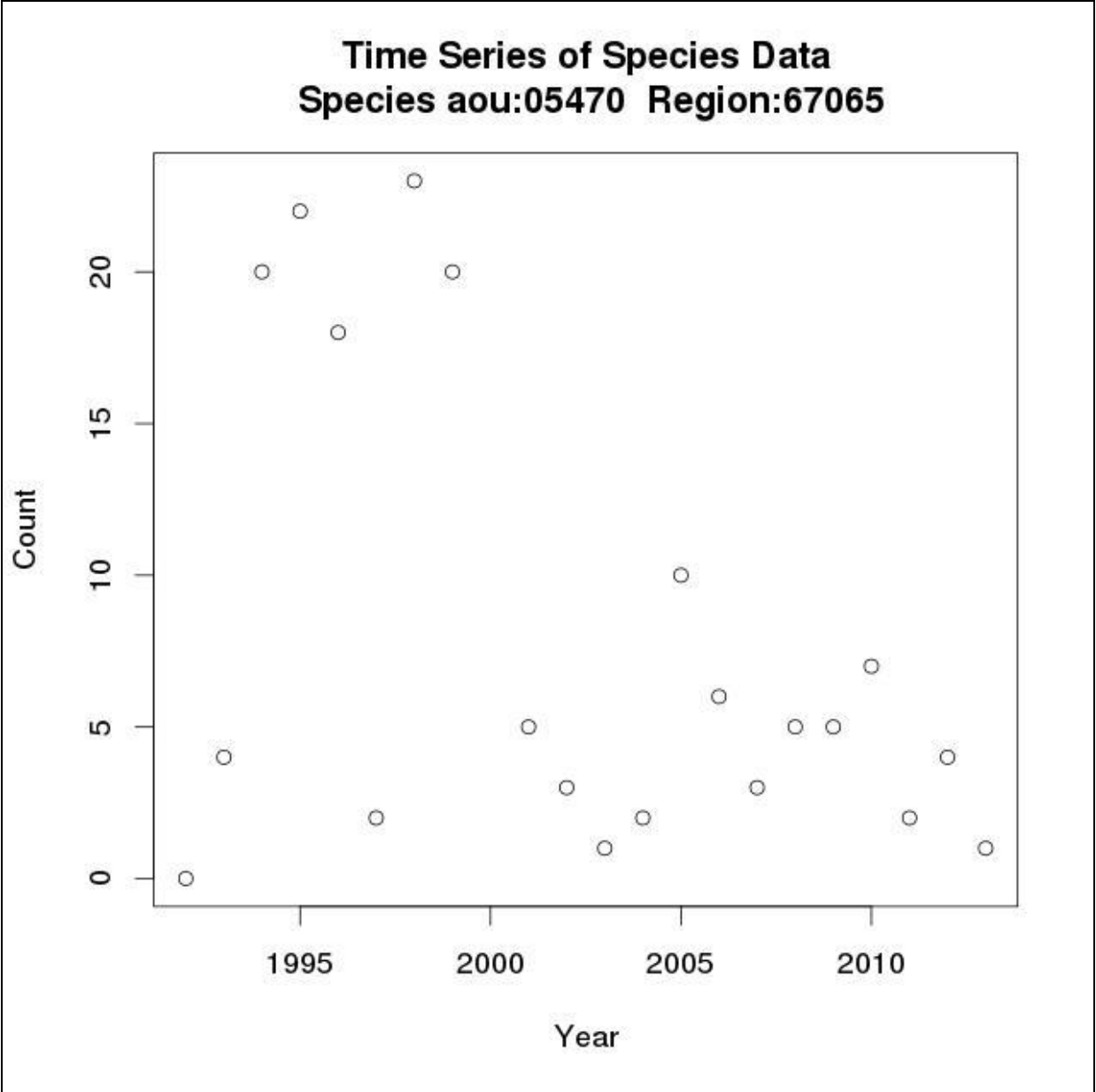


Figure 3. Henslow's Sparrow detections on USGS Breeding Bird Survey route 67-065, which passes through the Tallgrass Prairie Preserve in Osage County, Oklahoma.

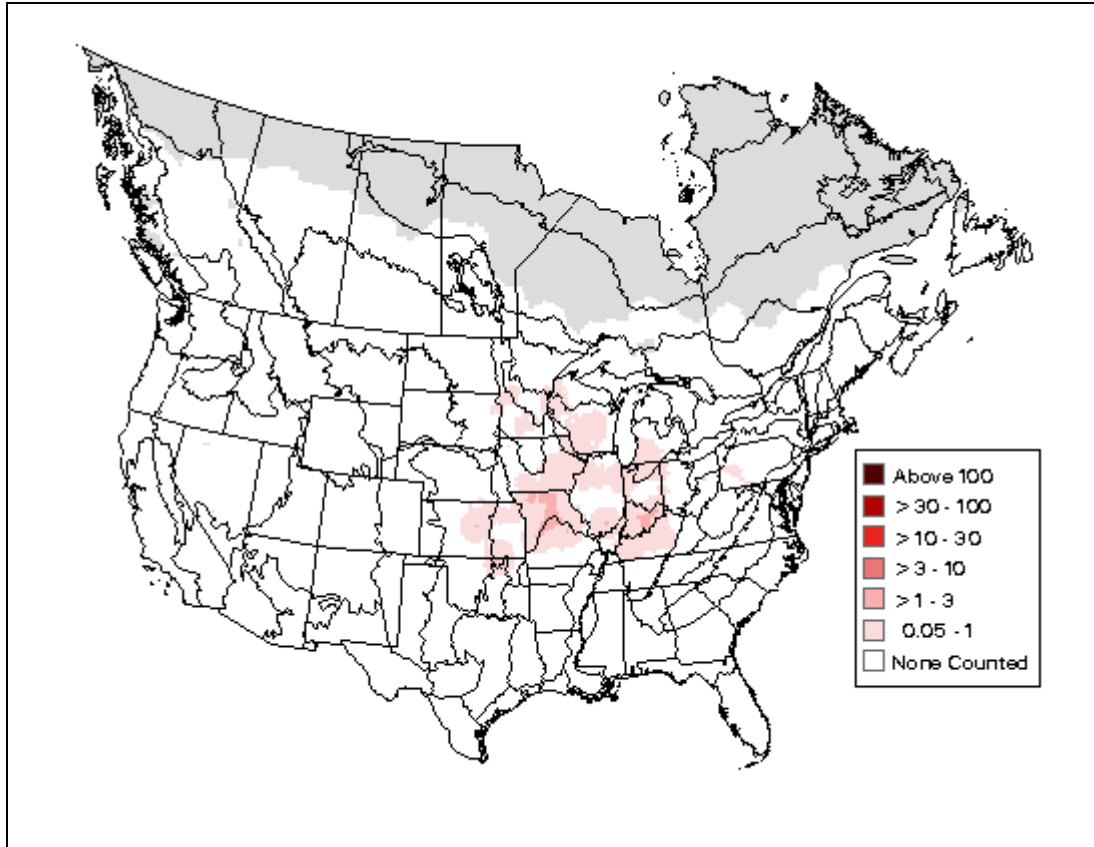


Figure 4. Breeding distribution of Henslow's Sparrow based on USGS Breeding Bird Survey data for the period 2007–2013.

Taking a broad view of Henslow's Sparrow population trends over the entire period of the Breeding Bird Survey program indicates a declining population trend in Oklahoma (Figure 5). While these data show a declining *trend* in Oklahoma (albeit a trend based on limited data), they can offer little in the way of documenting changes in the breeding *distribution* in the state due to the small number of routes in a limited number of locations. No strategic assessment of Henslow's Sparrow breeding distribution in Oklahoma has taken place since a species-specific survey in 1996 (Reinking 1997) and a broader study during the period 1997–2001 (Reinking 2004). The 1996 survey documented Henslow's Sparrows at 28 sites in six counties (Figure 6). Locations in Osage County in 1996 were from the Tallgrass Prairie Preserve in the north-central portion of the county, and numerous other scattered locations on private lands mainly in north-central and western portions of the county.

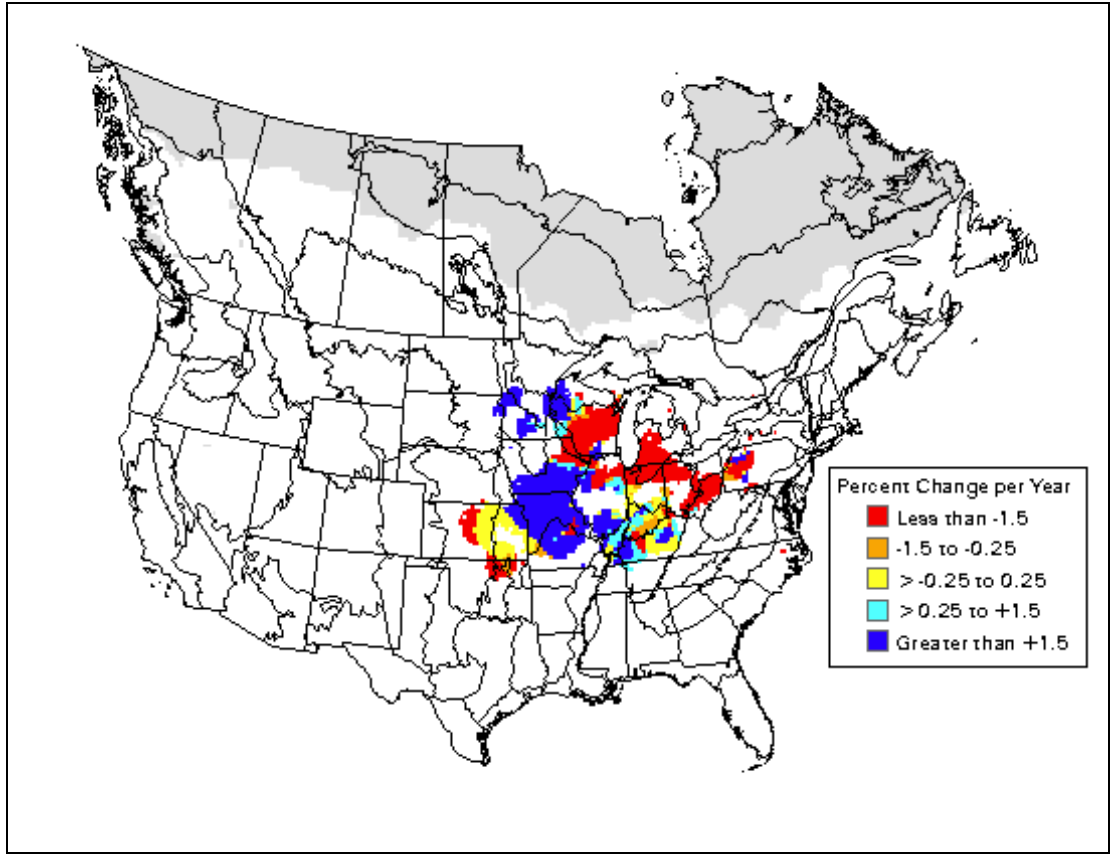


Figure 5. Henslow's Sparrow population trends as measured by USGS Breeding Bird Survey data for the period 1966–2013.

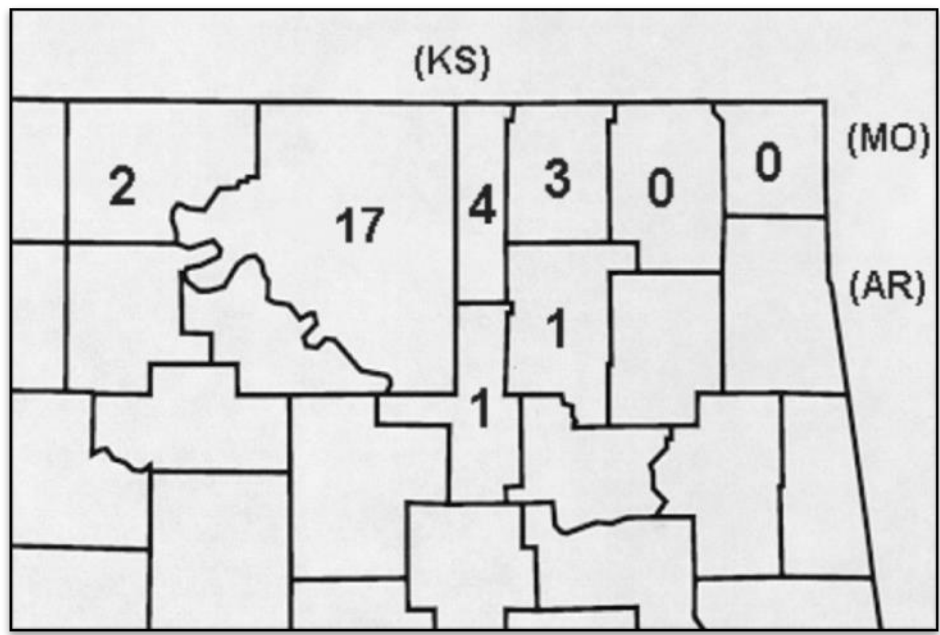


Figure 6. Number of locations with Henslow's Sparrows in each northeastern Oklahoma county where roadside surveys were conducted in 1996 (Reinking et al. 2000).

The Oklahoma Comprehensive Wildlife Conservation Strategy (OCWCS) Tallgrass Region chapter identified Henslow's Sparrow as a priority species that was categorized as being rare, having a small population size, and/or occurring in only a small portion of the region (ODWC 2005), along with having an unknown population trend in Oklahoma due to insufficient baseline information. Based on the OCWCS plan, biological surveys to determine the geographic range of this species were identified as a priority in the Request for Proposals for the Oklahoma Comprehensive Wildlife Conservation Strategy – State Wildlife Grants (ODWC 2016). This project was designed to address that priority.

The core areas selected for surveying were those counties in which Henslow's Sparrows were found during roadside surveys in 1996 (Reinking et al. 2000). These included all or portions of rural Kay, Osage, Washington, Tulsa, Nowata, and Rogers Counties. In addition, we were able to survey Craig County during the 2017 project season (Figure 7). Nearly all rural, public roads in Osage, Washington, Nowata and Craig counties were surveyed, while rural portions of northeastern Kay, northern Tulsa, and northern Rogers counties were surveyed, as these areas were deemed to have the greatest likelihood of occupancy by Henslow's Sparrows (Figure 8).

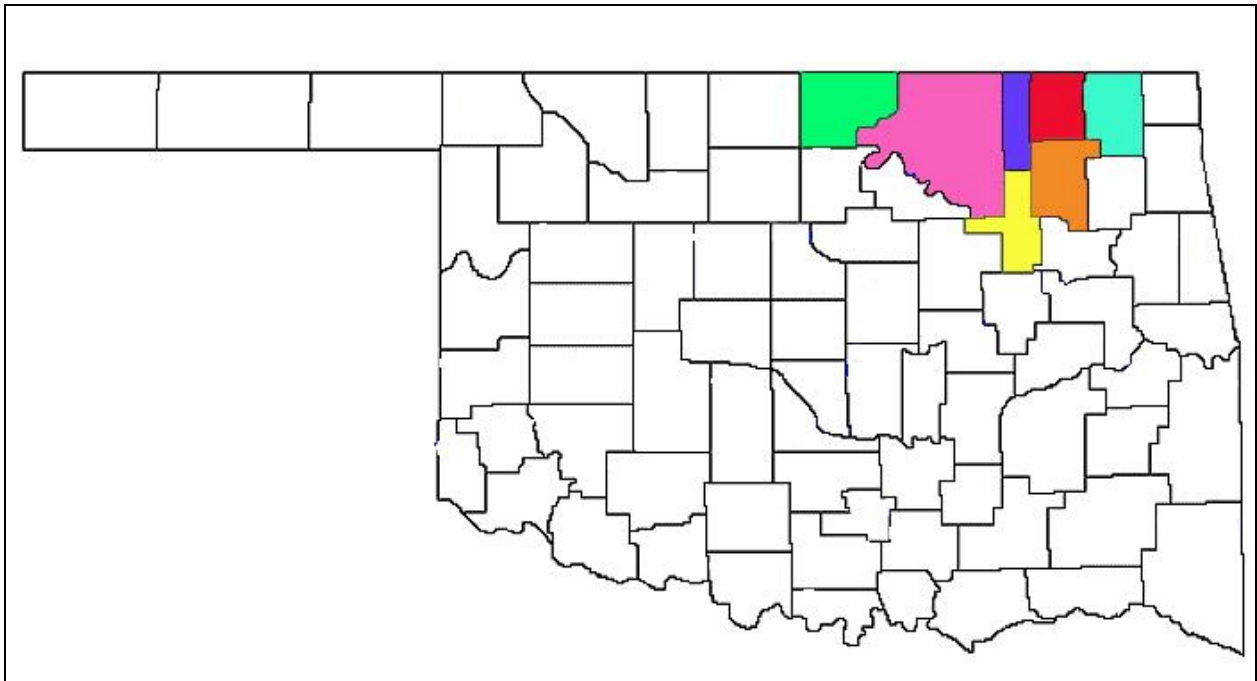


Figure 7. Counties surveyed all or in part for Henslow's Sparrows during the 2017 nesting season. These include Kay (green), Osage (pink), Washington (blue), Tulsa (yellow), Nowata (red), Rogers (orange) and Craig (teal).

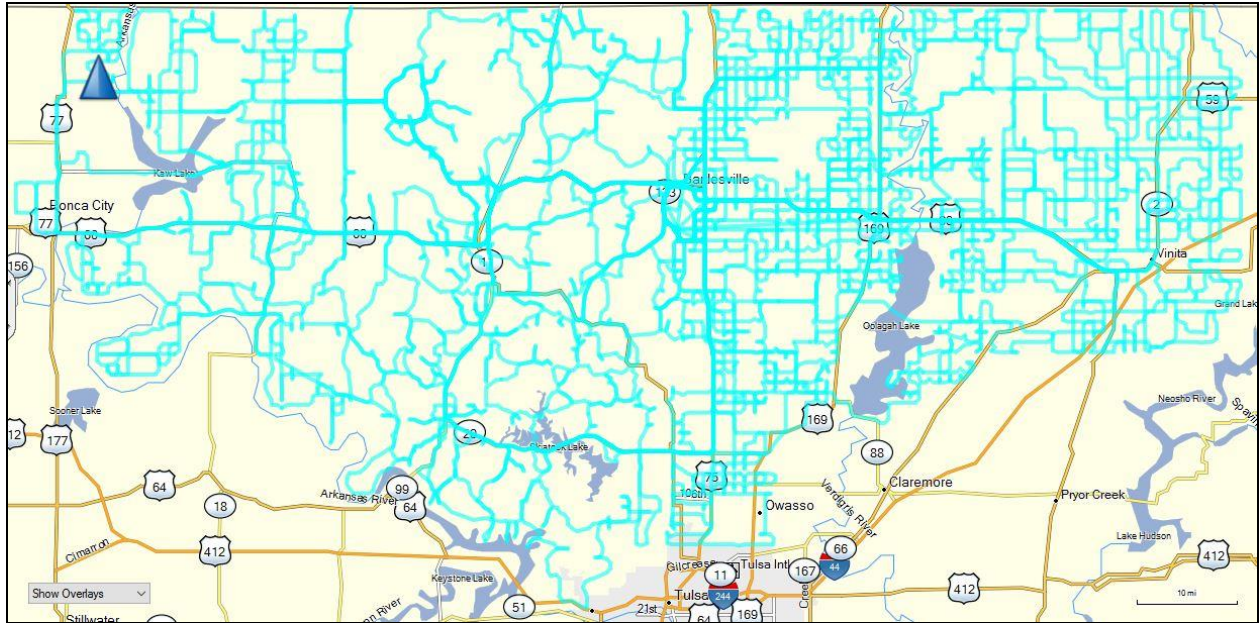


Figure 8. Roads shown in light blue were surveyed for Henslow's Sparrows in 2017. Nearly all rural, public roads in Osage, Washington, Nowata and Craig Counties were surveyed, while only those portions of Kay, Tulsa and Rogers Counties that were most likely to be occupied by Henslow's Sparrows were surveyed.

D. APPROACH/METHODS

Surveys

We conducted roadside surveys between May 1 and July 31. We systematically drove accessible public roads within the study area and outside of urban areas to visually evaluate and identify potential Henslow's Sparrow habitat. Based on known habitat preferences for Henslow's Sparrows in northeastern Oklahoma, areas with crops, excessive woody vegetation, heavily grazed pastures, recently burned pastures, and any other areas lacking at least moderately tall, dense grass were excluded from consideration. Open pasture areas with moderately tall, dense grasses containing a significant amount of standing, dead grasses and a thick litter layer are the preferred habitat for Henslow's Sparrows in northeastern Oklahoma, and were what we sought during roadside visual inspections. As a practical, field-friendly method of ensuring the desired coverage within the study area, we used paper maps of each county from the Oklahoma Wildlife Federation's *Oklahoma Backroads* atlas for navigation, and we colored each road with a highlighter pen after we drove it. Areas of habitat that appeared to have potential for hosting Henslow's Sparrows were examined more closely, albeit still from the roadside, by looking and listening for sparrows.

Queries sent to the Oklahoma birding listserv requesting information on sightings of Henslow's Sparrows, as well as queries of the eBird database for Henslow's Sparrow sightings in Oklahoma produced several recent reports of observations. All of these were within the core study area of the project, and we made a site visit to each location reported by other observers.

Point Counts

Areas where we detected Henslow's Sparrows during surveys were revisited on a subsequent day to conduct morning point counts. We conducted point counts between the hours of sunrise and 10:00 AM, and only during dry weather conditions with calm to moderate wind speeds. Each roadside point count had a duration of 10 minutes, with time intervals further divided into 0–3 minutes, 3–5 minutes, and 5–10 minutes for recording detections. Bird observations were recorded within four maximum distance categories including 25m, 50m, 100m, and >100m distances. We used a laser rangefinder to verify distances to birds detected during point counts. Point counts in occupied areas were spaced at 0.32 km intervals along roadsides until habitat was no longer suitable and/or until we no longer detected Henslow's Sparrows. Point counts were conducted by biological technician Brandon Gibson under the supervision of senior biologist Dan Reinking.

E. RESULTS:

Surveys

Nearly all rural, public roads in Osage, Washington, Nowata and Craig Counties were surveyed, while rural portions of northeastern Kay, northern Tulsa, and northern Rogers counties were surveyed, as these areas were deemed to have the greatest likelihood of occupancy by Henslow's Sparrows (Figure 8). Extensive annual or biennial burning of native prairie, combined with moderate to heavy grazing throughout the study area, resulted in very little habitat suitable for Henslow's Sparrows being found during our 2017 survey period. We found no Henslow's Sparrows outside of Osage County, in contrast to 1996 when we found sparrows in five additional counties.

Several reports generated from the eBird website and from the Oklahoma birding listserv were of observations made in early to mid- April, the time when Henslow's Sparrows are first arriving and passing through Oklahoma during spring migration. Upon visiting these locations later during the breeding season in May and June, we found most of these sites to be unoccupied. This suggests that pass-through migrants or resident birds settled briefly in areas of sub-optimal habitat while migrating, and either continued with migration or made local movements to higher quality breeding habitat by the time the breeding season was fully underway. While one of these early spring sightings was from northern Washington County, most were from areas north and west of the 16,000 ha Tallgrass Prairie Preserve in north-central Osage County. The Preserve and nearby private ranches together comprise an area that attracts birders, perhaps more than any other single location in our study area, as they seek grassland specialties including Henslow's Sparrows and Greater Prairie-Chickens.

The Tallgrass Prairie Preserve has been the main breeding location for Henslow's Sparrows in Oklahoma (Reinking and Hendricks 1993, Reinking et al. 2000, Reinking 2004). Although we drove all public roads and many private roads (with permission) within the Preserve during our surveys, we found very few Henslow's Sparrows on the Preserve during the 2017 nesting season. Most of our observations of Henslow's Sparrows came from locations on adjacent or nearby ranches north of the Preserve. One additional location was on private land about 12 km west of the Preserve headquarters and another was located about 24 km southwest of the headquarters. Figures 9 and 10 show areas in which we found Henslow's Sparrows during 2017. Figures 11–15 show occupied and unoccupied habitats and illustrate survey methods.

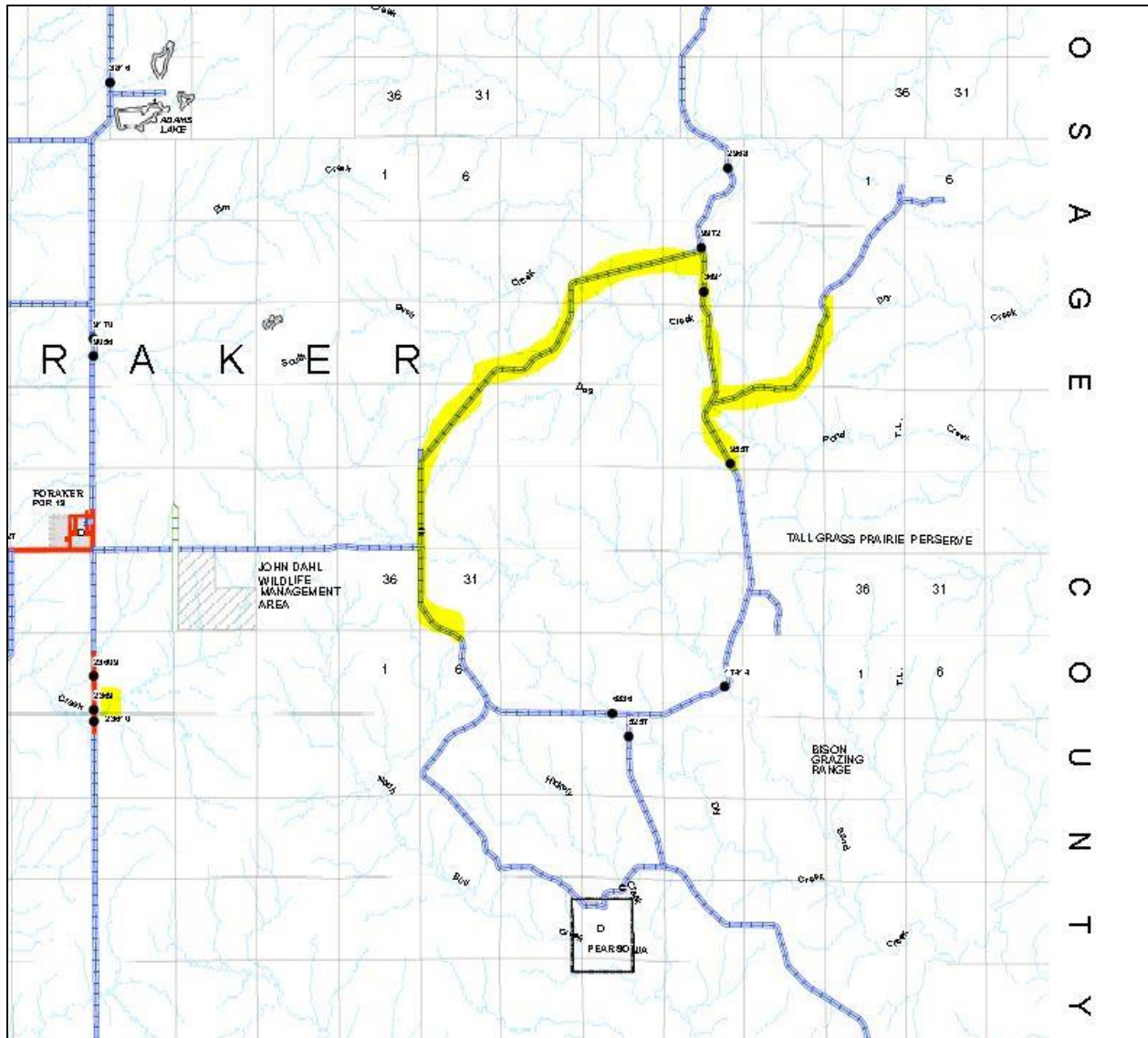


Figure 9. Portions of the adjacent roadside habitat indicated by yellow highlights in north-central Osage County, Oklahoma were found to be occupied by Henslow's Sparrows during roadside surveys in summer 2017. Occupied locations were spatially intermittent and not continuous along these roads, depending on the presence of suitable habitat. This area is directly north of the Tallgrass Prairie Preserve. The town of Foraker is shown in the west-central portion of the map, with the John Dahl Wildlife Management Area shown just east of Foraker. An outlying area where we found at least one singing Henslow's Sparrow is highlighted south of Foraker.

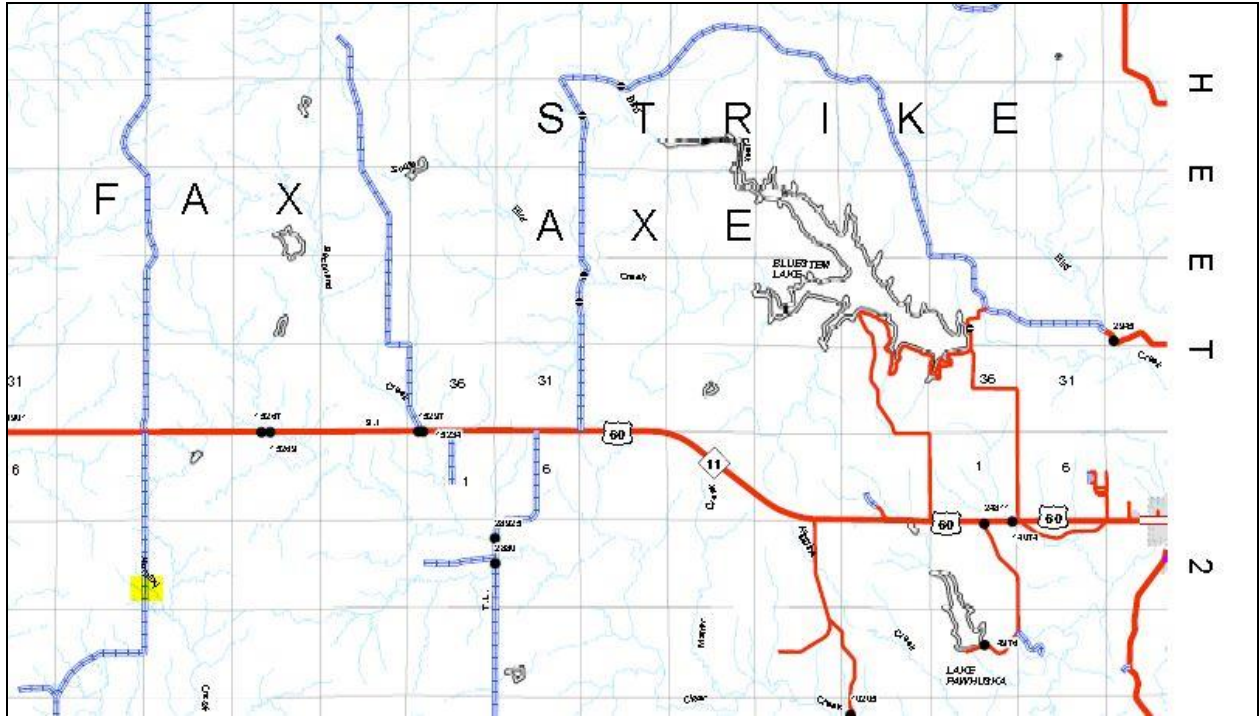


Figure 10. An outlying area occupied by multiple Henslow's Sparrows in Osage County, Oklahoma during summer 2017 is shown in yellow. This location is approximately 24 km south of Foraker, Oklahoma.



Figure 11. Occupied Henslow's Sparrow nesting habitat in Osage County, Oklahoma. The large amount of standing dead grasses leftover from previous growing seasons that show up here as tall, brown grass within the green growth of the current season is a key component of Henslow's Sparrow breeding habitat in Oklahoma tallgrass prairie. Photo by Dan L. Reinking.



Figure 12. Tallgrass prairie habitat not occupied by Henslow's Sparrows in Osage County, Oklahoma. Too much woody vegetation is present, and recent fire activity means there is little or no residual cover from previous growing seasons. Photo by Dan L. Reinking.



Figure 13. Tallgrass prairie habitat not occupied by Henslow's Sparrows in Osage County, Oklahoma. This area appears to have been burned in the late winter or early spring of 2017, and there is little or no residual cover from previous growing seasons. Photo by Dan L. Reinking.



Figure 14. The grassland area in the foreground with significant amounts of standing, dead grasses from previous growing seasons is suitable breeding habitat for Henslow's Sparrows, while the background pasture has been more recently burned and does not offer enough structure or residual cover to attract nesting Henslow's Sparrows. Photo by Dan L. Reinking.



Figure 15. Surveying potential habitat for Henslow's Sparrows in Osage County, Oklahoma. Photo by Dan L. Reinking.

Point Counts

We conducted point counts at 36 roadside locations between May 10 and July 7 in areas where we detected Henslow’s Sparrows during road surveys (Figure 16). We recorded Henslow’s Sparrows at 23 of these counts. At another 13 point counts we did not record Henslow’s Sparrows, as these were counts that, based on the 0.32 km spacing intervals, ultimately were found to extend beyond the occupied areas. In addition, we revisited a subset of eight of twenty locations that had Henslow’s Sparrows and that had first been counted on or prior to June 19 for a second point count on July 13 or 14 to examine whether or not Henslow’s Sparrows were still readily detectable in mid-July. A total of 61 Henslow’s Sparrows were detected during the first 36 point counts, while 25 were detected during the second round of 8 point counts (Table 1). A majority of detections occurred within the first three minutes of the point counts, but a substantial number of detections occurred through the ten-minute period, indicating that extending the point count time interval to 10 minutes is valuable for detections (Table 1).

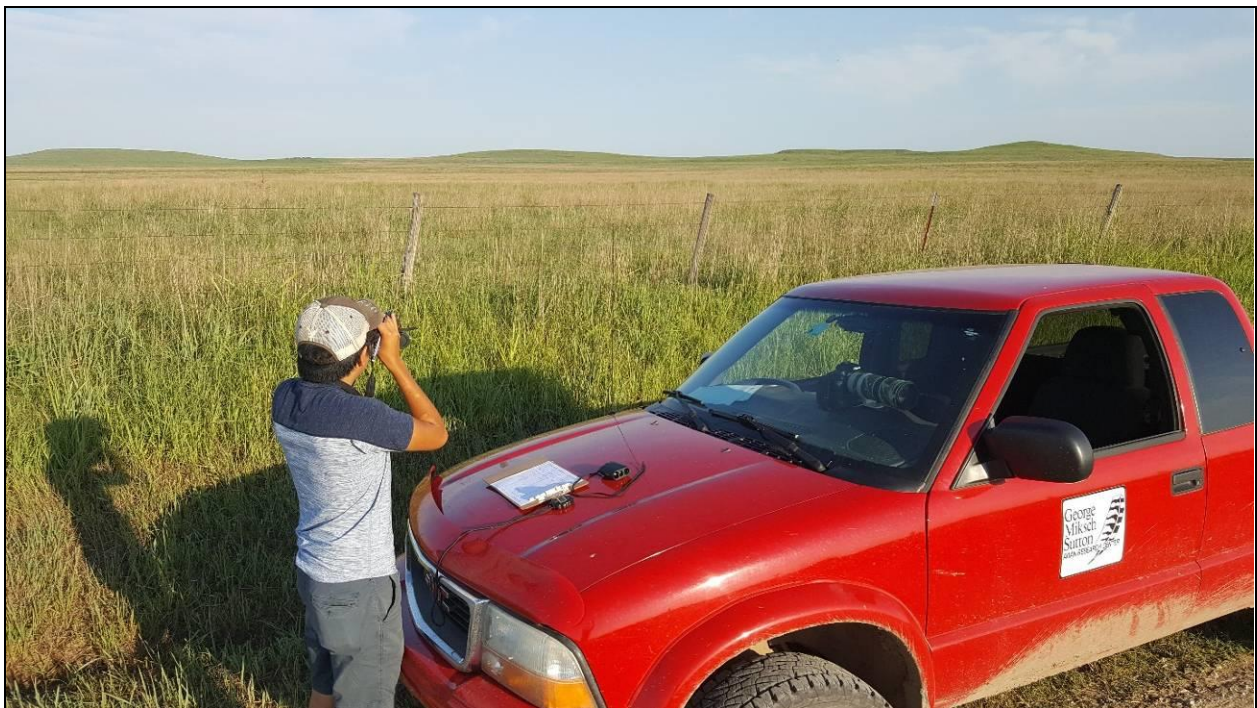


Figure 16. Conducting a roadside point count in Osage County, Oklahoma. Photo by Dan L. Reinking.

Table 1. Henslow’s Sparrow detections by time interval for roadside point counts in Osage County, Oklahoma.

	0–3 minutes	3–5 minutes	5–10 minutes
HESP detections (round 1; n=36 counts)	31	11	19
HESP detections (round 2; n=8 counts)	17	4	4

Few Henslow’s Sparrows were detected within 50 meters of the observer (Table 2). This is due in part to the nature of a roadside point count, in which the suitable habitat is a short distance away from the road itself. There is likely also a preferred “buffer distance” that Henslow’s Sparrows may keep from habitat disruptions such as roads or fencelines. A majority of detections on point counts occurred at distances >100 m from the observer (Table 2).

Table 2. Henslow's Sparrow detections by distance category for roadside point counts in Osage County, Oklahoma.

	<=25 m	25–50 m	50–100 m	> 100 m
HESP detections (round 1; n=36 counts)	1	2	24	34
HESP detections (round 2; n=8 counts)	0	0	4	21

A second round of counts were conducted at a subset of 8 of the original 36 point counts in mid-July to evaluate if Henslow's Sparrows were still readily detectable later in the breeding season. They were indeed detectable in mid-July, and we actually recorded larger numbers of singing males at most sites in July than we did earlier in the breeding season (Table 3).

Table 3. Comparison of Round 1 point count detections with later season Round 2 point count detections at 8 locations in Osage County, Oklahoma.

Round 2 Point Count Number	Round 1 HESP detections	Round 2 HESP detections
1	1 (May 10)	4 (July 13)
2	1 (May 26)	4 (July 13)
3	1 (May 26)	2 (July 13)
4	1 (May 26)	4 (July 13)
5	1 (May 31)	5 (July 13)
6	1 (June 7)	4 (July 14)
7	3 (June 7)	0 (July 13)
8	4 (June 19)	2 (July 14)
TOTAL DETECTIONS	13	25

F. DISCUSSION:

Henslow's Sparrows are persistent singers throughout the breeding season, with individuals often singing several times per minute in the mornings and somewhat less often in the afternoons (pers. observ.). This makes them relatively easy to detect when present. Despite their song being very short and seemingly feeble, it can carry for a surprising distance. On a number of occasions, we detected a singing Henslow's Sparrow that sounded very close, but upon locating it and using a laser rangefinder to measure the distance, we often found that it would be well over 100m away. This singing persistence and detectability increases our confidence that few potentially occupied areas were missed during our surveys.

The round 1 versus round 2 point-count results suggest a degree of immigration and emigration within local areas of suitable habitat during the breeding season. This is something also reported by Herse (2017) who noted that 86% of mid to late season Henslow's Sparrow detections during roadside surveys in Kansas were in areas where birds had not been detected earlier in the season, and some Henslow's Sparrows disappeared from areas where they had been detected earlier in the season.

Tallgrass prairie is a dynamic habitat. In the absence of regular fire, woody encroachment can render an area unsuitable for Henslow's Sparrows within as little as 5–7 years. At the opposite extreme, the grazing method known as early intensive stocking (Vermeir and Bidwell) is widely practiced within our study area, and is typically paired with annual or biennial prescribed burning. Previous research in Osage County indicated that the amount of standing dead grasses and the thick litter layer that Henslow's Sparrows require were found in areas with at least two growing seasons since the last fire (Reinking et al. 2000). Additionally, areas which are not burned annually or biennially but are grazed heavily also do not

provide suitable habitat for breeding Henslow's Sparrows. The dynamic nature of tallgrass prairie habitat, combined with the predominant current land management practices in northeastern Oklahoma, leave only a small window of opportunity for ideal habitat conditions within the burning/grazing/woody encroachment matrix that governs the composition and structure of the vegetation within the Henslow's Sparrow breeding range. Henslow's Sparrows are opportunistic with a capacity for nomadism as they seek suitable habitat, but the scarcity of ideal habitat and the degree to which habitat can change from one year to the next can make their breeding distribution fluid within a county or region from one year to the next.

One possible reason that we found Henslow's Sparrows in fewer counties in 2017 than in 1996 could be that the proportion of prairie habitat that was burned in 2017 and/or 2016 may be even larger than normal due to drought conditions for several years prior to this period. Pent up demand for burning, a management tool which is often avoided during periods of drought, together with good moisture levels in 2015 and 2016 producing large fuel loads, may have made 2016 and/or 2017 even bigger years for prescribed burning than average (Bob Hamilton, pers. comm.). The result of extensive burning in 2016 and/or 2017 is a reduction in the already limited potential breeding habitat for Henslow's Sparrows in northeastern Oklahoma.

Although surveys in 1996 recorded Henslow's Sparrows at 28 sites in six counties, 17 of those sites were in Osage County, with only 1 to 4 sites in each of the other counties (Figure 6). This emphasizes not only the relative scarcity of habitat in counties other than Osage, but also the ability of Henslow's Sparrows to colonize isolated areas of suitable habitat within a much larger landscape of unsuitable habitat. Two Osage County locations with Henslow's Sparrows in 1996 also had sparrows in 2017, but most sites in each survey year were independent of those in the other survey year, not a surprise given the frequent changes to tallgrass prairie habitat. One difference between the 1996 locations and the 2017 locations where Henslow's Sparrows were detected in Osage County is that most of the 1996 locations were widely scattered across a larger portion of north-central and western Osage County. During 2017, most locations were along one road that forms an approximately 18 km loop north of the Preserve, with only two additional outlying locations west of the Preserve (Figures 9 and 10). This distributional difference between the two survey years is likely a result of local habitat management decisions by landowners in 2016 and 2017 rather than some larger scale biotic or other anthropogenic effect in the county.

The management plan at the Tallgrass Prairie Preserve emphasizes the use of prescribed fire, grazing and rest intervals to provide a diversity of habitats across the Preserve. This provides some security for the long-term persistence of Henslow's Sparrows in northeastern Oklahoma. Another goal of the Preserve is to demonstrate by example that livestock production is not incompatible with providing habitat for a diversity of wildlife, and that the latter may even provide some production advantages. Some neighboring ranches have now begun patch burning (Weir et al. 2013), something which promotes heterogeneity and has been studied on the Preserve. This involves burning only a portion of a pasture, perhaps one-third, in a given year rather than burning the whole pasture. This has the effect of concentrating grazing in the burned portion due to livestock preference for the lush post-fire grass growth, while allowing grasses in other areas to develop into the taller and denser structure preferred by nesting Henslow's Sparrows, among other birds. It is encouraging to note that most of our sightings of Henslow's Sparrows in 2017 occurred on privately owned ranches practicing patch burning, and that Henslow's Sparrows readily colonized these areas. While our study cannot determine nest success or productivity in these areas, or evaluate whether they are source or sink populations, it is a positive development that substantial numbers of sparrows are finding habitat suitable for settlement on private lands during the breeding season. Education, outreach, and/or incentive programs designed to increase the implementation of management practices (such as patch burning) that can provide nesting habitat for Henslow's Sparrows and other birds should be encouraged to help ensure the long-term persistence of the Henslow's Sparrow breeding population in Oklahoma.

G. SIGNIFICANT DEVIATIONS:

There have been no significant deviations from the proposal.

H. PREPARED BY: Dan L. Reinking, Sutton Avian Research Center

I. DATE: June 11, 2018

J. APPROVED BY:

Wildlife Division Administration
Oklahoma Department of Wildlife Conservation

Andrea Crews, Federal Aid Coordinator
Oklahoma Department of Wildlife Conservation

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