

FINAL REPORT

SECTION 6

ENDANGERED SPECIES ACT



FEDERAL AID PROJECT E-41

Bachman's Sparrow Survey and Habitat Characterization
on Southeastern Oklahoma Wildlife Management Areas

SEPTEMBER 27, 1996 - SEPTEMBER 26, 1998

FINAL REPORT

STATE: Oklahoma

Grant Number: E-41

GRANT TYPE: Research

GRANT TITLE: Bachman's Sparrow Survey

SEGMENT DATES: September 27, 1996 - September 26, 1998

PROJECT TITLE: Bachman's Sparrow Survey and Habitat Characterization on Southeastern Oklahoma Wildlife Management Areas.

I. Objectives:

- 1) Using published records and museum locality data, estimate the Bachman's Sparrow's potential range and identify habitat types that appear to be suitable for nesting.
- 2) Conduct surveys on wildlife management areas in southeastern Oklahoma. Determine where apparently suitable habitat exists and/or where breeding populations exist. Also, include sites that could be enhanced to create suitable habitat.
- 3) Assess potential threats to existing populations and develop conservation/management recommendations.

II. Abstract:

A review of literature established records for Bachman's Sparrow for scattered localities in ten counties in eastern Oklahoma. Field surveys in 1997 and 1998 located territorial males, pairs, and adults with young in three southeastern Oklahoma Wildlife Management Areas. The records for McGee Creek WMA and Atoka WMA constitute new county records. Bachman's Sparrows utilize both oak savannah (Osage, Okmulgee, Creek, Cherokee, Pontotoc, and Pittsburg Counties) and pine grassland habitats (Delaware, Pittsburgh, Atoka, Pushmataha, LeFlore, and McCurtain Counties). Records indicate Bachman's Sparrow to be a rare summer resident with widely scattered, small colonies. Very rarely, individuals attempt to overwinter in scattered localities (McCurtain, Osage, and Pontotoc Counties). Bachman's Sparrow has been considered a rare permanent resident in McCurtain County, but there are no recent records to support this status. Bachman's Sparrow should be closely monitored in Oklahoma to establish geographic and seasonal status, habitat preferences, and response to habitat use/management strategies.

III. Procedures:

A review of known literature concerning any aspect of the ecology and distribution of Bachman's Sparrow, Aimophila aestivalis (Lichtenstein), in Oklahoma and adjacent states was conducted.

Field surveys were conducted on all target Oklahoma Department of Wildlife Conservation (ODWC) wildlife management areas (WMAs). Surveys were conducted by driving slowly along available roads or walking through selected areas, listening for singing Bachman's Sparrows, and making frequent stops to play taped songs and to listen for a response. A "point count" data sheet was made if a Bachman's Sparrow was detected. General vegetation descriptions, time, weather, and coordinates were recorded on the data sheet. All species of birds encountered in the WMAs were recorded. Bachman's Sparrows are noted to be shy and secretive except when the males sing in association with breeding/territorial advertisement displays.

IV. Results and Discussion:

Introduction

The range and population status of the western race of Bachman's Sparrow, Aimophila aestivalis illinoensis (Ridgway), for Oklahoma and adjacent states are poorly understood. It should be noted that the names Pine-woods Sparrow and Oak-woods Sparrow have been used as names for this race in earlier literature. Both geographic range and numbers of individuals are in a constant state of flux in this western edge of the species' range (Dunning, 1993). A summary of published records follows.

Records From Adjacent States

Kansas: Thompson and Ely (1992): "Status: The Bachman's Sparrow was formerly a casual visitor in extreme northeastern Kansas. There are no recent records. Period of Occurrence: There are only two records: a specimen from Lake Quivira, Wyandotte County, 24 April 1949, and a sighting from Johnson County, 26 April 1948, both by Harold C. Hedges." These were presumably migratory strays from the Missouri population. No recent records have been noted in the Kansas Ornithological Society (KOS) publications--The KOS Bulletin, nor in The Horned Lark, the official newsletter of the KOS. Both quarterly publications list bird observations of note.

Missouri: Robbins and Easterla (1992) reported records from 16 scattered counties, with a declining population from the Ozarks in south central Missouri. "Bachman's Sparrow Status: Very rare and local summer resident in the Ozarks, and at least formerly in the Ozark Border. Habitat: Overgrown grassy field with scattered scrubs and trees; open pinewoods. Spring Migration: The first migrants arrive at the very end of Mar and early Apr. Most are on the breeding grounds by the end of Apr. Earliest dates: 19 Mar 1907, . . . 29 Mar 1974, . . . 29 Mar 1976, . . . When this species was more common and bred further north . . . , it was seen in areas where it is now considered a vagrant. . . Summer: Until relatively recently the Bachman's occurred in the Ozarks from the southwestern

corner . . . east to Butler, Wayne, and St. Genevieve counties and north into the Ozark Border. It apparently has undergone a retraction from the northern edge of its range, and it appears to have decreased in the more southern areas during the past fifteen to twenty years. . . In 1976, 21 singing males were recorded in the Mark Twain NF of Taney and Ozark counties at the southern border (Hardin, K. I., T. S. Baskett, and K. E. Evans, 1982). These birds bred in glades with a relatively dense herbaceous cover, but since that time the species has been difficult to find in this unique habitat. Hardin et al. (op. cit.) suggest that overgrazing and drought have detrimental effect on the herbaceous growth in the glades, thus depressing sparrow densities. This coupled with the above apparent declines, which may be related to succession, underscores the rather narrow habitat preferences of this species. . . Fall Migration: All but two observations for this period are of birds on the breeding grounds in Aug. Latest dates: 7 Sept 1964 . . . 1 Sept 1947."

Jacobs and Wilson (1997) reported that atlasers observed Bachman's Sparrows in only six atlas blocks and breeding was confirmed in only two, all in the south central Ozarks during the six year atlas project. Chambers (1994) located birds at additional localities in southwestern counties in 1992 and 1993. These recent publications indicate the declining trend in Missouri reported by Robbins and Easterla is continuing.

Arkansas: James and Neal (1986): "Locally common summer resident in young pine plantations in the Ouachitas and on the Coastal Plain. Uncommon or absent in other regions. Migration: During spring migration Bachman's Sparrow has been found in Arkansas as early as mid-March, but arrivals are usually not reported until the second week of April and thereafter. During spring the species has been seen throughout much of the Coastal Plain, the eastern Ouachita Mountains, in the Arkansas River Valley, and in the eastern Ozarks. Reports for late summer and fall, especially after the birds stop singing, are lightly scattered. Five were counted in Hot Spring County as late as September 23, with some birds still singing. Thereafter there are scattered records to the second week in November. . . nests with eggs . . . are dated from May 6 to July 21. . . clutch size in each nest was four or five eggs, and all the nests were found in old fields, on the ground, and concealed under heavy vegetation. . . In a survey in 1983 Kimberly Smith of the University of Arkansas found Bachman's Sparrows in Baxter and Izard counties, where the species was present in old pine areas where fires had recently occurred, clearing the understory, and where broomsedge (*Andropogon virginicus*) was present in open areas among the trees. The birds were not found in some areas in the eastern Ozarks where apparently suitable habitat existed. Similar checks of one- to three-year old pine plantations in Grant and Jefferson counties on the Coastal Plain during the same period resulted in finding at least a few birds." A map with Bachman's Sparrow records by county is shown on p. 331 of James and Neal (op. cit.).

The works of Haggerty (1986, 1988, 1992, 1995, and 1998) provide excellent data on Bachman's Sparrow ecology in central Arkansas pine plantations. Two singing Bachman's Sparrows in Scott County, spring 1997 (specific date not given), were reported in the Arkansas Audubon Society Newsletter, Vol. 42, No. 3, September 1997. The fifth year of the Arkansas Breeding Bird Atlas project was completed in 1998. Singing male Bachman's Sparrows were reported on atlas blocks in Scott and Polk Counties during the spring and summer of 1998 (fide, David Arbour and reports at Arkansas Audubon Society/Oklahoma Ornithological Society joint meeting, Mena, AR May 1998). Status of Bachman's Sparrow as shown by the Arkansas BBA project should be available in 2000.

Texas: Texas Ornithological Society (1995): "Bachman's Sparrow, Aimophila aestivalis illinoensis (Ridgway). Uncommon local resident in the pine forest of east Texas west to about Leon and Van Zandt Cos. and south to Harris Co. Isolated records in Cooke, Lee and Navarro Cos."

Pulich (1988): "Status: Formerly occurred along the east side of the study area to Cooke County and south in Navarro County. No records since 1965 in north central Texas, were its present status is uncertain." Pulich reviews records for Cooke and Navarro Counties--all before the 1900s; and he questions records for Dallas (1931-32) and rejects a record from Denton County. Nesting Bachman's Sparrows were found in 1965 in Van Zandt County but habitat there has been disturbed since and no other Bachman's Sparrows have been reported since. Pulich reports recent records from two nearby counties: "Anderson County--one on Gus Engeling WMA 8 July 1984; Henderson County--one heard on the BBS of 11 June 1984, and a specimen from Wood on 23 October 1976."

Oberholser (1974): "Resident: Breeds, mid-Apr. to late July (eggs, Apr. 25 to July 5) from near sea level to 750 ft. Uncommon to rare and local in wooded eastern quarter, west to Cooke Co. and south to Harris Co. After breeding season a few individuals may drift south; there are unconfirmed winter sightings on central coast. Haunts and Habits: The Bachman's Sparrow . . . prefers open, parklike stands of tall pines with grass, wild flowers, scattered oaks, a few bushes, and an occasional fallen branch. Within its pinewoods haunts, the hermitlike Bachman's is generally difficult to spy. It spends most of the time on the ground, from where it flushes reluctantly. . . Changes: . . . Since the 1920's, almost all of these pinewoods have been closely managed for timber production and repeatedly lumbered before the pines have a chance to grow large. Exclusion of fire has, in many places, allowed pines, oaks, and brush to grow so dense that grass is choked out. Bachman's Sparrows have no use for thickets except occasionally in winter." Oberholser considers A. a. illinoensis (Ridgway) as the subspecies resident in eastern Texas. A map with county distribution is shown on p. 917 of Oberholser (op. cit.).

No recent records from "North Central Texas Region" and only one report from Angelina County in "East Texas Timberlands Region" have been noted in the Texas Ornithological Society Newsletter for recent years. Bachman's Sparrow is not on the Texas Ornithological Society review list so written documentation is not requested by the Texas Bird Records Committee. The Texas Breeding Bird Atlas publication will provide current breeding distribution. Publication is expected soon. Bachman's Sparrows have been infrequently recorded on Christmas Bird Counts in Texas. The Texas winter records are in the easternmost counties of the breeding range.

Summary comments of records from adjacent states: Bachman's Sparrow numbers have declined in the Missouri Ozarks since 1982. Records from the eastern Ozarks and eastern Ouachitas of Arkansas are not at all common. Recent Texas records are of local populations in the open pine woods of eastern counties. Records from all three states indicate a habitat preference to open pine woods with Andropogon grasses. All writers comment on the difficulty of locating this species except during the breeding season when territorial males are in full song.

Historical and Recent Records for Oklahoma:

Considerable confusion has arisen from the series of name changes for the one journal which regularly provides brief notations of important bird sightings across North America on a seasonal basis. Published by the National Audubon Society from 1947 until 1997 under three names, the same journal now continues under publication by American Birding Association. Because of the confusion created by National Audubon Society's actions, full citations are given for the quotes from Audubon Field Notes (1947-1970), American Birds (1971-1994), NAS [National Audubon Society] Field Notes (1994-1997), ABA [American Birding Association] Field Notes (1997-date). In these citations the author is the regional editor for the "Southern Great Plains" which includes Oklahoma.

Nice (1931) recorded Bachman's Sparrow as a "rare transient" on the basis of a specimen taken (assumed to have been near Alva, Woods County) by Professor George W. Stevens (who was at what is now known as Northwestern Oklahoma State University from 1904-1914), identified by Outram Bangs of the Museum of Comparative Zoology at Harvard University. Location of this specimen is not known (not at Harvard nor at Northwestern Oklahoma State University, Alva), if it is still in existence. It is the author's opinion that this record should be held in question since its location is so far out of range, many of Stevens' specimens are known to have been without data tags, and Stevens worked and collected in Missouri. However, Nice correctly predicted, "It is possible that this bird . . . will be found nesting in eastern Oklahoma. Its favorite haunts are old brushy pastures or recently cut-over pine woods."

McCurtain County: Sutton (1967) reports that near Bethel, McCurtain County, in a "three-acre partly cleared hilltop throughout which fallen branches under scattered oaks and hickories protected grass from livestock; here, April 23 [1937], bird was observed carrying nest material and three singing males and a female with egg almost ready to lay were taken." Survey party included Sutton, John B. Semple and Karl Haller. See also, Sutton (1938) under Oak-woods Sparrow. These are the first extant specimens from Oklahoma and are presently at the Oklahoma Museum of Natural History (OMNH) numbers 10044-10046 (males) and 10047 (female). Sutton (1967) also reports that "three or four singing males were seen and one taken" by John S. Weske 16-17 April 1966 near Haworth, McCurtain County, in "gently sloping field of broomsedge with scattered young loblolly pines (*Pinus taeda*) and blackberry thickets." This specimen is OMNH 5877.

Tom J. and Cepha Jessee reported "a Pine-woods Sparrow [=Bachman's Sparrow] seen on the McCurtain County Game Refuge from December 10 [1953] to February 12 [1954] constituted a new locality record and the first winter record in the State." (Baumgartner, F. M. 1954, Audubon Field Notes, 8(3):261 *in* Southern Great Plains Region.) Date given as December 10 1953-March 15, 1954 in Baumgartner and Baumgartner (1992) which includes all sightings--including those after Audubon Field Notes deadline for winter season. Tom J. Jessee was manager of the McCurtain County Game Refuge for the Oklahoma Game and Fish Department (now ODWC) and the Jessee's regularly reported bird observations to the Baumgartners from 1953-1955. This is their only known Bachman's Sparrow observation (Jessee/Baumgartner correspondence was not located). This area is now known as the McCurtain Wilderness Area managed by ODWC. John E. Skeen, current

manager of this area, has initiated a Red-cockaded Woodpecker management project which may also enhance habitat for Bachman's Sparrow (see Liu, et. al., 1995; Wilson, et. al., 1995; and, Plentovich, et. al., 1998). Open glades along some of the major ridges, especially White Oak Mountain, appear to provide suitable habitat. Masters, Skeen and Whitehead (1995) present an account of the fire history and briefly describe habitats of the McCurtain Wilderness Area,

From the late 1980's until the mid-1990s, a few unpublished observations are known from clear-cuts with early stage pine plantations in other areas of McCurtain County.

LeFlore County: "In early April 1977, heard Bachman's Sparrows singing regularly in open woods six miles east of Zoe in an area of open growth pine with light understory and a good grass cover." Observer not recorded by Sutton [1982], but is thought to have been Robert LaVal.

On 22 June 1986, James L. and Marion Norman found two Bachman's Sparrows on the Big Cedar Breeding Bird Survey (BBS) route.

"Is there a population of Bachman's Sparrows still left in e. Oklahoma? From the occasional record scattered here and there, it appears this species deserves more attention. One was noted May 8 [1990] in LeFlore Co. [James L. Norman]. Is it part of a hidden low density population, or the last of the remnants?" (Grzybowski, J. A., 1990, *American Birds*, 44(3):457 in Southern Great Plains Region.) This was actually near Hodgen where George A. Bukenhofer of the U. S. Forest Service had earlier located a singing male on territory and took Jeri A. McMahan and James L. Norman to see the bird. In the spring of 1991, Bukenhofer found Bachman's Sparrows several miles west of this place in LeFlore County.

During 1997 and 1998, point counts have been conducted as an ongoing research project on the avifauna of the Ouachita National Forest in this area of Oklahoma and adjacent Arkansas. Bachman's Sparrows were not recorded on any of the Oklahoma sites. Several of the point locations were in former clearcuts, but were very brushy with very little grass. None of the point count locations were in open, mature pine forests. (fide, Nathan Kuhnert)

Pushmataha County: On 21 June 1992 WAC and John E. Skeen recorded a Bachman's Sparrow on the Pushmataha BBS route just southeast of the Pushmataha WMA. WAC and MDD observed pairs of Bachman's in three locations on the WMA during June and July 1993 and have seen a few individuals during May and June 1994-1996. Bachman's Sparrows have been recorded in the Pushmataha WMA on this BBS route in three subsequent years; one on 30 May 1994, WAC, MDD and Mark D. Howery; one on 8 June 1997, MDD and WAC; two on 29 May 1998, MDD and WAC. Ronald E. Masters (pers. comm.) has also observed Bachman's Sparrows (dates not available) in forest management plots in this WMA during his studies of the area extending from 1985. On 15 March 1996, Monte Stewart (with the Oklahoma State University wild turkey research group) showed Michael S. Newman two singing Bachman's Sparrows near WMA Headquarters.

"Two Bachman's Sparrows in Pushmataha Co., OK [Jeri A. McMahan, John O. Sterling, James L. Norman] March 24 [1994] were hoped to be part of a localized but widespread population."

(Grzybowski, J. A. 1994a, NAS Field Notes, 48(3):315 in Southern Great Plains Region). This was in the Pushmataha WMA at the location given above.

Atoka County. "Surveys by [W. A.] Carter for Bachman's Sparrows in s.e. Oklahoma located a scattering of individuals, including one in Atoka [County], OK, July 31 [1997] [James A. Arterburn]. (Grzybowski, J. A. 1998, Field Notes, 51(5):1017 in Southern Great Plains Region.). This issue of Field Notes covers the "Nesting Season, June 1 - July 31, 1997," thus, the reference to the date as it is the end of the reporting period for this issue. This project actually recorded pairs of Bachman's Sparrows from early May through late August 1997 in Atoka County and these were new county records.

Pittsburg County: Bachman's Sparrows were first recorded in Pittsburg County along the Blanco BBS route (from Blanco, to Ti Valley, to Counts, to Sardis, and ending northeast of Clayton) on 18 May 1972 when WAC and John R. Schenck found three singing males while scouting the route as this was the first year Carter would do this BBS route. Bachman's Sparrows have been recorded on this route in nine subsequent years; 4 individuals on 11 June 1972, WAC and Bruce G. Stewart; 1 on 9 June 1974, WAC and Dennis M. Mullins; 1 on 17 June 1981, WAC and Charles L. Fowler; 2 on 1 July 1982, WAC and Charles L. Fowler; 2 on 7 June 1983, WAC and Barry King; 2 on 28 June 1984, WAC and Dana L. Base; 1 on 13 June 1987, WAC and John Skeen; 1 on 9 June 1990, WAC and MDD; 2 on 5 June 1993, WAC and MDD; 3 on 4 June 1994, WAC and MDD. Also, see under section "Records from 1997-1998 Project Field Surveys."

Pontotoc County: William A. Carter collected a specimen 20 January 1965 on the Carter Ranch, near Ada, Pontotoc County for "the fourth locality in which this species has been found in the state and the first known record since 1954" (Baumgartner, F. M. 1965, Audubon Field Notes, 19(3):398 in Southern Great Plains Region) (Carter, 1966). A second specimen was collected in the same area 6 May 1969 and nesting was documented in June-July with birds observed until 26 August 1969 (Carter, 1970.) Both specimens are in the East Central University Vertebrate Zoological Collections.

Bachman's Sparrows were recorded on the Carter Ranch in subsequent years: Many students assisted in the studies and several members of the Oklahoma Ornithological Society visited the area to observe the Bachman's Sparrows.

- 1970: 10 April to 8 September, up to 6 pairs with adults and young noted on 22 August
- 1971: 7 April to 11 August, nests found and cowbird parasitism documented
(6 May, one singing on Gray Ranch, 8 mi ESE of Ada, WAC and Dennis M. Mullins)
- 1972: 14 April to 24 June
- 1973: 5 May to 12 June
- 1974: 7 April to 8 September
- 1975: 20 April to 24 May
6 June John S. Shackford, and George M. Sutton
- 1976: no records

1977: 27 and 29 April
Note: From WAC field notes.

Okmulgee County: A singing male was observed near Dewar in Okmulgee County on 23 May 1969--WAC and Larry A. Pulliam. At the same site two were observed and photographed--Jenna J. Hellack, David L. Jones, Pulliam and WAC. On June 14 Hellack, Pulliam and WAC observed two BACS singing and carrying food. No Bachman's Sparrows were found on July 6 or August 3 at this site. (Carter, 1970).

Osage County: J. L. Borden (corres. to M. M. Nice) reported the collection of a specimen one mile north of Tulsa, in Osage County, 7 February 1941. According to this correspondence, the specimen was identified by H. C. Oberholser. (Baumgartner and Baumgartner, 1992). We continue to search for the whereabouts of this specimen and the specific locality. Curiously, Sutton (1967) does not mention this specimen.

A singing Bachman's Sparrow was reported from the Zink Ranch, Osage County in early August 1997 by members of the Tulsa Audubon Society. The habitat is described as oak savannah. Tulsa Audubon Society members found three singing Bachman's Sparrows near the same area on the Zink Ranch on August 22, 1998 [fide, M. J. Loyd]. During 1998 BBA work on a block near this site on 25 June, Jeffrey A. Cox found an adult with 3 juveniles, another singing male nearby, and another just outside his BBA block. These records may be near the area where J. L. Borden collected the 1941 specimen mentioned above. Bonnie Gall recorded singing Bachman's Sparrows on her BBA block in eastern Osage County (just north of the above mentioned records) from the end of May, 28 June, 3 July, and 14 July 1998.

Delaware County: Baumgartner and Baumgartner (1992, p. 357 and personal com.) report a singing male on territory 15-20 April 1976 bird sang every day in woods near house; 15 May 1978 singing male in edge of woods; 10-22 April 1985 male heard near edge of property, not seen; and 8-20 July 1987 male sang regularly; all on their property just south of Jay, Delaware County. No other individuals were ever encountered and no nesting activity seen.

Creek County: "Substantially more unusual were a colony with at least four male Bachman's Sparrows discovered in Creek Co., OK [James C. Hoffman]. Young were noted in July [1992]." (Grzybowski, J. A., 1992b, *American Birds*, 46(5):1152 in Southern Great Plains Region).

"A new breeding site for Bachman's Sparrow was located in Creek Co., OK. Four adults and two immature were noted there August 8 [1992] [James C. Hoffman]" (Grzybowski, J. A., 1993, *American Birds*, 47(1):115 in Southern Great Plains Region).

"A Bachman's Sparrow was found in Creek Co. OK June 16 [1994] [Patricia L. Seibert, M. J. Loyd] at the same locality where it or others were observed last year." (Grzybowski, J. A., 1994b, *NAS Field Notes*, 48(5):959 in Southern Great Plains Region). We are unable to find records for 1993 in either *American Birds*, *NAS Field Notes* or in *The Scissortail*, Newsletter of the Oklahoma

Ornithological Society.

Cherokee County: "A Bachman's Sparrow noted September 17 [1991] in Cherokee Co., OK [Jeri A. McMahon] provides meager data but much speculation potential over its status (migrant or resident)." (Grzybowski, J. A., 1992a, *American Birds*, 46(1): 117 in Southern Great Plains Region; also, Grzybowski, J. A., 1992c, *Scissortail*, 42(1):12). This observation was below Fort Gibson Reservoir dam along the Grand River in an open woodland bordering a brushy field. Observers included McMahon, James L. Norman, Jim J. Harman, Vera F. Jennings, Elsie Stubbs, and Steve Crank (McMahon, 1992).

Records From 1997-1998 Project Field Surveys

Field surveys were conducted on all target Wildlife Management Areas (WMAs). Most Bachman's Sparrow activity was expected to occur at dawn and dusk hours. Bachman's Sparrow activities were observed from dawn until early afternoon and from late afternoon until dusk during the 1997 and 1998 surveys. Record high temperatures and lack of rainfall during the summer of 1998 in southeastern Oklahoma, resulted in a reduction of song and other territorial activities for Bachman's Sparrows as well as other songbirds just after mid-morning. Bachman's Sparrows and most other songbirds had terminated typical territorial and nesting behavior by early July, at least a month earlier than usual for this area of the state.

McGee Creek Wildlife Management Area, Atoka County: Singing Bachman's Sparrows were found at four different sites on 6 May 1997 (Sect. 2 T2S R13E just south of parking area 16) (SE/4 of Sect. 13 T2S R13E at three sites in the open glades along the ridge road). An adult was seen carrying food at one location just north of parking area 9. This is the first known record for this locality. Subsequent attempts failed to find any Bachman's Sparrows in the WMA in either the 1997 or 1998 nesting seasons. Bachman's Sparrows were located in open oak-pine woodlands with broomsedge and other tallgrasses and shrub/vine ground cover. Other birds recorded at these sites when Bachman's Sparrows were observed included: Turkey Vulture, Red-shouldered Hawk, Great Crested Flycatcher, Red-eyed Vireo, Carolina Chickadee, Tufted Titmouse, Carolina Wren, Blue-gray Gnatcatcher, Pine Warbler, Black-and-white Warbler, Summer Tanager, Indigo Bunting, and Brown-headed Cowbird. Obviously, had Bachman's Sparrows been located on additional days, this list would have included several more species as this WMA has a variety of habitats and many nesting species of birds.

Atoka Wildlife Management Area (West Unit) and Atoka Public Hunting Area (PHA) (East Unit), Atoka County: Atoka WMA was surveyed during both years of this project without finding Bachman's Sparrows. Bachman's were located in the Atoka PHA at two locations. Location One in Atoka PHA at the south entrance, includes small areas of Sects. 1 and 2 T1S R13E and the E/2 Sect. 35 and W/2 Sect. 36 T1N R13E. In 1997, at least five pairs were found in this open mature pine-grassland with singing males on territory observed in June, July and August. Young were seen with adults in August in this area. In 1998, singing males were first located 24 March and five singing males with established territories were present from April through early July. Record high

temperatures and unusually low rainfall may have been the reason for reduced activity by mid-June 1998. Location Two in Atoka PHA was in W/2 of Sect. 27 and E/2 of Sect. 28 T1N R13E. This area also includes mature pine-grassland habitat. One singing male was recorded here on 19 June 1997, but not recorded again. This date would indicate a second nesting time period.

Frequency of other species recorded at Bachman's singing sites on the Atoka PHA included:

Species:	Percent
Great Blue Heron	10 (fly over)
Turkey Vulture	40 (fly over)
Red-tailed Hawk	30
Northern Bobwhite	30
Mourning Dove	50
Yellow-billed Cuckoo	10
Ruby-throated Hummingbird	20
Red-bellied Woodpecker	10
Downy Woodpecker	10
Yellow-shafted Flicker	10
Eastern Wood-Pewee	50
Eastern Phoebe	10
Great Crested Flycatcher	10
Blue Jay	30
American Crow	40
Carolina Chickadee	20
Tufted Titmouse	20
Brown-headed Nuthatch	50 (family group in area both years)
Carolina Wren	40
Blue-gray Gnatcatcher	10
Eastern Bluebird	40
Northern Mockingbird	10
Yellow-throated Warbler	30
Pine Warbler	60
Black-and-white Warbler	10
Summer Tanager	20
Chipping Sparrow	30
Field Sparrow	50
Northern Cardinal	30
Indigo Bunting	80
Painted Bunting	10
Brown-headed Cowbird	20
Orchard Oriole	20
American Goldfinch	10

In the Atoka PHA Location One, a second Bachman's Sparrow was recorded 90% of the time and a third individual was recorded 50% of the time on the point counts.

Bachman's Sparrows in Atoka PHA were found in areas with habitat typically described for nesting territories (Dunning, 1993; Haggerty, 1998). These areas have large, open, mature stands of pine with broomsedge as the dominant ground cover. Little bluestem, big bluestem, and several forbs form the remainder of the ground cover. Standing dead stems, two to three feet in height, form a conspicuous part of this ground cover. Fifteen to twenty percent of the area is dominated by understory shrubs, mainly oaks and pines four to six feet in height. The large pines form about 40% - 50% canopy cover.

Pushmataha Wildlife Management Area, Pushmataha County: The population of Bachman's Sparrow in this WMA has been known for several years (see under Pushmataha County for specific records). Bachman's Sparrows utilize the more open oak - pine forest areas with tallgrass ground cover. Bachman's Sparrows were observed in Sects. 19, 30, and 31 T1N R17E and in Sects. 24, 25, 33, 34, and 35 T1N R18E and Sects. 4 and 5 T1S R18E. The 1997 surveys indicated at least four pairs of Bachman's Sparrows in the Forest Management Plots 1 and 2 and the immediate area—from the Headquarters area and the first section of the north leg of Pine Tree Circle road where Sects. 24 and 25, T1N R18E and Sects. 19 and 30 T1N R17E join. Singing males with established territories were found from 7 June through 8 August when adults and young were observed. It is this locality that birders frequently check to see and hear Bachman's Sparrows. This is the first stop on the Pushmataha BBS route and the most likely stop for recording Bachman's Sparrows. An additional two singing males were located in the N/2 of Sect. 31 T1N R17E in June, but were not found later. In 1988 at least three singing males were observed 24 March in the S/2 of Sect. 33 T1N R18E and N/2 of Sect. 4 T1S R18E. These individuals were in the open forest glade along the ridge line near the west end of Pine Tree Circle. On 5 May, territories seem to be firmly established, with two pairs in the Forest Management Plots 1 and 2, one singing male at Pine Tree Circle and Hackberry roads (Sect 34 T1N R18E), at least two singing males at end of the ridge (Sects. 33 and 4 mentioned above), at least two singing males (possibly three) were observed in Sect. 35 T1N R18E along Dogwood Drive. Territorial singing continued in these locations through early June, was intermittently observed into early July. Record high temperatures and unusually low rainfall extended from May throughout the summer months. Most songbird, including Bachman's Sparrows, activity was reduced in response to this abnormal weather pattern.

Bachman's Sparrow's in Pushmataha WMA were found in the more open areas of the WMA. A considerable portion of the WMA consists of dense stands of oak - pine woodlands with most of the older mature pine removed. These dense stands of timber with up to 90% canopy closure have little understory or ground cover. Bachman's Sparrow territories were always in open areas with broomsedge and other tall grasses and forbs as the ground cover. Areas utilized for nesting had controlled burns the previous fall or spring. Canopy cover varied from a low of 10% to a high of 80%. The same high variability also existed for understory shrubs.

Frequency of other species recorded at Bachman's singing sites on the Pushmataha WMA included:

Species:	Percent
Red-shouldered Hawk	10
Wild Turkey	20
Northern Bobwhite	30
Downy Woodpecker	30
Pileated Woodpecker	10
Eastern Wood-Pewee	20
Great Crested Flycatcher	10
White-eyed Vireo	10
Yellow-throated Vireo	10
Red-eyed Vireo	60
American Crow	60
Carolina Chickadee	40
Tufted Titmouse	70
White-breasted Nuthatch	20
Carolina Wren	70
Blue-gray Gnatcatcher	10
Pine Warbler	60
Prairie Warbler	30
Common Yellowthroat	10
Summer Tanager	30
Scarlet Tanager	10
Indigo Bunting	70
Chipping Sparrow	40
Field Sparrow	10
Brown-headed Cowbird	20

In the Pushmataha WMA a second Bachman's Sparrow was recorded 50% of the time on the point counts..

Collins Wildlife Management Area, Pittsburg & Latimer County: Bachman's Sparrows were not located on the Collins WMA although several areas appear to have suitable habitat. These areas were surveyed both in the early and latter parts of the nesting season both years of this project.

Private lands in SE Pittsburg County: Bachman's Sparrows were heard singing in pinewoods along the Blanco Breeding Bird Survey route on 10 June 1997 where they have been recorded occasionally since 1972 (see under Pittsburg County in this report for earlier records). Most of the observations of Bachman's Sparrows are from an area of ranch land with mature pine and tallgrass understory. The pine has been and continues to be selectively harvested and control (?) burns have been used in this area to reduce deciduous shrub growth. These observations of Bachman's Sparrows were in Sects. 26 and 35 T3N R16E.

Hugo Wildlife Management Area, Choctaw County: Surveys of these areas were not successful either for locating populations of Bachman's Sparrow nor for finding accessible areas of suitable habitat

Pine Creek Wildlife Management Area, Pushmataha, Choctaw, and McCurtain Counties: Surveys of these areas were not successful for locating populations of Bachman's Sparrow, however some upland pine forests may provide suitable habitat in areas open enough to allow tallgrass cover to develop.

Surveys of several sites across southeastern Oklahoma were surveyed in early August 1998 without finding Bachman's Sparrows. Many of the specific locations in LeFlore County where Bachman's Sparrows have been reported a few years ago are no longer suitable Bachman's Sparrow habitat. Early stages of pine plantations, from one to five year-old pine stands in clearcuts, are acceptable habitat if adequate amounts of herbaceous vegetation as ground cover are available (Liu, et. al., 1995). Bachman's Sparrows also utilize open mature pine stands (>80 years old) with appropriate ground cover (Dunning and Watts, 1990)—few such sites remain in Oklahoma.

Known Phenology of Bachman's Sparrow in Oklahoma.

This phenology is constructed from records contained in this report (~, all month; 7~, from the 7th through the month; ~8, from the 1st through the 8th of the month).

January

- ~ observed, McCurtain Co. (1954)
- 20 AHY female specimen, Pontotoc Co. (1965)

February

- ~ observed, McCurtain Co. (1954)
- 7 specimen, Osage Co. (1941)

March

- 1-15 observed, McCurtain Co. (1954)
- 24 2 observed, Pushmataha Co. (1994)
- 24 singing males, Atoka Co. (1998)
- 24 singing males, Pushmataha Co. (1998)

April

- ~ singing males on territory, Atoka Co. (1998)
- ~ singing males on territory, Pushmataha (1998)
- early singing regularly, LeFlore Co. (1977)
- 7~ singing males, Pontotoc Co. (1971, 1974)
- 10~ 1 singing, Pontotoc Co. (1970)
- 10-22 singing male, Delaware Co. (1985)
- 14~ singing males, Pontotoc Co. (1972)
- 15-20 singing male, Delaware Co. (1976)
- 16-17 3 or 4 singing males, McCurtain Co. (1966)
- 20~ singing males, Pontotoc Co. (1975)
- 23 3 singing males, one female with egg in oviduct ready to lay, McCurtain Co. (1937)
- 27, 29 singing males, Pontotoc Co. (1977)

May

- 6 specimen, Pontotoc Co. (1969)
- ~ singing males on territory, Pontotoc Co. (1969-1975)
- ~ singing males on territory, Atoka Co. (1998)
- ~ singing males on territory, Pushmataha (1988)
- 6 several singing males on territory, Atoka Co. (1997)
- 7 nest with 6 eggs, Pontotoc Co. (1971)
- 8 one observed, LeFlore Co. (1990)
- 13 6 young in nest, Pontotoc Co. (1971)
- 15 singing male, Delaware Co. (1978)
- 19 4 fledglings near nest with 2 nestlings, Pontotoc Co. (1971)
- 23 singing male, Okmulgee Co. (1969)

June

- ~ singing males on territory, Pontotoc Co. (1969-1974)
- ~ at least four pair on territory, Atoka Co. (1997)
- ~ at least three pair on territory, Pushmataha Co. (1997)
- ~ singing males on territory, Atoka Co. (1998)
- ~ singing males on territory, Pushmataha (1988)
- ~ singing males, BBS route Pittsburg Co. (1972, 74, 81-84, 87, 90, 93, 94)
- 6 two nests, one with 3 near fledging young, Pontotoc Co. (1975)
- 14 two singing males on territory, carrying food, Okmulgee Co. (1969)
- 16 female on nest with 6 eggs, Pontotoc Co. (1969)
- 16 observed, Creek Co. (1994)
- 19 three hatchlings and 2 eggs, Pontotoc Co. (1969)
- 20 singing male, Pittsburg Co. (1997)
- 22 nest with young, Pontotoc Co. (1971)
- 22 2 singing males, Le Flore Co. (1986)
- 25 adult with 3 juveniles + singing male, Osage Co. (1998)
- 26 three had fledged, Pontotoc Co. (1969)
- 29 pair tending at least 2 fledglings, Pontotoc Co. (1971)

July

- ~ singing males, pairs, Pontotoc Co. (1969-1971, 1974)
- ~ at least 4 pair on territory, Atoka Co. (1997)
- ~ at least 3 pair on territory, Pushmataha Co. (1997)
- ~26 singing males on territory, Atoka Co. (1998)
- ~26 singing males on territory, Pushmataha (1988)
- 8-20 singing male on territory, Delaware Co. (1987)
- ? young noted, Creek Co. (1992)
- 15 adults tending fledglings, Pontotoc Co. (1971)

August

- 8 singing male, Osage Co. (1997)
- 8 4 adults and 2 immatures, Creek Co. (1992)
- ~ singing males and/or birds observed, Pontotoc Co. (1970, 1974)
- ~26 singing males and/or birds observed, Pontotoc Co. (1969)
- ~11 singing males and/or birds observed, Pontotoc Co. (1971)
- ~26 adults and young of the year, Atoka Co. (1997)
- ~ adults and young of the year, Pushmataha Co. (1997)

September

- ~8 observed, Pontotoc Co. (1970, 1974)
- 17 one singing and observed, Cherokee Co. (1991)

October

no records

November

no records

December

- 10~ observed, McCurtain Co. (1953)

Management Considerations

Management considerations for the scattered populations in Oklahoma should include, but not be limited to the following areas:

1) Grazing practices should be limited so that standing stems of tall grasses are left the fall and winter. Overgrazing has reduced large areas of the Atoka PHA to weedy patches without good stands of grass. Overgrazing into late summer and fall prevents the grass species from producing seed and storing adequate nutrition for early spring growth.

2) Grazing should be limited during the spring and summer to reduce the population of the Brown-headed Cowbird, Molothrus ater (Boddaert), a known nest parasite. Increasing cowbird population could easily prevent the small population of Bachman's Sparrows from producing enough young to maintain the population, much less increase the size of the population on the Atoka PHA (Robinson, et. al., 1993).

3) Continue to sequence control burns so that some areas of open pine woods with standing tall grass stems are left each fall. Wilson, Masters, and Bukenhofer (1995) noted Bachman's Sparrow response to fire restoration of the pine-grassland communities. Haggerty (1986 and 1988) notes use of fire in the management of open stands of mature pine to reduce litter is important to Bachman's Sparrows use. Bachman's Sparrows utilize spring burn areas in Pushmataha WMA. Zimmerman (1993) presents an excellent study of fire and birds in tallgrass prairies.

4) Pine removal should be limited to allow more mature pines to be left in open stands--no total pine removal.

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Epilogue:

"When the spring sun warms and brightens the pinelands this quietly colored little bird flies to a leafless branch fifteen or twenty feet from the ground, lifts its head, and sings almost as if knowing that it has found a voice for all the silent things about it—the carpet of brown needles and leaf mold, the burgeoning dogwood buds, the canopy of pine tops, the sky. No scientist can have thought of this sort, of course, but an ordinary bird artist can."

George Miksch Sutton, caption with painting of Florida Bachman's Sparrow in Thomas D. Burleigh, *Georgia Birds*. University of Oklahoma Press, Norman. 1958.

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