

# CURRENT STATUS OF THE FIVE-STRIPED SPARROW IN ARIZONA

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Although the Five-striped Sparrow (*Aimophila quinquestriata*) is not uncommon in appropriate habitat in northern and western Mexico, and has occurred regularly in summer in southeastern Arizona since 1969, not much is known about its movements or true numbers. The A.O.U. (1983) called the species a "resident from southeastern Arizona south through eastern Sonora and western Chihuahua to central Sinaloa and western Durango; also in Jalisco," implying the species is nonmigratory. In southeastern Arizona only a few individuals have been found in winter (Snider 1969, Stotz 1978, Mills et al. 1980, Mills 1989, 1992). From museum specimen records, Phillips and Phillips (1993) deduced that the species migrates seasonally north-south.

In 1977 and 1978, during a life-history study of the Five-striped Sparrow near Patagonia, Arizona, an intensive search of several other canyons revealed the species in four canyons in the Pajarito Mountains (Sycamore, Tonto, Holden, and California Gulch) and in Chino Canyon in the Santa Rita Mountains (Mills "1977"). Interestingly, more males were found after July than before (Mills et al. 1980).

After 1978, my yearly casual monitoring and reports from birders suggested that the numbers of Five-striped Sparrows had declined in some canyons, and by 1985 the species no longer occurred in two of the six canyons (Chino Canyon and Patagonia) where Mills ("1977") had reported them. In this paper I report the results of my surveys during the 1990-1992 breeding seasons. The purposes of the surveys were to determine the population status of the Five-striped Sparrow in Arizona almost 15 years after the initial intensive survey, to determine whether the midsummer influx of males during 1977 and 1978 was typical, and to determine whether males moved from canyon to canyon.

## METHODS

Using the same technique to locate males that I had used during 1977 and 1978, I surveyed Chino Canyon, in the Mt. Wrightson Wilderness Area of the Santa Rita Mountains, east of Amado, and Sycamore Canyon, Tonto Canyon, Holden Canyon, and California Gulch, all in the Pajarito Mountains south of Ruby (Figure 1). Sycamore Canyon and the western part of Tonto Canyon are within the Pajarito Wilderness Area. Five-striped Sparrow habitat diminishes near the U. S./Mexico border, so I did not survey south of the border, nor did I survey the canyon located on private property near Patagonia because no Five-striped Sparrows have been found there for several years. I surveyed each canyon once each June and August 1990, 1991, and 1992, except Holden Canyon was not surveyed in August 1990, because of unsafe conditions, and Tonto Canyon was not surveyed in June 1991. I did not search for the inconspicuous females.

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In 1990 I played taped songs and calls of a male Five-striped Sparrow I recorded in July 1978 near Patagonia; in 1991 and 1992 I played songs and calls of a male Five-striped Sparrow recorded at California Gulch (Keller 1988). I broadcast songs and calls intermittently on a Panasonic RQ-355 cassette tape recorder at previously known sites and in other suitable habitat.

In 1991 and 1992 I attempted to capture Five-striped Sparrows in mist nets, decoying them with more broadcast song and a plastic dummy Five-striped Sparrow. I determined the sex of captured birds by their singing and the size of their cloacal protuberance, and I aged them by plumage color (Wolf 1977). I banded them with U. S. Fish and Wildlife Service aluminum bands and colored plastic bands in unique combinations for individual identification. I marked each male's location on a U. S. Geological Survey topographic map. Previous studies have shown that Five-striped Sparrow territories are arranged linearly within a canyon, no territory is above another territory, and boundaries are defined by topographic features such as ridges (Mills et al. 1980). Previously banded birds found in later surveys were not recaptured but were identified and their location was marked on a map.

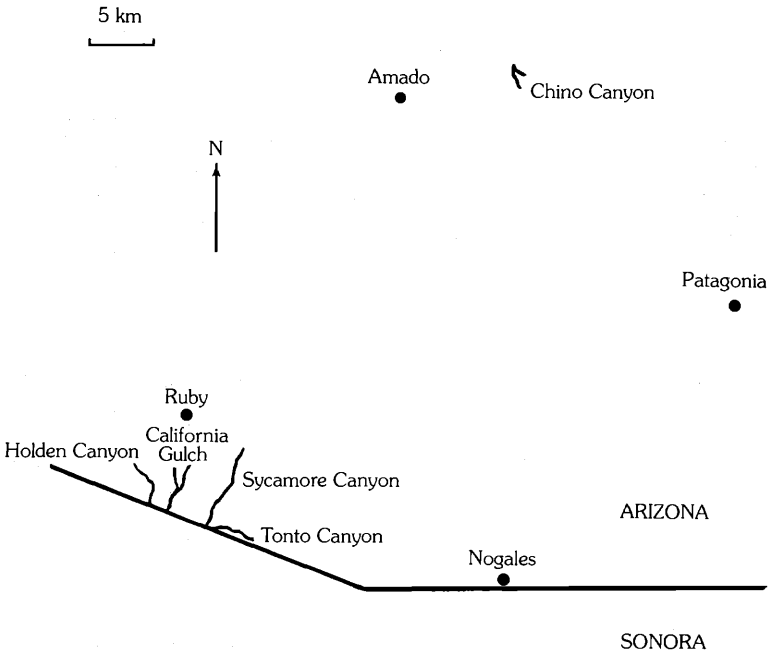


Figure 1. Arizona sites searched for Five-striped Sparrows, 1990-1992. Circles, reference localities.

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RESULTS

The 1990 survey of unbanded males in the five canyons showed that total numbers of Five-striped Sparrows had declined since 1978, primarily because of the species' disappearance from Chino Canyon and a substantial decrease in numbers at Tonto Canyon and California Gulch. In Sycamore and Holden canyons, however, the number of males had changed little since 1978-1979. In August the number of males found in Sycamore Canyon was over twice that found in June, at California Gulch one more male was found, and in Tonto Canyon the same number was found (Table 1). At none of the canyons was there a decrease in males from June to August, suggesting that the change in numbers wasn't due to local inter-population dispersal.

The 1991 and 1992 surveys with uniquely banded birds provided more accurate information about population size and movements of individuals (Table 2). Except in Chino Canyon, the numbers of male Five-striped Sparrows in each canyon were close to those found during the 1977-78 surveys and higher than in 1990. The total number of birds observed in all canyons in both 1991 and 1992 was higher than the total number of birds observed in any individual survey, either June or August.

In 1991, in the three canyons for which I have relevant data, the number of males decreased, not increased, from June to August. The appearance in August of unbanded birds, however, demonstrated that an influx of males did occur, though offset by the disappearance of banded birds. In 1992 the midseason influx almost equaled the efflux.

This mid-seasonal movement and the decrease in numbers between June and August 1991 may be attributable to lack of rainfall; summer monsoons trigger breeding (Mills et al. 1980). Dependency on rainfall and "nomadic reproduction" is known in other *Aimophila* sparrows, e.g., the Rufous-winged (*A. carpalis*), and Cassin's (*A. cassinii*) (Marshall 1963, Short 1974). In 1991, I found only two pairs of birds with fledged young, and

**Table 1** Locations and Numbers of Unbanded Male Five-striped Sparrows in Arizona in 1977, 1978, and 1990

Location	1977 <sup>a</sup>	1978 <sup>a</sup>		1990	
	July/August	June	July/August	June	August
Sycamore Canyon	12	5-6	15	7	16
Tonto Canyon	12	— <sup>b</sup>	4 <sup>c</sup>	6	6
California Gulch	9	— <sup>b</sup>	7	3	4
Holden Canyon	7	3-4	8	8	— <sup>b</sup>
Chino Canyon	2	1-6	12	0	0
Total	42	9-16	46	24	26

<sup>a</sup>Data from Mills et al. (1980).

<sup>b</sup>Canyon not surveyed.

<sup>c</sup>Canyon incompletely surveyed.

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**Table 2** Locations and Numbers of Male Five-striped Sparrows in Arizona in 1991 and 1992

	1991		1992		Total 1991	Total 1992
	June	August	June	August		
Sycamore Canyon	13	9	17	11	16	24
Tonto Canyon	— <sup>a</sup>	8	8	7	8	8
California Gulch	10	8	7	7	12	11
Holden Canyon	9	6	5	11	11	11
Chino Canyon	0	0	0	0	0	0
Total, all canyons	32	31	37	36	47	54

<sup>a</sup>Canyon not surveyed.

their calculated date of conception (Mills et al. 1980) coincided with the first heavy rainfall on 25 July (local resident, pers. comm.). I observed no pairs building nests, no males were singing spontaneously, and the birds I caught in August were already in the late stages of postnuptial molt. In other years, Five-striped Sparrows have nested up to three times, into late August and September (Wolf 1977, Mills et al. 1980). Failure to breed in 1991 is also indicated by the ages of males I banded in 1992. Bellies of Five-striped Sparrows in juvenal or first basic plumage are yellowish, whereas those in later plumages lack yellow (Wolf 1977). In 1991, 11 of 37 males captured had yellow, whereas 0 of 26 caught in 1992 had yellow. Therefore, no first-year males representing the previous summer's hatch were found in 1992.

Banding revealed that very few birds returned in 1992 to the same canyon and territory where they were captured in 1991, yet total population numbers changed little between 1991 and 1992 (Table 2). Of 37 males banded in 1991, only 10 were resighted in 1992 and only 4 of these were in territories they had occupied in 1991 (Table 3). The fate of the missing 27 males and the source of immigrating males are unknown. Within a season, most males remained in the territory where they were banded, only

**Table 3** Resightings in 1992 of Male Five-striped Sparrows Banded in Arizona in 1991

	Canyon			
	Sycamore	Tonto	California	Holden
Banded in 1991	15	4	10	8
Resighted in 1992	3	1	4	2
Resighted in 1992 on territory where banded in 1991	1	0	1	2

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a few switching territories within a year or from one year to the next. This shifting of territories has been reported previously; it may be related to breeding failure and mate-switching (Mills et al. 1980).

The banding study implies that Five-striped Sparrows move mid-seasonally to and from their Arizona range. However, no banded bird was found away from the canyon where it had been banded. This apparent isolation from each other of the populations in various canyons is remarkable, considering their proximity and the discovery that Five-striped Sparrows in Mexico are not as sedentary as was once thought (Phillips and Phillips 1993).

### SUMMARY

Five-striped Sparrows have occupied territories in Sycamore Canyon, Tonto Canyon, Holden Canyon, and California Gulch, Santa Cruz Co., Arizona, since their discovery in 1977, but the species has disappeared from Chino Canyon and Patagonia. In 1991 and 1992, and especially between the two years, there was substantial turnover of individual birds, so earlier counts may have underestimated the total number of birds found in each canyon per season. Yet within a canyon very few birds switched territories, either within or between breeding seasons. I observed no intercanyon movement by banded birds.

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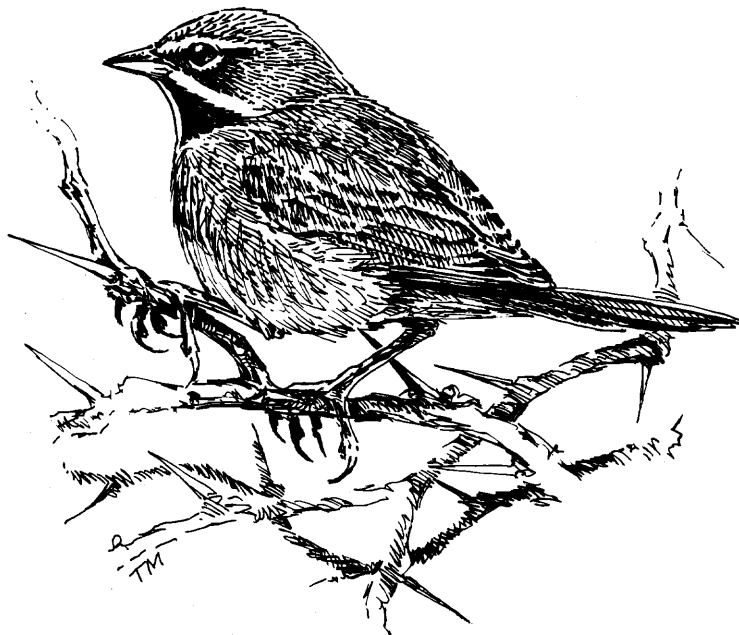
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Sketch by Tim Manolis