



# As the Sparrow Flies: How Bachman's Sparrows Traverse a Fragmented Landscape.

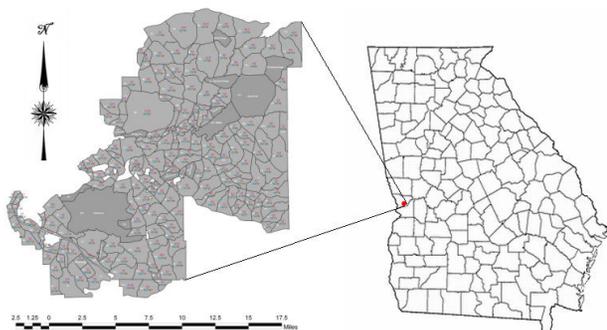
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## Introduction

Habitat fragmentation is a dominant factor in the decline of many North American breeding bird populations (Askins et al. 1990, Herkert 1994, Bélisle et al. 2001, Donovan and Flather 2002). In addition to the direct loss of total suitable habitat, suitable patches of habitat become more isolated, potentially affecting dispersal and colonization, which may alter population dynamics. Bachman's Sparrow (*Peucaea aestivalis*) is a resident songbird of frequently burned ( $\leq 3$  years) pine that has been declining due to loss of habitat through development, fire suppression, and fragmentation (Haggerty 1988, BirdLife International 2008). Throughout the Bachman's Sparrow's range, patches of suitable habitat occur that are unoccupied (BirdLife International 2008), suggesting that dispersal and colonization may be impeded by barriers that result from fragmentation.

For this pilot study, we investigated the effects of fragmentation and habitat barriers on the movement of Bachman's Sparrows at Ft. Benning, GA (Figure 1). To do this, individuals were equipped with radio transmitters and relocated from their territories across a barrier and released. We then monitored movement to determine whether or not each individual would return to its territory, and if so, whether or not it traversed unsuitable habitat. We predicted that individuals would return to their territories when relocated short distances, but would avoid barriers when navigating back to their home territories.



**Figure 1.** Location of study site at Ft. Benning, GA. Ft. Benning contains a large population of Bachman's Sparrows because of their frequent use of prescribed fire.

## Methods

We captured and attached radio transmitters to Bachman's Sparrows and released them back into their territories to allow them to adjust to the transmitters. Forty-eight hours later, after the birds were observed singing and defending their territory with the transmitter attached, we recaptured the individuals and released them at multiple distances and across unsuitable habitat patches (Table 1). We then monitored their movements until they returned to their territory and georeferenced their locations as they travelled across the landscape.

**Table 1.** Distance of release from capture point, the duration of time it took for the individual to return to its territory, and whether or not the individual crossed the field during its return.

	Release Distance (m)	Time to Return	Did it cross barrier?
Bird 1	1,300 m	4 days	No
Bird 2	800	12 hours	Yes
Bird 3	800	12 hours	Unknown
Bird 4	800	2 hours	Yes

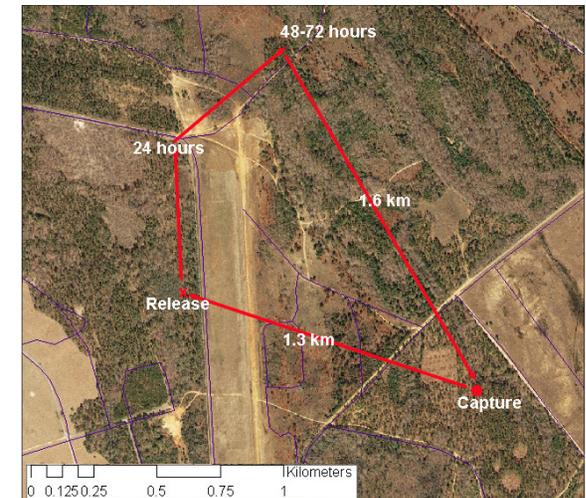
## Results

Data were collected for four individuals in this pilot study. All four individuals returned to their respective territories, though at different rates, with some crossing barriers while others did not (Table 1). Bird 1 was moved the farthest at 1,300 m and took 4 days to return, avoiding barriers (Figure 2). Conversely, Bird 4 returned within two hours of release and crossed the barrier. Birds 2 and 3 returned within 12 hours of release, however, we were unable to completely document Bird 3's movements due to the speed at which it moved, though we suspect that it did given the time between it was last known location and its return ( $< 1$  hour).



## Discussion

Understanding how fragmentation affects the dispersal and movement of Bachman's Sparrows is important for conservation planning and habitat management. Our previous studies using experimental translocations found that fragmentation slowed the return of Bachman's Sparrows to their territories at distances over 1 km (Jones et al. unpublished data). Using radio transmitters to track specific movements enable spatially explicit models to be created to predict population responses to fragmentation and provide justification for the creation of corridors between patches of suitable habitat to facilitate the dispersal of Bachman's Sparrows and other early successional species.



**Figure 2.** Aerial photograph showing the capture point, release point, travel path, and corresponding travel time of Bird 1. Green trees are open pine forest burned on a three-year rotation. Narrow strip of bare land is the abandoned air field that served as a habitat barrier.

## Acknowledgements

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## References

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