INTRODUCTION

Previous studies have suggested that populations of North American aerial avian insectivores are decreasing (Robbins et al. 1989, Böhning-Gaese et al. 1993, Askins 1995). Most recently, based on North American Breeding Bird Survey (BBS) data from between 1966 and 2006 and including most BBS routes for Canada and the United States (excluding Alaska, Yukon, and states or provinces with 15 or fewer BBS routes), Nebel et al. (2011) concluded that Tree Swallow (*Tachycineta bicolor*) populations were among the species of decreasing aerial insectivores, especially in northeastern North America. BBS data, such as those analyzed by Nebel et al. (2011), are collected along roads, and are most concentrated near areas of high human population density (see Sauer et al. 2011 for details on spatiotemporal coverage). In many parts of theaTt
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Fig. 1. Location and occupancy rates over time of Tree Swallow sites. Scatterplots associated with open circles over sites have negative trends (Table 1); closed circles indicate increasing trends.

Table 1. Site details (Fig. 1) and results of logistic regressions with number of occupied boxes and number of boxes as response variables, year as explanatory variable, and error distributions set as quasi-binomial. Sites are arranged by longitude. β is the slope, and SE β is the standard error of the slope estimate. Significant slopes in bold.

Site name	Site name, researchers	Latitude

RESULTS

Ten of 16 sites had significant increases or decreases in box occupancy rates (Fig. 1, Table 1). All six sites east of -78° W longitude had decreased occupancy (5 of these significantly so), whereas only two of ten sites west of -78° W longitude had decreased occupancy. Both North ($F_{1,13}$ = 10.9, P = 0.006) and West ($F_{1,13}$ = 11.2, P = 0.005) were significant predictors of trend slopes (overall model R^2 = 0.47, $F_{2,13}$ = 5.7, P = 0.02). If the Saskatchewan, Manitoba, and Wisconsin sites were excluded because they regularly had ~100% occupancy, North ($F_{1,10}$ = 8.4, P = 0.02) and West ($F_{1,10}$ = 8.6, P = 0.01) still remained significant predictors of trend slopes (overall model R^2 = 0.47, $F_{2,10}$ = 4.4, P = 0.04).

We reanalyzed data from Manitoba after excluding 2005, a year that followed two consecutive years of 100% predation by short-tailed weasels (*Mustela erminea*) (Fig. 1); this did not produce a significant trend for this site (β = 0.041 ± 0.125, t = 0.3, P = 0.75). Excluding 2008 from the Michigan data following a year of complete predation by cats (*Felis domesticus*) and raccoons (*Procyon lotor*; Fig. 1) resulted in a statistically significant positive trend for this site (β = 0.095

to be behaviorally cryptic (Smith 1978, Stutchbury and Robertson 1985, Shutler and Weatherhead 1991, 1992, 1994).

routes, or timing. Our results indicate that populations of Tree Swallows bear close monitoring; they may provide keys to identifying many of the unknowns contributing to changes in populations of other species of aerial insectivores.

Responses to this article can be read online at:
http://www.ace-eco.org/vol7/iss1/art3/responses/

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