Introduction

Window collisions are the second largest (after cats) anthropogenic cause of bird mortality in North America, killing 365 to 988 million (median = 599 million) birds every year in the United States alone[3].

• Most studies regarding bird-window collisions focus on migrations seasons rather than breeding season.

Relative to estimated abundance, some species of birds have been found to collide with buildings more frequently than others.[1,4]

• This poorly understood phenomenon may cause increased rate of population decline for species already under pressure.

• Only a small number of studies have attempted to compare collision rate to local abundance.

• There are a variety of ecological differences that could possibly explain the variation in collision rates per species including traits such as feeding, nesting, foraging style, typical habitat requirements, etc.[1,4]

Hypothesis

It was hypothesized that collision vulnerability would vary among species, and that ecological differences such as those listed above would provide a stronger explanation for the relative vulnerability than would the relative abundance alone.

Objectives

1. Provide much-needed quantitative data regarding species-specific bird-window collision rates during the breeding season
2. Analyze which, if any, species are more or less likely (based on relative abundance) to collide with windows in a downtown business district zone
3. If possible, provide mitigation suggestions for city planners to lower the number of collisions

Methods

Data Collection

During the breeding season of 2017, bird collision and bird abundance data were collected from a two-mile route in downtown St. Paul.

• Route was surveyed at sunrise for 26 days
• Collisions: Bird carcasses found under windows and skyways were collected
• Abundance: 10-6 minute point counts were conducted at each of the 16 corners

Data Analysis

Using Program R and the lmef package[3];

• To test the significance and strength of abundance as an explanatory factor of collisions among bird species
• Best model had a fixed effect of abundance and a random effect of week nested within species
• Species origin (i.e. native or introduced) was then added as a second fixed effect to test with abundance.

Results

During surveys, 1,551 live birds and 21 collision mortalities were counted. However, four collision specimens were removed from the data set because identification was uncertain leaving a collision count of n=17 (Table 1).

• Live detections: 8 species
  • 59% house sparrow (n=875) • 22% rock pigeon (n=320)
  • Collision detections: 10 species
  • 18% house sparrow (n=3) • 18% house finch (n=3)
  • Only 3 species were detected both alive and dead: house sparrow, house finch, and American robin

According to the best supported model, there is weak evidence that collision vulnerability is positively correlated with abundance (ΔAIC = 1.72; β = 0.1867; p-value = 0.101).

Conclusions

As a result of surveying only one breeding season, the collision data set collected was rather small (n=17). The data did not support the hypothesis that non-native species would be less vulnerable to collisions. However, it did suggest a weak positive association between abundance and species-specific collision vulnerability.

It is likely due to the small data set that there was not a significant relationship between collision vulnerability and species origin.

• Three of the four species in this study that are non-native (European starling, rock pigeon, and house sparrow) suggest the hypothesis is correct (figure 3).
• They had relatively low rates of collision as would be expected for non-native species which are often more well adapted to human-dominated environments[7].
• However, because there was such a small number of collision detections and an even smaller number of species detected both alive and dead, house finch (a non-native species) was able to skew the significance.

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References