

When Corridors Collide: Road-Related Disturbance in Commuting Bats

I. Introduction

- A. Scientists are testing the circumstances of why bat species are in decline. The study area is the Indianapolis International Airport in Marion County due to it being a high prevalent area for North American bat species.
- B. The scientists understand that high bat mortality rates are due to vehicle collision but they want to understand the relationship of those factors. They are looking at the commuting routes and seeing if it elicits road avoidance behavior from bats.
- C. The scientists chose this subject because if this trend were to continue, the population of local and region bats would be reduced drastically. They wanted to find ways to increase permeability in commuting routes for bats.
- D. Bats play a crucial role in the environment and biosphere cycle and if they were to go extinct or reduced drastically in population then there would be imbalance with the environment and cycle of many animals.
 - a. The scientists are trying to find factors influencing road avoidance behavior and to what extent.
- E. The scientists wanted to test if commute structure routes varied the frequency at which bats exhibited road avoidance behavior and identify features and triggers that led to road avoidance behavior when roads intersected the bats commuting route.
 - a. Understanding the effect, the environment plays on bat population will give a different perspective on reason for bat mortality rates and open the door to new solutions.

II. Materials and Methods

- A. The scientists chose 5 sites with commuting routes that varied in structure and composition from each other. Data was collected in terms of 3 “surveys;” habitat, sensing and crossing. The habitat survey collected data on the commute route structure, the sensing survey looked at visibility/audibility of vehicles moving along the commute route, and the crossing survey measured movement/behavior of bats in presence/absence of vehicles.
- B. Concentrated surveys within a 40 m stretch – maximize chances of observing road avoidance behavior. In addition, surveys were conducted prior to foraging period. To determine route surveyed, scientists used long-term telemetry data and preliminary observational surveys. It helped identify the frequency bats used in all locations. 1 m intervals along the stretch - characteristics were recorded such as trees, shrubs, fencing, and other absent features. More precise measurements were recorded of the plant life.

C. All habitat surveys were carried out during the day – this was independent of weather and other surveys. The instrument used for the sensing surveys was a digital sound pressure level meter. This recorded the peak noise levels of passing vehicles through route.

III. Results/ Discussion

- A. Results showed that the road avoidance behavior exhibited by bats was due to the structure of the commuting route. Each site varied in frequency emitted, there was significant variation. When no cars were present, bats readily turned (trees/shrubs were absent). This finding proved that bats had a disturbance threshold.
 - a. “Turning frequency of bats was found to increase with vehicle noise level and the location at which bats responded to vehicles corresponded with areas where greatest.” (Bennett & Zurcher, 2013) This led to the belief that bats had a disturbance threshold at about 88dB (value varies – species).
- B. Information gathered supported desired end goal, to understand factors contributing to road avoidance behavior of bats.
 - a. Indicates that if gaps along road stretch were restored and road-crossing opportunities were created, then it would increase life expectancy of road-prevalent landscapes to bats. Overall, this study highlights the impact of soundscape and the influence it plays with species.
 - i. Limitations in this study consisted of not being able to precisely specify species of bats recorded.
- C. The study did contribute to further understanding the impact the environment and urban roadwork have on bats by providing insight on the overall picture (cause and effect).

Bibliography

Bennett, V. J., & Zurcher, A. A. (2013). When Corridors Collide: Road-Related Disturbance in Commuting Bats. *The Journal of Wildlife Management*, 93-101.