ASSESSING THE IMPACTS OF FRAGMENTATION AND IMPERVIOUS SURFACES ON BAT ACTIVITY AND DIVERSITY
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Introduction

The Oak Openings region serves as critical bat habitat (Turner 2018).

The highly fragmented nature and high bat biodiversity in this region makes it a good place to study how fragmentation and impervious surfaces impact bats.

Methods
Anabat SD2 monitors were left at paired edge and interior sites or paired sites in parking lots and 100 m away from them.
Surveys conducted May-September 2020.
Calls were identified using Analook.
Field habitat variables were measured 15 m away from stationary points.
Insects were caught with sweep nets.
Percent of each land cover type in 100 m and 500 m were measured in ArcGIS using a land cover map.
FRAGSTATS was used to measure fragmentation and heterogeneity.
Nonparametric tests run in JMP to determine correlation between paired sites.
AIC tables created to look at most important variables across all stationary sites.

Results
Paired Sites

No differences in species richness for either Edge and interior sites 32% dissimilar in bat species and 14% dissimilar in insect orders Parking lot and non-parking lots 48% dissimilar in bat species and 49% dissimilar in insect orders

Big brown bats (Eptesicus fuscus) and silver haired bats (Lasionycteris noctivagans) more common at forested interior sites

Hoary bats (Lasiurus cinereus) more common in parking lots and evening bats (Nycticeius humeralis) less common

Conclusion
Bats slightly prefer interior sites to edge ones.
Slightly more bat activity in parking lot sites (not significant)
Some species-specific preferences.
Models have somewhat high explanatory power
Importance of structural variables and some habitat types

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Figure 1: Parks where stationary monitors placed (Turner 2018)
Figure 2: Land cover map of Oak Openings Region (Root and Martin 2020)

Variable | Effect
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Conifer forest in 100 m | -
Clutter 0-3 m | +
% Canopy cover | +
Moon | -

Figure 3: Total activity at edge/interior points
Figure 4: Total activity at parking lots/outside them

Variable | Effect
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Conifer forest in 100 m | -
Sand barrens in 500 m | +
Eurasian meadow in 500 m | -
Canopy cover | +
Clutter 0-3 m | +
Clutter 3-6.5 m | -

Variable | Effect
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Conifer forest in 100 m | -
Clutter 0-3 m | +
% Canopy cover | +
Moon | -