The Birds and the Trees

Branden Lawson, Karina Sanchez, Dr. Lauryn Benedict
Benedict Behavioral Ecology Lab, University of Northern Colorado, Greeley, Colorado

Objective / Prediction One

- Determine survival rate for urban and non-urban American Robin nests.
- Predicted that the survival rate of nestlings will be higher in Non-Urban habitats than in Urban habitats.

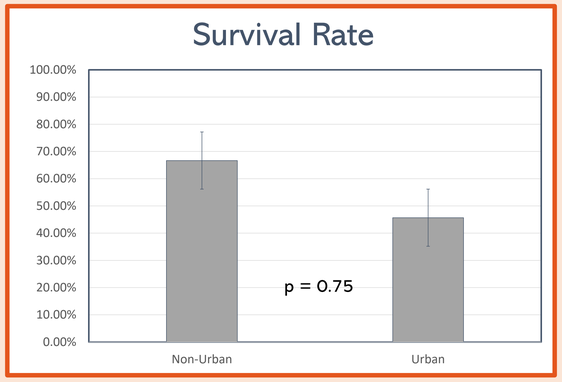
Objective / Prediction Two

- Collect data on tree characteristics in a 0.2 Hectare plot nests: Diameter at breast height, Canopy Cover, Number, Height.
- Predicted that non-urban locations would have an increase in tree collected characteristics.

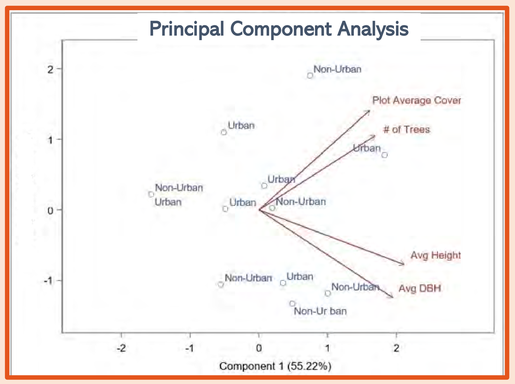
Objective / Prediction Three

- Determine if the differences in tree characteristics between Urban and Non-urban locations affect the survival rate of American Robins.
- Predicted that survival rate will be lower in Urban locations vs. Non-urban location due to the difference in tree characteristics.

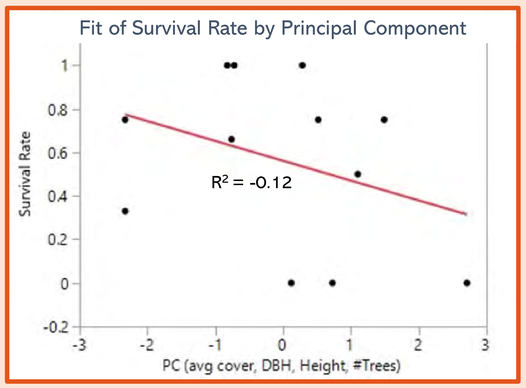
Results



Survival Rate in urban locations was found to be 45.67% while in non-urban locations it was found to be 66.67%. These data were found to not be statistically significant.(Wilcoxon Rank-Sum test: Z = -0.32, p = 0.75).



Principal Component Analysis allows us to see that urban and non-urban study sites do not group together as we expected. As the number of trees within a plot increases so does the average cover within the plot. Additionally, as the average height of trees increases so does the average diameter at breast height.



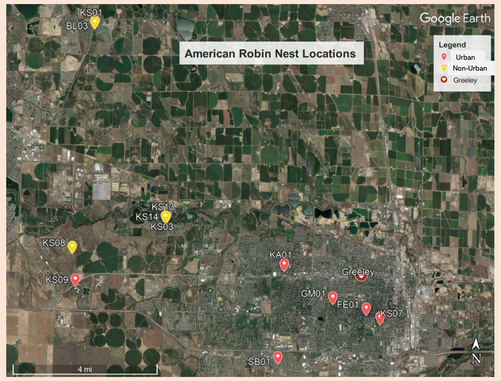
Regression Analysis of survival rate as predicted by the plot characteristics provides us with a negatively correlated relationship (R^2 = -0.12). As the average cover, diameter at breast height, height of trees, and number of trees increase there is a decrease in survival.

Introduction

Bird populations in North America have declined by 2.9 billion individuals since 1970.[1] The transformation of the earth's land surface due to urbanization is estimated to be 10-15%. This loss of habitat is due to many human enterprises that result in land transformation, biotic additions and losses, loss of biological diversity, as well as climate change.[2] It has been shown that the urban bird community is strongly influenced by vegetation, with the volume of native vegetation being most closely correlated with native bird density and species richness.[3] American Robins (*Turdus migratorius*) are common in urban and non-urban areas and can serve as useful indicators of human activities' effects on wildlife.[4] American Robins tend to nest in habitats that contain mature vegetation, large trees, and plenty of cover. Therefore, understanding the variation in survival between urban and non-urban locations is important to maintain habitat.

Methods

- Data collection occurred during the 2019 breeding season
- Nest monitoring occurred from clutch initiation to fledging.
- A circular plot (0.2 ha), with the nest at the center, was surveyed for tree density, tree height, the diameter of trees, and cover provided by the trees.



Twelve nesting sites that were categorized urban or non-urban based on distance from the city center of Greeley, Colorado.

Red = Urban

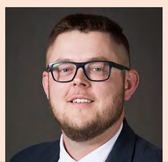
Yellow = Non-Urban

Conclusion

- The prediction that survival rate of nestlings will be higher in Non-Urban habitats than in Urban habitats could not be supported.
- The prediction that non-urban locations would have an increase in collected tree characteristics could not be supported.
- The prediction that survival rate will be lower in urban locations vs non-urban locations could not be supported.
- These results suggest that the American Robin, regardless of urban or non-urban habitat characteristics, are nesting in locations similar in number, diameter, and height of trees as well as in areas with the same amount of cover provided by trees.

References

1. Rosenberg, K. V. et al. 2019. Decline of the North American Avifauna. *Science* 365(6461)
2. Beaver, Donald. 1980. "Recovery of an American Robin Population after Earlier DDT Use." Journal of Field Ornithology 51(3): 220–28.
3. MillS, G. et al. 1991. "The Relationship between Breeding Bird Density and Vegetation Volume." The Wilson bulletin (Wilson Ornithological Society) 103(3): 468–79.
4. Vitousek,P.M. et al.. 1997. "Human Domination of Earth's Ecosystems." Science 277(5325): 494–99.



Branden Lawson
Ecology, Evolution, and Conservation
blawso@brandensbioblog.com
Twitter: @brandensbioblog
LinkedIn: brandensbioblog

UNIVERSITY OF NORTHERN COLORADO
McNair scholars PROGRAM