

2019

The Role of Endangered Oak (*Quercus* spp.) Savanna Characteristics in Supporting Red-Headed Woodpecker (*Melanerpes erythrocephalus* L.) Populations

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Recommended Citation

Zralka, Kimberly J. (2019) "The Role of Endangered Oak (*Quercus* spp.) Savanna Characteristics in Supporting Red-Headed Woodpecker (*Melanerpes erythrocephalus* L.) Populations," *ELAIA*: Vol. 2 , Article 17.

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Cover Page Footnote

I would like to thank my advisor and project mentor, Dr. Derek W. Rosenberger, for everything he has taught me and helped me with over the years completing this project; I wouldn't be where I am today without you. I would also like to thank Dr. Leo Finkenbinder for his help giving me honors project ideas and helping me get started with everything early on. I would like to thank the Nature Conservancy and the Forest Preserve District of Will County for allowing me to conduct research in the field. I would also like to thank the Olivet Nazarene University Department of Biological Sciences for allowing me to use their equipment to conduct my research. This project was generously funded through the Elbert Pence & Fanny Boyce Undergraduate Summer Research Experience grant and the Olivet Nazarene University Honors Program. Lastly, I would like to thank my friends, family, and Cohort 9 for all of their support and encouragement along the way. Thank you!



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Presented as Abstract only

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ABSTRACT

Declines in animal populations worldwide are of critical conservation concern. However, without an understanding of optimal habitat preference, it is often difficult to determine what factors are driving these losses. Red-headed woodpecker (*Melanerpes erythrocephalus* L.) populations have declined by over 70% in the last fifty years, yet in some areas the birds seem to maintain stable populations. The aim of this study was to empirically test the effects of various habitat factors on red-headed woodpecker presence and abundance in both the summer and winter seasons. As oak acorns are a critical food source for this bird, we were particularly interested in whether the oak species (*Quercus* spp.) present in savanna environments (an endangered ecosystem in the Midwestern United States) affect woodpecker presence and abundance, as this has not been tested to our knowledge. After conducting 414 point-count surveys and habitat analysis at five sites throughout northeastern Illinois, generalized linear and multiple regression models using backwards elimination were used to show how habitat factors affected presence and abundance of red-headed woodpeckers. Our models indicated that decreasing canopy cover, increasing dead limbs, increasing red oak group trees, and decreasing white oak group trees at a site were significant factors in predicting woodpecker presence and abundance during the summer months. However, in winter our models indicated that mainly tree size, and potentially number of snags, number of dead limbs, and percent canopy cover play a role in predicting red-headed woodpecker habitat selection. These results confirm and expand upon previous studies, suggesting that mature oak savanna environment is important to the success of red-headed woodpecker populations. Our findings that a greater number of red oak group trees, but a smaller number of white oak group trees, may be positively related to woodpecker abundance at a site is of interest, as this may indicate that the optimal habitat requirements of red-headed woodpecker populations are more specific than previously thought. Together, these factors should help inform managers in conservation planning for this iconic species.