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Tri-colored Bat Roost Tree Use and Movement Patterns Following White-nose Syndrome in Western Kentucky

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TRI-COLORED BAT ROOST TREE USE AND MOVEMENT PATTERNS POST- WHITE-NOSE SYNDROME

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Introduction

The tri-colored bat (*Perimyotis subflavus*) was once one of the most common bats in North America and a species for which we have limited knowledge of its roosting habitat needs (Veilleux et al. 2004; Lacki et al. 2007). The species is undergoing severe declines due to the fungal disease white nose syndrome (WNS; Coleman 2014). Despite the extinction of local bat populations in many areas, remnant populations of WNS-susceptible bats, including tri-colored bats, are surviving where the main populations were decimated (Frick et al. 2015). We examined roost tree use by tri-colored bats in western Kentucky (Figure 1) five years after WNS was confirmed in the state.

Objective

Determine distinguishing characteristics of roost trees and roosting areas used by tri-colored bats so that their roost needs can be considered in management plans.

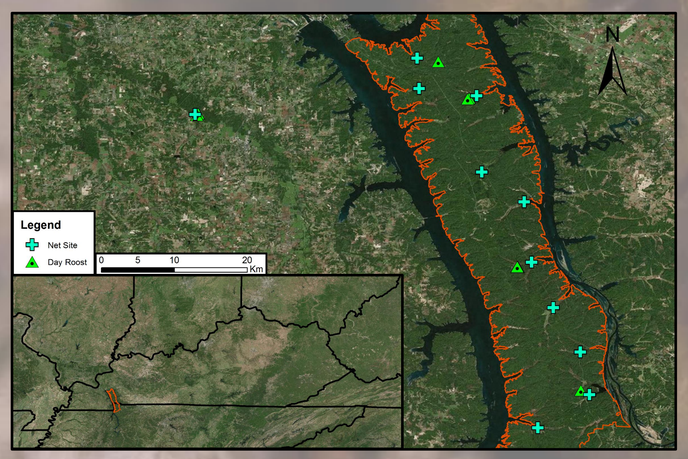

Figure 1. Mist-net and roost tree sites. Inset shows Kentucky with Land Between the Lakes National Recreation Area (LBL) in orange.

Methods

- Mist-netted bats at LBL and Clarks River National Wildlife Refuge during May through August 2015.
- Attached a radio transmitter to adult tri-colored bats (Figure 2).
- Tracked six bats to their day roosts for one to 12 days as signal allowed (Figure 3; Perry and Thill 2007).
- Collected habitat data at 20 roost trees and 40 randomly selected trees within the distance traveled by a bat to its roosts O'Keefe et al. 2009).
- Used habitat data to create a generalized linear model and compared variables measured between roost tree and random tree sample groups (Veilleux et al. 2003).

Figure 2. (Left) Five element antenna used in radio telemetry to locate bats. (Right) Tri-colored bat with glue to attach transmitter.

Bat Movement Results

Greatest distance moved to successive roosts was 207.8 m; average movement 68.9 m.

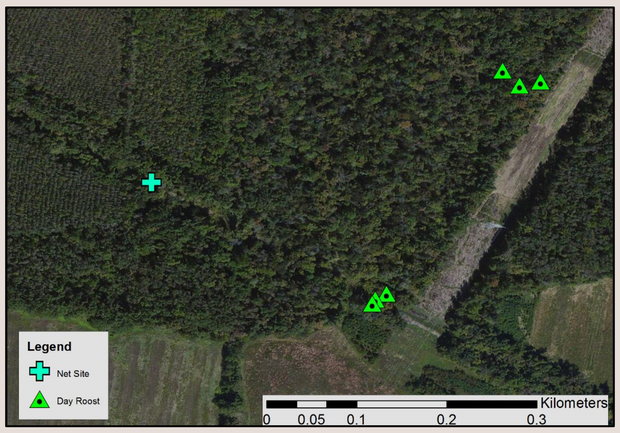

Figure 3. Net and roosting sites for two bats. Each bat uses trees within a 50 m area and less than 0.5 km from capture site

Individuals remained within 2.5 km of capture site.

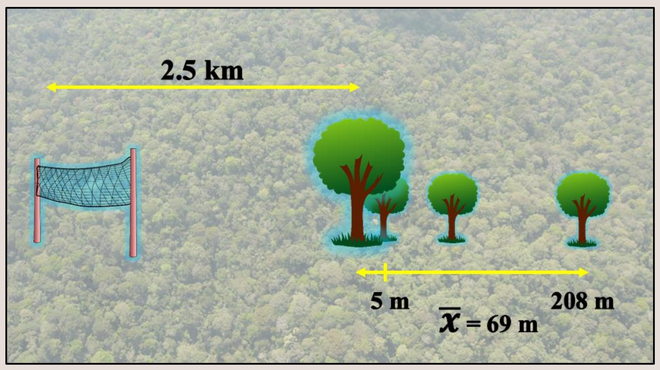

Figure 4. The maximum distance moved from capture site to roost, and min., max., and average distance between roosts

Roost Use Results

Canopy depth is a significant predictor of bat tree use. The best linear model ($p < 0.007$) comparing known roost trees to our random tree survey is:

Bat Occurrence = 0.12 * Canopy Depth (m) – 2.07

Roost Use Results (cont.)

All roosting bats were located within the foliage of live trees.

Figure 5. Typical view of canopy in which a tri-colored bat roosted.

19 roosts located in 10 different species of tree

Mockernut hickory (*Carya tomentosa)* and black oak (*Quercus velutina)* was used as roosts more, and white oak *(Q. alba)* were used less, than available.

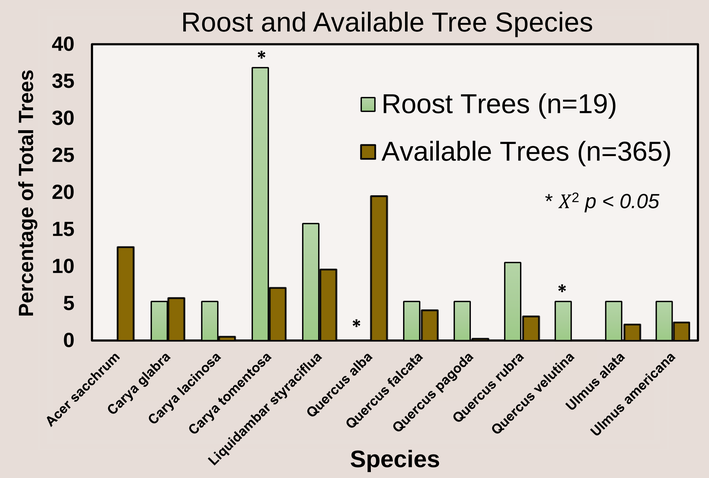

Figure 6. The percentage of tree species used as roosts compared to the species' availability in the adjacent area.

Conclusions

- Tri-colored bats appeared to select for and against specific tree species and for higher canopy depth than occurred at random.
- Mean movement to next roost (69 m) was much less than typically reported for coinciding protected *Myotis sps.* (Lacki et al. 2007)
- Management needs of the tri-colored bat likely differ from those of other declining bat species (e.g., *Myotis sps*.) which prefer trees in mid-decay stages.

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Acknowledgements

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