

Reducing wildlife mortality on roads in Vermont: Determining relationships between structure attributes and wildlife movement frequency through bridges and culverts to improve conservation investments

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Introduction

When bridges and culverts are designed to accommodate use by wildlife for moving under VT highways, co-benefits for conservation and road safety issues are realized. We conducted game-camera based research to assess wildlife through-passage frequency at culverts and bridges designed for fluvial conveyance to generate recommendations for designing road-stream crossings to increase the frequency of wildlife use for under-road movement.

Methods

Eighty-four game cameras were set up at 23 culverts/bridge sites on State, US, and Interstate highways in Vermont that were located within road corridor segments identified by connectivity modeling as important for regional habitat connectivity for up to 24 months. We selected structures that were most likely to be used by wildlife based on modified criteria of the Passage Assessment System (Shilling et al 2012). Our analysis tested the applicability of the Movement Guild framework (Kintsch and Cramer 2011) for characterizing wildlife species use of structures of different structure size classes.



Figure 1. Examples of game camera positioning at monitored transportation structures.

Results

Overall, 573 “passage events” through bridges/culverts of 13 moderate/wide ranging “focal” mammal species (excluding rodents, raccoon, woodchuck, and domestic pets) were recorded over nearly 40,000 camera monitoring days. While all but one of our sites were used by focal species to move under roadways, there was a substantial amount of variation in the frequency of use among sites, and 10 of the 23 sites yielded surprisingly low through-passage frequencies.



Figure 2. Select photos of wildlife-transportation structure interactions.

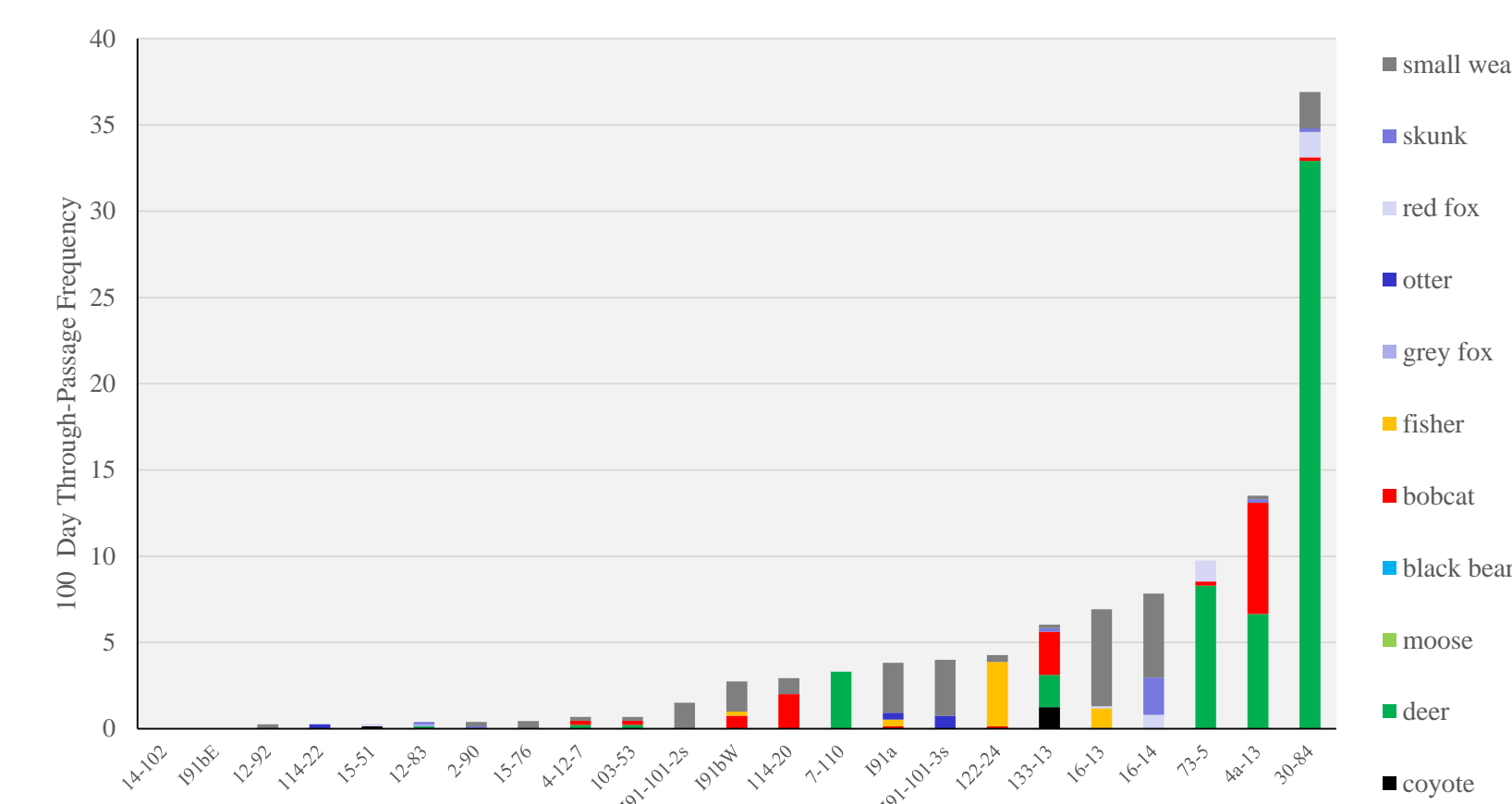


Figure 3. Focal species 100 day through-passage frequency at all sites, color coded by species.

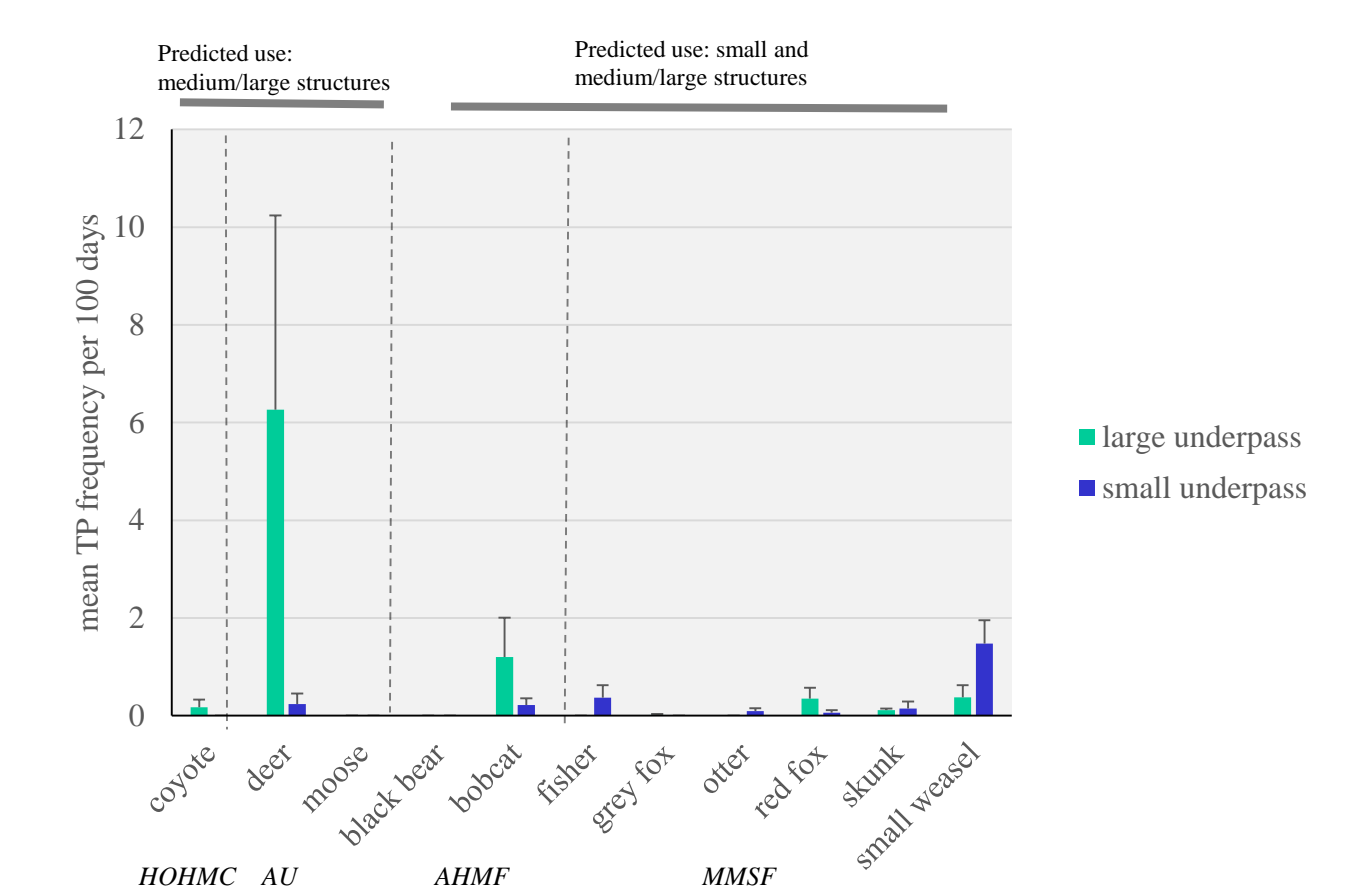


Figure 4. Mean 100-day through-passage frequencies per species by size class. Species are grouped by Movement Guilds.

Conclusions

Structure use patterns of focal species were consistent with a modified “Movement Guild” framework (with notable absence of through-passage detections for larger focal species: black bear and moose). Also, local-scale structural connectivity of forest habitat and availability of dry movement surfaces appeared to explain some of the between-site variation in through-passage frequency data.

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References

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