

Reducing Wildlife Mortality on Roads in Vermont: Determining Relationships Between Structure Attributes and Wildlife Movement Frequency Through Bridges and Culverts to Improve Related Conservation Investments

Paul Marangelo* The Nature Conservancy of Vermont; pmarangelo@tnc.org

UVM Transportation
Research Center

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. Building on insights from a preceding study, this project is collecting game-camera data to assess the effects of bridge and culverts structural characteristics on the frequency of wildlife use to generate recommendations for designing road-stream crossings to increase the frequency of wildlife use for under-road movement.

Methods

Game cameras were set up on State, US, and Interstate highways at 25 culverts/bridge sites in Vermont that were located within road corridor segments identified by connectivity modeling as important for regional habitat connectivity. Data was recorded for a set of 13 focal species. Monitored structures represented a range of structural characteristics within sites most likely to be used by wildlife based on our understanding of transportation structure wildlife use gained from a preceding project (Marangelo 2016). We intentionally included 6 new post-Irene structures to assess wildlife use of bridges/culverts constructed to modern design specifications.



Figure 1. Examples of transportation structure types used for wildlife use monitoring



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

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Results

Data collection is ongoing, and a completed project analysis will be available in May 2019. Overall, 19 of the 25 structures were used by focal wildlife species thus far. New post-Irene structures were minimally used by wildlife.

Size Class	Structure	Movement guild	species
Small underpass	pipe, box, and arch culverts; 3-6' wide and < 8' height	Moderate Mobility Small Fauna (MMSF)	<u>small weasels</u> , <u>fox</u> , <u>otter</u> , <u>fisher</u>
		Adaptive High Mobility Fauna (AHMF)	lynx, <u>bobcat</u>
Medium/Large underpass	bridge spans, large culverts > 8' wide, > 8' high	Moderate Mobility Small Fauna (MMSF)	<u>small weasels</u> , <u>fox</u> , <u>otter</u> , <u>fisher</u>
		Adaptive High Mobility Fauna (AHMF)	lynx, <u>bobcat</u>
		Adaptive Ungulates (AU)	<u>deer</u> , <u>moose</u>
		High Openness High Mobility Species (HOHMS)	<u>cougar</u> , <u>wolf</u> , <u>coyote</u> , <u>bear</u>

Table 1: Modified movement guild/structure size class framework denoting structure use preferences of wildlife species groupings based on to-date project results. Species that were documented using structures for moving under roads are underlined.

Conclusions

Structure use patterns of focal species are thus far consistent with a modified wildlife "Movement Guild" framework (Table 1), and new black bear structure use data suggested assigning bears to the movement guild that exhibits a strong preference for large, open bridges. Qualitative observations from data collected thus far suggest that structure designs that offer consistently dry, natural substrate movement surfaces appear to be most favorable for wildlife use. Flat-bottom concrete box culverts appear to have value for only a limited number of species, while pipe culverts benefit a greater (though still limited) variety of species. Wildlife use of the new post-Irene structures is minimal despite more favorable structure design characteristics, likely because of tree/brush clearing in construction footprints of temporary bridges. Full project analysis will be available May 2019.

References

- Marangelo P. and L. Farrell. 2016. *Reducing Wildlife Mortality on Roads in Vermont: Documenting Wildlife Movement near Bridges and Culverts to Improve Related Conservation Investments*. Report to the Vermont Agency of Transportation. 36 pp plus appendices.
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