

2019 Research Showcase

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

& STIC Annual Meeting

RESEARCH PROJECT TITLE

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

STUDY TIMELINE

March 2017 – May 2019

INVESTIGATORS

Paul Marangelo, The Nature Conservancy in Vermont

VTRANS CONTACTS

James Brady, Environmental Specialist

MORE INFORMATION

VTrans Research will add link to the final report and other materials on VTrans website

This fact sheet was prepared for the 2019 VTrans Research Showcase & STIC Annual Meeting held at the Dill Building in Berlin, VT, on September 11, 2019 from 8:30 am– 1:00 pm.

Fact sheets can be found for additional projects featured at the 2019 Symposium at <http://vtrans.vermont.gov/planning/research/2019showcase>

Additional information about the VTrans Research Program can be found at <http://vtrans.vermont.gov/planning/research>

Additional information about the VTrans STIC Program can be found at <http://vtrans.vermont.gov/boards-councils/stic>

Introduction

Road corridors fragment wildlife habitat, and wildlife need to cross busy roads to move between valuable habitats, endangering both wildlife and highway users. We assessed wildlife use of culverts and bridges to clarify relationships between design characteristics of transportation structures habitat characteristics of the surrounding site, and the frequency of wildlife use for under-road movement. Project results can be used to identify sound investment opportunities to modify transportation structures to increase their usability by wildlife.

Action Taken

We assessed wildlife through-passage frequency at culverts and bridges designed for fluvial conveyance in order to clarify previously investigated relationships between structural dimensions and frequency of wildlife use of transportation structures. Eighty-four game cameras were set up at 26 culverts/bridge sites on State, US, and Interstate highways in Vermont within road segments important for wildlife habitat connectivity. We selected bridges and culverts that were most likely to be used by large terrestrial mammals (Marangelo and Farrell 2016; Shilling et al 2012). Structures represented a range of structure design characteristics (round pipe, box, and “squash pipe” culverts, bridges with and without: concrete abutment footings, riprap banks vs. no riprap).



Conclusions

A complex suite of structure design and site characteristic factors appeared to influence wildlife use of culverts and bridges. Bridge spans with usable movement surfaces (even floodplains or fine particle streambanks) were the most frequently used by the largest variety of wildlife species. In non-embedded culverts, movement surface availability and substrate type for wildlife was a simple function of structure design-type and structure size with respect to its stream. Perpetually wet flat-bottomed concrete box culverts performed especially poorly, with little wildlife use, while other culvert types with bankful width ratios >0.5 had low to moderate wildlife use frequencies. Substrate development in embedded culvert designs appears important, as high gradient structures that retain only boulder or cobble have poorer movement surfaces suited to a smaller set of wildlife species.

Potential Impacts and VTrans Benefits

This project developed a refined understanding of wildlife use of transportation structures that can inform road corridor management to better support this value in locations important for wildlife. A subsequent project phase will use this understanding to develop a wildlife terrestrial passage screening tool framework for bridges and culverts.

