# Effective Exclusionary Measures for Threatened Bats in Middlebury, VT

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## Topic & Importance

**Surveys to determine the presence or probable absence of federally- and state-listed threatened and endangered bats were conducted following the VFWD's and USFWS' guidelines. Based on the survey results, VTrans successfully implemented exclusionary measures to protect threatened and endangered bats.**

## Background, Methods, or System Design

**Vertical clearance beneath the deteriorating Middlebury bridges is substandard so the railroad tracks must subsequently be lowered to accommodate double-stacked freight trains. When the deteriorating bridges are demolished, the only access to local businesses will be by a temporary access road. Bridge demolition and tree clearing associated with the project will remove bat habitat and must be conducted in ways that avoid and minimize impacts to bats and mitigate for those that are unavoidable.**

**STEP 1**
Habitat Assessment *(bridge and tree-roosting habitat present)*

**STEP 2**
Passive acoustic monitoring surveys conducted *(myotis bats present)*

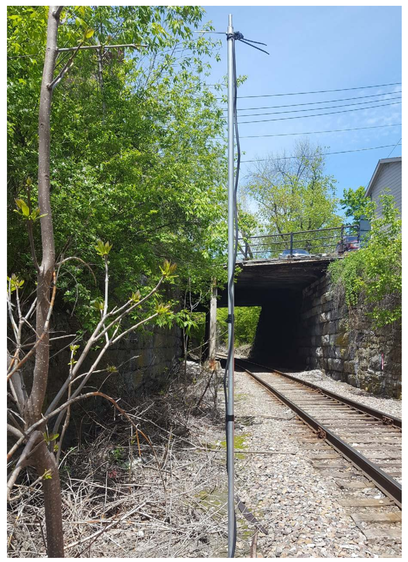
**STEP 3**
Active acoustic monitoring and exit surveys *(myotis bats are bridge roosting)*

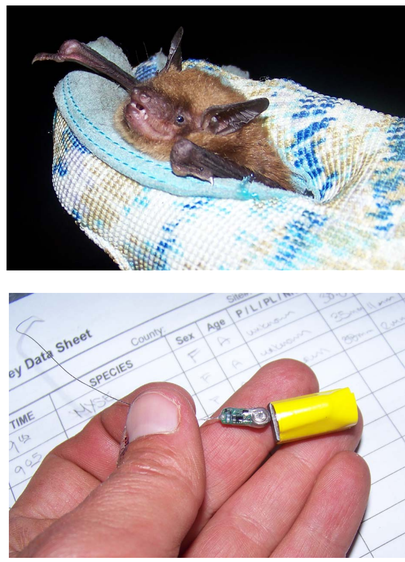
**STEP 4**
Mist-net surveys to confirm which species is present

**STEP 5**
Exclusionary measures implemented to prevent Northern long-eared bats from using bridges *(to prevent harm during bridge demolition)*

## Results

**Acoustic monitoring and exit surveys confirmed the presence of Myotis bats. An unexpected emergency declaration was issued for immediate bridge demolition, and temporary bridges were to be installed during the spring 2017. Exclusionary measures were therefore implemented during the winter 2016-2017 to remove roosting habitat in order to avoid harm to bats during demolition in spring 2017. Mist-netting surveys were still conducted during the summer of 2017 to determine which species were in the area, which resulted in the capture of six female Northern long-eared bats, four of which were transmitted and tracked.**








*Photographs of a potential roost tree, a passive acoustic monitoring deployment, a Northern long-eared bat, and transmitter that was affixed to the bat.*

## Conclusions

**The iterative process for conducting bat surveys, as outlined by the VFWD and USFWS, was successful and the overall objective of avoiding, minimizing and mitigating for potential harm to bats was achieved. Implementation of exclusionary measures was a critical component in the protection and conservation of bats at the project.**

## Acknowledgments

**VTrans, Federal Highway Administration, VT Railway, VT Fish and Wildlife, and USFWS.**