



# Investigation of Northern Long-Eared Bat Roosting Sites on Bridges

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## ABSTRACT

Populations of several non-migratory bat species have declined significantly in New England due to White-nose Syndrome, resulting in several species, including the Northern Long-Eared Bat (*Myotis septentrionalis*), being listed as threatened or endangered at the federal or state level. While bats are known to roost in bridges in other regions, it was not known whether bridge roosting was utilized in New England. The project initiated with a literature review and interviews with personnel involved in tracking bat populations, inspecting bridges and researching bridge roosting. The project team then conducted rapid visual screenings of 191 bridges throughout New England, and selected eighteen bridges for further in-depth study. Further study included visual inspection, acoustic monitoring, thermal imaging and evening monitoring of structures for emergence. A supplemental survey form was developed to supplement the current federal forms. Comparisons and recommendations are included for evaluation methods including visual inspections, staining characteristics, acoustic monitoring and guano identification, with examples provided for each of the eighteen bridges.

## ACKNOWLEDGMENTS

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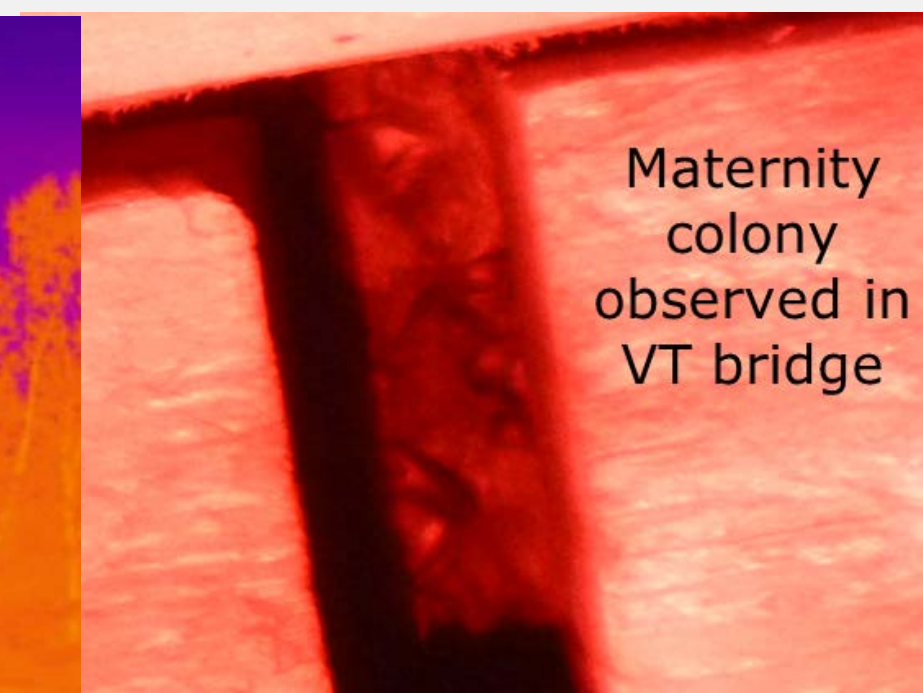
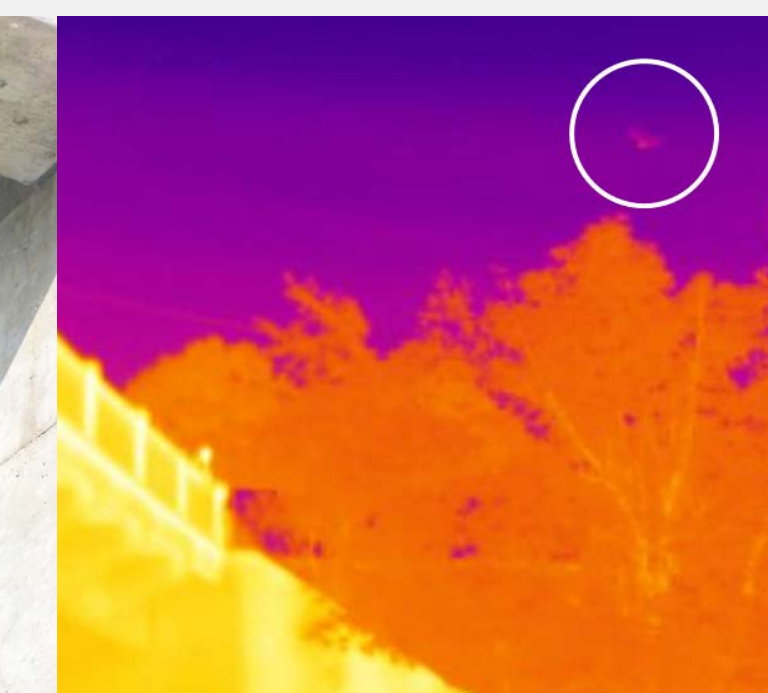
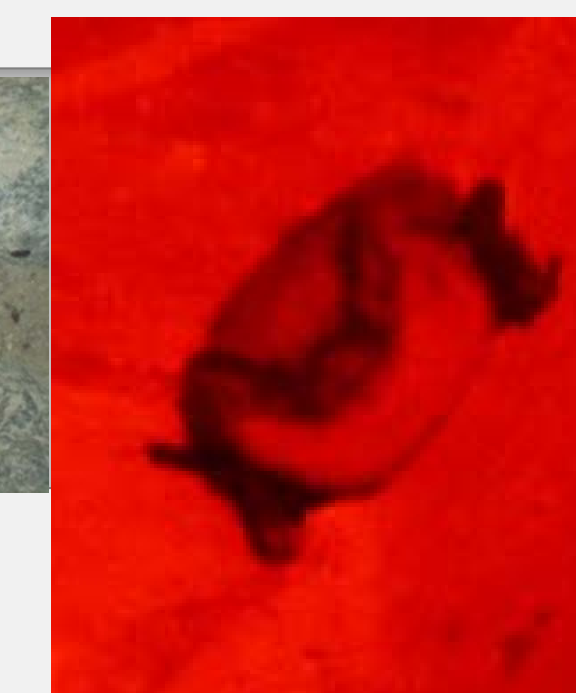
The conclusions and interpretation of these data are solely those of the authors.

## DATA

The project team provided in-depth evaluations of eighteen bridges along with rapid visual screenings to characterize structure types in the region. In-depth evaluations included full visual inspections of all accessible components of the bridges. These inspections were used to evaluate and provide recommendations on the U.S. DOT "Bridge/Structure Assessment Form" and develop a supplemental survey form. Acoustic monitoring data was collected at each bridge multiple times using automated field equipment. Each bridge also had at least one evening monitoring of the structure for emergence. Thermal imaging was collected of evening foraging and roosting activity as well as overall imaging of structures. Guano samples found during visual inspections were collected for laboratory testing.

## ANALYSIS

The collected acoustic data was evaluated through multiple full spectrum and zero cross automated call identification programs by the research team as well as consultants contracted through the project. Results were compared between programs and subsequent expert hand vetting completed by consultants on potential Northern Long-Eared bat calls. Guano samples were sent to two laboratories for DNA testing, one that analyzed individual pellets and another that performed pooled sample testing. Characteristics of identified roosts were compared to determine if there were consistent qualities.



Maternity colony observed in VT bridge



## CONCLUSIONS

Through the project and reporting by state DOTs, thirteen New England bridges have been confirmed and two are highly suspected of being bat roosts, compared with one known roost at the beginning of the project. Comparisons and recommendations on evaluation methods (visual inspections, staining characteristics, acoustic monitoring and guano identification) were provided, with case studies completed for each of the eighteen bridges. Recommendations for changes to the 'Bridge/Structure Assessment Form' from the U.S. DOT "Programmatic Biological Assessment for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat" have been made, specifically recommending replacement of non-representative photo examples, re-consideration of the required timing of inspections, clarification of the "staining" definition and provision of consistency in training and reporting on the forms. An additional survey form was developed to supplement the federal form with the purposes of guiding the inspector toward characteristics of the bridge that are most likely to be used as roosts and providing historical documentation of bridge characteristics that can later be used to compare bat use of bridges. Non-agreement between automated acoustic bat identification software programs was noted along with the need for expertise in manual vetting. Manual vetting results also varied, predominantly based on the intent of the vetting process and threshold likelihood of the call identification. Pooled guano testing was an effective means for identifying species and was an excellent tool to complement visual inspections. Federal regulations enacted during the course of the project do not require specific restrictions on bridge work due to the threatened Northern Long-Eared Bat (*Myotis septentrionalis*). These findings are still relevant due to similar questions regarding the endangered Indiana bat (*Myotis sodalis*), more stringent listings in some New England states, the possibility of upgrading the federal listing due to declining populations and providing best practices to avoid harming bat species during construction projects.