Environment and Natural Resources Trust Fund
2024 Request for Proposal

General Information

Proposal ID: 2024-163

Proposal Title: Status of Bats and Roost Trees after White-Nose

Project Manager Information

Name: Ron Moen

Organization: U of MN - Duluth - NRRI

Office Telephone: (218) 788-2610

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Project Basic Information

Project Summary: We will deploy acoustic detectors and revisit roost trees identified in our previous ENRTF project to measure effect of seven years of white-nose syndrome on Minnesota bats.

Funds Requested: $195,000

Proposed Project Completion: December 31, 2026

LCCMR Funding Category: Small Projects (H)
    Secondary Category: Foundational Natural Resource Data and Information (A)

Project Location

What is the best scale for describing where your work will take place?
    Statewide

What is the best scale to describe the area impacted by your work?
    Statewide

When will the work impact occur?
    During the Project and In the Future

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Just after white-nose syndrome (WNS) arrived in Minnesota, we found 238 roost trees used by northern long-eared bats, and we deployed acoustic detectors at 303 sites throughout Minnesota (see proposal graphic) in our 2015 ENRTF project Endangered Bats, White-Nose Syndrome, and Forest Habitat (M.L. 2015, Chp. 76, Sec. 2, Subd. 03i).

Since 2015 WNS has continued its offense against bats. In northeastern Minnesota Myotis species have declined from almost 90% of calls in 2015 to < 1% of calls in 2022, declined from about 20 calls/night to 1 call per night on average, and are no longer even recorded at some sites.

The northern long-eared bat status was changed to Endangered on March 31, 2023. The little brown bat and the tri-colored bat will probably be listed in 2023. These bat species, and the big brown bat, are Minnesota Species of Special Concern.

The MNDNR helped write a Habitat Conservation Plan that provides a framework to protect bat species while allowing state, county, municipal, and private landowners to conduct forest management activities. An example impact on forestry is harvest restrictions around known roost trees.

Updated data on roost tree persistence and bat distribution will help inform future management actions.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

Acoustic data from northeast Minnesota shows that Myotis populations have declined. Data from our prior ENRTF project provides a powerful resource to determine the extent of the decline in other parts of Minnesota. In this project we would re-deploy acoustic detectors on the same locations they were deployed in 2015-2017, providing an updated snapshot of the current distribution and relative abundance of each bat species.

At the same time, we would locate the maternity roost trees we identified from 2015 to 2017 and determine if those trees are still standing and usable by bats. Based on a study in Alberta, up to half of these roost trees could be gone! We will also deploy acoustic detectors at some roost trees to determine if bats are still present.

This data from acoustic detectors and maternity roost trees will help inform management decisions on bat habitat use and population status, and will also be informative for the Lake States Forest Management Bat Habitat Conservation Plan. For example, the decline in bats we have measured in NE MN supports the HCP approach of considering the impacts of forestry on covered bat species at a landscape scale rather than at the stand level.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

Foundational data on bat species distribution and relative abundance is needed to help conserve and enhance our bat populations. The historical acoustic data set from our ENRTF project is an ideal opportunity to identify impacts of WNS on bats from a comparative perspective.

Because maternity roost trees are a part of ESA protections, knowing how long maternity roost trees persist is a critical piece of data. Documentation of roost tree disappearance is as important as identifying roost trees.

For each outcome we will produce a technical report for rapid dissemination of results and a peer-reviewed paper.

Activities and Milestones

Activity 1: Determine persistence of maternity roost trees and repeat acoustic detector surveys 5 years after WNS

Activity Budget: $195,000

Activity Description:
We will document changes in maternity roost trees and bat species presence by revisiting locations of data collection in the 2015-2017 ENRTF-funded bat project. Maternity roost trees will be re-located to determine if they have fallen, and we will use bat detectors on a subsample of the roost trees that are still standing to determine if bats are still found by the roost trees.

We will also deploy acoustic detectors in the same locations that we deployed acoustic detectors from 2015 to 2017. When call files are processed, we will have an update on the changes in relative abundance and species composition of bats across the forested area of Minnesota. Resurveying previous acoustic detector sites is more cost effective than deploying detectors at completely new sites.

As in the previous project, acoustic detectors will be deployed for at least 7 days at each site, and we will also match the dates of deployment at each location as close as possible to keep deployments as similar as possible. Logistically, we will need two summer field seasons in order to deploy acoustic detectors about 300 times across the forested area of Minnesota and to revisit the 268 roost trees.

Activity Milestones:

Description	Approximate Completion Date
Relocate maternity roost trees, deploy acoustic detectors, and process call files from Year 1.	December 31, 2024
Disseminate preliminary results to the public via outreach and media	April 30, 2025
Relocate additional maternity roost trees, deploy acoustic detectors, and process call files from Year 2.	November 30, 2025
Relocate maternity roost trees, deploy acoustic detectors, and process call files from final season	September 30, 2026
Complete all analyses and project technical reports	December 31, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Dr. Michael Joyce	UMD-NRRI	Co-investigator. Will provide input and support on all aspects of this project and will work with project manager to oversee all aspects of this project.	Yes

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

This project is unique in that it will leverage existing acoustic data collected by a previous ENRTF-funded bat project to update foundational data on Minnesota bat species. Minnesota Forest Industries and Sappi North America support the project (see Letters of Support) and we have designed the project in consultation with DNR personnel. One benefit of the project is that foundational data on relative abundance of bat species and persistence of roost trees increases certainty in economic planning for businesses and for the MN DNR.

Project Manager and Organization Qualifications

Project Manager Name: Ron Moen

Job Title: Wildlife Ecologist

Provide description of the project manager's qualifications to manage the proposed project.

Dr. Moen is a Wildlife Ecologist and Research Lab Manager at the Natural Resources Research Institute, University of Minnesota Duluth. He has over 25 years of wildlife research experience, with over $4 million of research projects on Minnesota mammals. Ron has managed many research projects during his career, focusing on mammals, telemetry, and wildlife ecology. In addition, Ron has taught Mammalogy at the University of Minnesota Duluth since 2003. ENRTF research projects have helped fund research on mammals in Minnesota by 14 of his 28 graduate students. Over the years Dr. Moen has also trained over 150 UMD students in wildlife research skills as Undergraduate Research Assistants. A critical aspect of Dr. Moen's research approach is a desire to complete research projects that can be used to inform and improve management of Minnesota's natural resources.

EDUCATION:

Ph.D., 1995. University of Minnesota, Wildlife Conservation.
M.S., 1988. University of Minnesota, Wildlife. Plant Physiology Minor.
B.S., 1984. Cornell University, Division of Biological Sciences.

RECENT PUBLICATIONS. 24 peer-reviewed papers and 36 Technical Reports have used ENRTF-funded data, including these recent publications:

Alston, J.M., M.J. Joyce, J.A. Merkle, and R. Moen. 2020. Temperature shapes movement and habitat selection by a heat-sensitive ungulate. Landscape Ecology 35:1961-1973.

McGraw, A.M., R. A. Moen, L. Cornicelli, M. Carstensen, and V. St-Louis. 2021. Evaluating the threshold density hypothesis for moose, deer, and Parelaphostrongylus tenuis. Journal of Wildlife Diseases 57:569-578.

Velander, T.B., M.J. Joyce, A.M. Kujawa, R.L. Sanders, P.W. Keenlance, and R. Moen. 2023. A dynamic thermal model for predicting internal temperature of tree cavities and nest boxes. Ecological Modelling 478:110302.

Organization: U of MN - Duluth - NRRI

Organization Description:
The Natural Resources Research Institute (NRRI) is an applied research and economic development engine for the University of Minnesota research enterprise. NRRI employs over 130 scientists, engineers and technicians to deliver on its mission to deliver integrated research solutions that value our resources, environment and economy for a sustainable and resilient future. NRRI collaborates broadly across the University system, the state and the region to address the challenges of a natural resource based economy.

NRRI researchers have extensive experience in managing large, interdisciplinary projects. NRRI's role is as an impartial, science-based resource that develops and translates knowledge. Projects include characterizing and defining resource opportunities, minimizing waste and environmental impact, maximizing value from natural resources and maintaining/restoring ecosystem function. NRRI's role is as an impartial, science-based resource that develops and translates knowledge by characterizing and defining value-resource opportunities, minimizing waste and environmental impact, maximizing value from natural resource utilization and maintaining/restoring ecosystem function.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Ron Moen, Research Scientist/Professor		Project Manager			26.9%	0.2		$33,735
Michael Joyce, Research Scientist		Co-Investigator			26.9%	0.22		$25,012
Wildlife Technician		Field and office work			24.24%	0.63		$31,057
M.S. Graduate Student		Conducting field work, data management, data analysis, and writing. The student will contribute to all aspects of this project.			19.1%	0.16		$8,917
Seasonal Wildlife Technician		Conducts field and office work			7.64%	0.85		$32,987
Undergraduate research assistant		Conducts field and office work			0%	0.72		$22,292
							Sub Total	**$154,000**
Contracts and Services								
							Sub Total	-
Equipment, Tools, and Supplies								
	Equipment	New acoustic detectors with microphones (10 @ $1,400 ea) and 10 replacement microphones for existing acoustic detectors (@ $200 ea).	To conduct acoustic surveys for bats					$16,000
	Tools and Supplies	Supplies for acoustic surveys (batteries, bait, locks/straps, etc.)	To conduct acoustic surveys for bats					$3,000
							Sub Total	**$19,000**
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								

								Sub Total	-
Travel In Minnesota									
	Miles/ Meals/ Lodging	Travel for fieldwork, including mileage (75%) and lodging for technician, researcher, and undergraduate research assistant. Mileage will be reimbursed using the University approved travel rate for NRRI personnel. Lodging is estimated between $90 and $110 per night, less if camping is possible. Some trips will involve longer-distance travel and require overnight expenses (camping or motel) and food expenses.	Collect field data for project						$20,000
								Sub Total	**$20,000**
Travel Outside Minnesota									
								Sub Total	-
Printing and Publication									
								Sub Total	-
Other Expenses									
		Page Charges	Cost to publish papers						$2,000
								Sub Total	**$2,000**
								Grand Total	**$195,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
-			**State Sub Total**	-
Non-State				
In-Kind	UMN unrecovered indirect costs are calculated at the UMN negotiated rate for research of 55% modified total direct costs.	Indirect costs are those costs incurred for common or joint objectives that cannot be readily identified with a specific sponsored program or institutional activity. Examples include utilities, building maintenance, clerical salaries, and general supplies. (https://research.umn.edu/units/oca/fa-costs/direct-indirect-costs)	Secured	$107,250
			Non State Sub Total	**$107,250**
			Funds Total	**$107,250**

Attachments

Required Attachments
Visual Component
File: [ae4e0be8-f48.pdf](ae4e0be8-f48.pdf)

Alternate Text for Visual Component
The visual component has a Minnesota map with locations where 238 roost trees were found in our previous ENRTF bat project. The 303 acoustic detector locations were distributed similarly. Also pictured are one bat that we put a transmitter on, a roost tree cluster, and an acoustic detector....

Optional Attachments
Support Letter, Photos, Media, Other

Title	File
Minnesota Forest Industries (MFI) Letter of Support	[bd020f8a-338.pdf](bd020f8a-338.pdf)
UMN Transmittal Letter	[cbb4d0ba-c0e.pdf](cbb4d0ba-c0e.pdf)
Sappi Letter of Support	[b4f184ce-2d4.pdf](b4f184ce-2d4.pdf)

Administrative Use

Does your project include restoration or acquisition of land rights?
> No

Does your project have potential for royalties, copyrights, patents, or sale of products and assets?
> No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?
> N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?
> N/A

Does your project include original, hypothesis-driven research?
> Yes

Does the organization have a fiscal agent for this project?
> No

Does your project include the design, construction, or renovation of a building, trail, campground, or other capital asset costing $10,000 or more?
> No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services, as defined in Minnesota Statutes section 299C.61 Subd.7?
> No