



Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-115

Proposal Title: Updating and Sharing Information on Minnesota's Tick Biodiversity

Project Manager Information

Name: Benjamin Cull

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

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Project Basic Information

Project Summary: This project will update information on the biodiversity and distribution of ticks in Minnesota, and create a publicly accessible GIS dashboard integrating these data with citizen science-sourced tick records.

ENRTF Funds Requested: \$186,000

Proposed Project Completion: December 31, 2027

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.

Ticks (Order Ixodida) are blood-feeding parasites that infest numerous wildlife species and play important roles in various human and animal diseases. The only comprehensive description of ticks inhabiting Minnesota was published in 1941 and recorded seven species. Since then, thirteen tick species have been reported in Minnesota. However, research has been limited to two or three species of public health importance, and basic information on many ticks associated with wildlife is severely lacking. Most state records of the lesser studied species are over 50 years old and limited to a few specimens in the University's Insect collection. Therefore, an update of Minnesota's tick biodiversity is overdue. Ticks can significantly influence wildlife health through the transmission of pathogens, induction of stress and immunosuppression, blood loss and anemia, and alterations to behavior and population dynamics. However, to evaluate the effects that ticks may have on the state's wildlife, a fundamental understanding of their distribution and wildlife hosts in Minnesota is required. This baseline data can aid wildlife conservation and serve as a comparator for future changes in wildlife parasite biodiversity impacted by factors such as alterations in wildlife populations, climate, and land use.

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.

This project would establish statewide passive wildlife surveillance for ticks, involving collaboration with wildlife rehabilitation centers, veterinary clinics, DNR wildlife biologists, park districts, hunters, bird ringers, and other groups in contact with wildlife. This surveillance method has proven effective in other states for surveying a diversity of wildlife host species for ticks and, therefore, cataloguing a much more comprehensive range of tick species than methods focusing solely on human encounters with ticks. Sampling equipment (collection vials, tick removal tool, datasheet) and prepaid mailing packs would be supplied to volunteers for return to the UMN for tick identification. Samples will be stored in the UMN Insect Collection, providing a resource and long-term record for other researchers. Submissions from wildlife hosts will be complemented by data from our existing iNaturalist program (Minnesota Tick Activity Monitor) that tracks human-tick encounters across Minnesota.

Data will be uploaded regularly to a publicly accessible ArcGIS StoryMaps-based webpage to maintain volunteer engagement and provide up-to-date information on ticks in Minnesota. ArcGIS StoryMaps allows the integration of photos, text, and maps into an interactive dashboard that facilitates public engagement and data dissemination. The public-facing webpage will be publicized to drive participation, garner support, and receive feedback.

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?

The conservation of Minnesota's wildlife relies on understanding their interactions with other species, particularly those representing threats to their health, such as parasites. Basic data on tick species associated with Minnesotan wildlife and their distribution are necessary for wildlife managers to assess how anthropogenic change (climate; land use) may affect wildlife-tick interactions and, consequently, wildlife health, as well as evaluate potential transmission of ticks between wildlife and livestock. This project addresses the state's lack of wildlife tick data by coupling our tick surveillance expertise with stakeholder engagement to produce interactive data dashboards that enhance public awareness of Minnesota's tick diversity.

Activities and Milestones

Activity 1: Update information on the biodiversity and distribution of wildlife ticks in Minnesota through a collaborative citizen science-driven collection scheme

Activity Budget: \$96,773

Activity Description:

Ticks will be collected through passive surveillance with the distribution of prepaid tick collection packs to hunters, wildlife centers, recreational areas (state parks, national parks, regional/county park systems), veterinary centers, and other groups that regularly encounter wildlife. Potential groups will be identified throughout the state to achieve a wide distribution across Minnesota and contacted at the start of the project. Prior to the start of the sampling period in January 2026, volunteers will be sent collection packs containing instructions, tools, collection vials, datasheets, and prepaid return mailing envelopes. Volunteers will collect any ticks encountered during their normal activities with wildlife and record information on collection date, host species, geographical location (at least County), and any known out-of-state travel history of the animal host. Samples will be sent to the UMN for identification of tick species and life stages. Specimens will be stored at the UMN Insect Collection as a resource for other researchers and potential use in future studies such as pathogen testing. Sampling period will cover two years: 2026, 2027.

Observations of ticks from across the state will also be collected and identified from the online biodiversity recording platform iNaturalist, through our existing "Minnesota Tick Activity Monitor" project.

Activity Milestones:

Description	Approximate Completion Date
Identify and contact relevant organizations/groups to recruit volunteers	December 31, 2025
Assemble sample collection packs and send to volunteers	December 31, 2025
Ongoing receipt and identification of tick samples and data analysis	December 31, 2027
Ongoing identification and analysis of iNaturalist tick observations	December 31, 2027

Activity 2: Develop an online GIS dashboard to display survey results and provide an educational resource on Minnesota's tick biodiversity

Activity Budget: \$89,227

Activity Description:

An interactive public-facing webpage will be developed using the ArcGIS StoryMaps platform (ESRI) to disseminate information from the project and increase awareness of tick biodiversity in Minnesota. Combining information and images of ticks with regularly updated data collected from Activity 1, this page will enable users to learn about the various tick species in the state, which wildlife hosts they are associated with, and use interactive county-scale maps to explore the known distribution of different tick species in the state. Users will be able to further explore the data using various filters, for example, to see which ticks have been found in their county, which tick species have been found on certain wildlife species, and to compare historical records with results from the current project. For species of potential public or veterinary health concern, pertinent information will be provided, with links to relevant pages of the Minnesota Department of Health, Minnesota DNR, USDA, etc.

Data on the webpage will be regularly updated (monthly) as results are analyzed from the wildlife collections and iNaturalist tick project. This method of data sharing is expected to improve volunteer engagement with the project, aid project publicization, and ultimately improve tick awareness across Minnesota.

Activity Milestones:

Description	Approximate Completion Date
Design and implementation of ArcGIS StoryMaps webpage about Minnesota ticks	December 31, 2025
Monthly updates to tick webpage using data from Activity 1	December 31, 2027

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Renee Schott	Wildlife Rehabilitation Center of Minnesota	Contribute tick samples collected from wildlife	No
UMSP Insect Collection	University of Minnesota	Long-term storage and documentation of collected tick specimens	No

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?

Results from this project will be used to update current knowledge on wildlife-associated ticks in Minnesota and create a publicly accessible map-based webpage to share the data and improve available information on tick biodiversity. This information can be used to aid wildlife conservation efforts. It is expected that at least one scientific publication will result from this project. Should results highlight the presence and/or significant geographic expansion of tick species of public or veterinary health concern, further publications may be produced, and additional external funding will be sought to carry out further targeted investigations.

Project Manager and Organization Qualifications

Project Manager Name: Benjamin Cull

Job Title: Research Assistant Professor

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

Dr. Benjamin Cull’s research focusses on the biology of arthropod vectors, the interactions between ticks and bacterial pathogens, eco-epidemiology of vector-borne diseases, and the development of novel tools for the surveillance of ticks and tick-borne pathogens. He is experienced in the identification of tick species from North America and Europe, GIS mapping analysis, and the application of citizen science for collection of data on arthropod vectors. He has worked in the UMN Department of Entomology’s Tick lab since 2019. Prior to moving to the University of Minnesota, Dr. Cull worked in the Medical Entomology and Zoonoses Ecology team at Public Health England (now the UK Health Security Agency) where he was involved in running national passive surveillance projects for ticks and mosquitoes, relying on sample submissions from medical, veterinary and wildlife professionals and members of the public. These projects led to improved understanding of tick and mosquito species in the UK, and their distributions, seasonal activity, and host/habitat associations. His recent research has investigated the use of the open access citizen science platform iNaturalist as a tool to collect additional data on the distribution and species diversity of important tick and mosquito vector species at the state, national and continental scales. He has established the Minnesota Tick Activity Monitor iNaturalist project to provide ongoing monitoring of human-tick encounters in Minnesota and to improve awareness of ticks among iNaturalist users in the state. With this experience, Dr. Cull brings the necessary skills to successfully lead and manage the proposed project.

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

Organization Description:

The UMN’s College of Food, Agricultural and Natural Resources Sciences (CFANS) is comprised of 12 academic departments and 10 research and outreach centers, along with the Minnesota Landscape Arboretum, the Bell Museum, and dozens of interdisciplinary centers. As part of a major urban university located in the heart of the Twin Cities, we

also provide immersive study opportunities across the state. Our living laboratories allow students, faculty, and staff to study throughout Minnesota's diverse ecosystems.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Faculty		Overseeing project, mentoring of graduate student, management of iNaturalist project and GIS webpage			37.1%	0.75		\$70,371
Graduate student		Manage communication with volunteers; sample receipt, identification, and storage; data management and analysis.			25.1%	2		\$106,083
							Sub Total	\$176,454
Contracts and Services								
							Sub Total	-
Equipment, Tools, and Supplies								
	Tools and Supplies	Estimated costs of mailing supplies, tick removal tools, tubes for tick collection and storage, forceps, dishes, ethanol	Supplies needed for sending samples to/from volunteers and for the collection, identification and storage of tick samples.					\$7,546
							Sub Total	\$7,546
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
							Sub Total	-
Travel Outside Minnesota								

	Conference Registration Miles/ Meals/ Lodging	Travel, lodging and registration at an out-of-state conference to present project results	Dissemination of results from the project at a major national conference (likely to be in a different state)	X				\$2,000
							Sub Total	\$2,000
Printing and Publication								
							Sub Total	-
Other Expenses								
							Sub Total	-
							Grand Total	\$186,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Travel Outside Minnesota	Conference Registration Miles/Meals/Lodging	Travel, lodging and registration at an out-of-state conference to present project results	Conferences at which findings will be presented, such as those of the Entomological Society of America and The Wildlife Society, are likely to be held outside of Minnesota

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	-
Non-State				
			Non State Sub Total	-
			Funds Total	-

Total Project Cost: \$186,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [26c2a2ca-1ab.pdf](#)

Alternate Text for Visual Component

Ticks are collected from wildlife with the help of various groups in contact with animals, and mailed to the University of Minnesota for identification. Tick observation data are also collected from iNaturalist. Both data sources are integrated into an interactive online informational GIS dashboard for data sharing and public education....

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
Authorization Letter from UMN SPA Cull1129349	b65d0afa-526.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

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?

Yes, Sponsored Projects Administration

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing \$10,000 or more or large-scale stream or wetland restoration?

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 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

Andrea Little (University of Minnesota)

