Environment and Natural Resources Trust Fund

2026 Request for Proposal

General Information

Proposal ID: 2026-509

Proposal Title: Monitoring Changes in Urban Wildlife

Project Manager Information

Name: James Forester

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

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Project Basic Information

Project Summary: Establish a long-term sampling network to monitor changes in wildlife occupancy across an urbanization gradient and use these data to visualize the spread of CWD in metro deer.

ENRTF Funds Requested: $455,000

Proposed Project Completion: June 30, 2029

LCCMR Funding Category: Fish and Wildlife (D)

Project Location

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

Region(s): Metro

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

Region(s): Metro, Central,

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.

As Minnesota's anthropogenic landscapes continue to expand and transform natural habitats, understanding the dynamic responses of wildlife species to these environmental modifications has become increasingly urgent. Effective natural resource management of these changing landscapes requires systematic monitoring of wildlife species across urban-rural gradients. Unfortunately, long-term monitoring of multiple populations of wildlife (ranging from amphibians to deer to birds and bats) is often labor intensive and is rarely compiled in a single database or continued for multiple years. However, longitudinal monitoring provides crucial insights into ecosystem resilience and vulnerability. As cities expand, some species face local extinction while others adapt to urban conditions. Documenting these responses helps identify thresholds beyond which biodiversity losses become pronounced, informing evidence-based land-use planning. Such data can also be used in broad-scale predictions of how animals may be expected to flow through the complex urban landscape of the Twin Cities; this is even more important with the recent detection of Chronic Wasting Disease in a deer that was harvested in the west metro.

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 will establish a comprehensive wildlife monitoring network across an urban-rural gradient in the Twin Cities using trail cameras and acoustic sensors with AI-powered analysis. We will use the resulting data to understand how urbanization affects diverse wildlife populations and to engage the public in wildlife research. Further, by joining the Urban Wildlife Information Network (UWIN), our project will contextualize local findings within national data while supporting land management decisions.

A specialized focus on deer populations will leverage trail camera data to expand models of Chronic Wasting Disease (CWD) transmission dynamics throughout the metropolitan area. By combining relative deer density data with existing movement behavior research, the team will map connectivity patterns across the urban landscape and develop an interactive online tool identifying high-risk areas for CWD spread under various scenarios.

Our integrated approach delivers multiple benefits: establishing baseline wildlife distribution data across urbanization gradients, engaging citizens in ecological monitoring, enhancing science education, creating practical disease management tools, and contributing to a national urban wildlife research network—all while providing critical insights for wildlife managers addressing ecological and wildlife health challenges in an increasingly urbanized area of Minnesota.

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?

Our project will incorporate significant community engagement through volunteer site monitors, a public iNaturalist platform for sharing wildlife images, and partnerships with K-12 educators to integrate ecological monitoring into science curricula. We will produce an online database that will allow land managers and the public to visualize the distribution of the species captured by our network of cameras and audio sensors. Finally, we will develop an online tool for managers to explore how CWD is likely to spread across the deer population in the metro area.

Activities and Milestones

Activity 1: Monitor wildlife across an urban to rural gradient using a network of trail cameras and acoustic sensors.

Activity Budget: $312,605

Activity Description:
We will establish, across a gradient of urbanization, a network of trail cameras and acoustic sensors that can be used for long-term monitoring of wildlife. We will use AI and machine learning methods to analyze these data and determine how changes in human land use and associated changes in land cover affect the distribution and abundance of wildlife (including mammals, birds, and amphibians) across seasons in and around the Metro area. Importantly, this effort will engage with the public in a variety of ways. We will recruit volunteers from the community to monitor a subset of the sites (e.g., on their property or in parks near their residence), we will establish a project on iNaturalist where we will share images from this study, and we will work with at least five K-12 educators in the Metro area to incorporate learning materials developed by the Urban Wildlife Information Network into their science curriculum. Establishing the Twin Cities as an official UWIN node will allow us to view our results in the context of data collected from other cities across the country and will provide a mechanism for land managers to monitor the impact of their projects on wildlife species.

Activity Milestones:

Description	Approximate Completion Date
Identify sampling sites using available land-use and land-cover data	October 31, 2026
Recruit volunteers to monitor private property sites and obtain permits for sampling on public land.	December 31, 2026
Deploy the camera/acoustic units.	April 30, 2027
Recruit five or more K-12 educators to include a UWIN module in their science curriculum	September 30, 2027
Visit K-12 classrooms to discuss the project and work with them to understand initial results.	April 30, 2028
Analyze camera and acoustic data and develop map of species use.	December 31, 2028
Finalize analysis and submit manuscript for publication	April 30, 2029

Activity 2: Model the expected spread of Chronic Wasting Disease in the Twin Cities Metro Area.

Activity Budget: $142,395

Activity Description:
For this activity, we will focus on images of deer captured by our UWIN trail-camera grid to produce an estimate of how we expect Chronic Wasting Disease (CWD) to spread across the Twin Cities Metro area. We will combine data on suburban deer movement behavior that we are currently collecting for other projects with relative deer densities estimated by our UWIN trail-camera grid. Collectively, these data will allow us to describe the connectivity and expected flow of deer in the complex urban landscape. Further, we will use these expected patterns of movement to expand and test a model of disease spread that includes both deer-to-deer contact and environmental exposure (both are characteristics of CWD). Outcomes of this activity will include: 1) a movement-based map of deer connectivity in the Metro Area, and 2) an interactive, online tool that can be used to highlight locations at the highest risk for CWD spread under different assumptions of dispersal rates and disease parameters. These outcomes will provide important tools to managers as they design monitoring and control programs to mitigate the further spread of CWD in the Metro area deer population.

Activity Milestones:

Description	Approximate Completion Date

Develop connectivity map for the Metro using existing deer movement data	May 31, 2028
Extract all deer images from UWIN trail-camera data.	October 31, 2028
Estimate environmental and seasonal drivers of deer density using image data.	December 31, 2028
Refine and test spatiotemporal disease model for the Metro	February 28, 2029
Develop an online tool for managers to predict hotspots of CWD spread	May 31, 2029
Submit a manuscript for publication	June 30, 2029

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Elena West	University of Minnesota	Lead collection and analysis of audio recording data.	Yes
Meggan Craft	University of Minnesota	Lead development of deer CWD spread model.	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?

Study findings will be disseminated to management and academic audiences through conference presentations (e.g., The Wildlife Society) and peer-reviewed publications. We will translate our findings for outreach and public engagement at parks and nature centers, such as those at Elm Creek and Carver Park Reserves. Once our initial network of equipment and analysis workflow are established, we plan to maintain this network with small state and federal grants; however, we will also apply for an NSF Research Experience for Undergraduates program that we can incorporate into the Minneapolis-St. Paul Metropolitan Area Long Term Ecological Research Program.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Understanding Brainworm Transmission to Find Solutions for Minnesota Moose Decline	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03f	$400,000
Mapping Habitat Use and Disease of Urban Carnivores	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03g	$500,000
Mapping the Ecology of Urban and Rural Canids	M.L. 2023, , Chp. 60, Art. 2, Sec. 2, Subd. 03l	$601,000
White-Tailed Deer Movement and Disease in Suburban Areas	M.L. 2024, , Chp. 83, Art. , Sec. 2, Subd. 03u	$699,000

Project Manager and Organization Qualifications

Project Manager Name: James Forester

Job Title: Associate Professor

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

James Forester received his Ph.D. in Zoology from the University of Wisconsin—Madison in 2005. He has a broad background in field ecology but is most interested in using quantitative and computational methods to address applied questions related to natural resource management. Although his research covers a range of spatial and temporal scales, his current work is focused on how changing landscapes affect the distribution, abundance, and disease dynamics of wildlife populations

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

Organization Description:

The Department of Fisheries, Wildlife, and Conservation Biology is part of the University of Minnesota, one of the largest and most recognized public research universities in the United States. Its mission is to conduct high-quality research and scholarship that can then be shared, extended and applied to challenges faced by organizations and individuals in the community.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
James Forester /Associate Professor/PI		Project management / provide lead in synthesizing broad-scale models of animal distributions			36.6%	0.24		$52,881
Postdoctoral associate		Manage field crew and data processing effort takes lead on developing distribution, group size, and behavior models, and also gives public presentations on the findings.			25.9%	2		$162,958
Undergraduate technician		Assist in checking trail cameras and processing images			0%	0.3		$11,856
Elena West / Teaching Assistant Professor / coPI		Provide lead role in analyzing audio recorder data.			36.6%	0.24		$38,379
Meggan Craft / Associate Professor / coPI		Provide lead role in integrating disease information with ecological and behavioral information			36.6%	0.24		$59,816
Whitney Sansom / Master's Student		Lead the field effort for initial deployment. Graduate student fringe is 23.2% + tuition for 2 semesters, totaling 19,469			23.2%	1		$57,215
							Sub Total	**$383,105**
Contracts and Services								
							Sub Total	**-**
Equipment, Tools, and Supplies								
	Equipment	75 trail camera sets (cameras at @ $200 each, lockbox and cable @ $56)	Capture images of wildlife species across a range of urbanization					$19,200
	Tools and Supplies	SD Cards (300 @ $24 each)	Record trail-camera images and audio data from ARUs; double sets to allow for swaps					$7,200

	Tools and Supplies	Lithium batteries (75 audio recorders and 100 cameras [including supplementary cameras] * 8 deployments * 6 batteries @ $2.26 each)	Long-lasting batteries to power the trail cameras and ARUs					$16,272
	Tools and Supplies	Flagging tape, poles, post hole digger, and bolts, label making supplies	Tools and equipment to mark and secure the camera sites					$313
	Equipment	75 autonomous recording unit (ARU) sets (ARUs @ $150 each, lock and cable @ $50)	record audio for identifying birds					$15,000
	Equipment	External Network Attached Storage (100TB RAID Drive Array)	back up audio and image data					$2,250
							Sub Total	**$60,235**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	Vehicle mileage for fieldwork to deploy, check on, and recover trail cameras and ARUs (400 miles per trip x 32 trips at $0.7/mile)	Vehicle mileage for fieldwork to deploy, check on, and recover trail cameras and ARUs					$8,960
	Conference Registration Miles/ Meals/ Lodging	One undergraduate researcher to present at MN TWS meeting, $156 conference registration. $165/ng lodging. $102 meal per diem ($51/day 1st &last day of travel). $77 miles (110 miles @ $0.70/mile)	Presenting at the Minnesota Chapter of The Wildlife Society will highlight the research in the state and serve and outreach function					$500
							Sub Total	**$9,460**
Travel Outside Minnesota								
	Conference Registration Miles/ Meals/ Lodging	$264 conference registration. $330 lodging ($165/ng x 2ngs). $170 meal per diem ($51st day, $68 full day, $51 last day). $336 miles (480mi x $0.70/mi) x 2 people	The postdoc and graduate student will present the outcome of our research at a national conference	X				$2,200
							Sub Total	**$2,200**
Printing and Publication								

							Sub Total	**-**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$455,000**

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	$264 conference registration. $330 lodging ($165/ng x 2ngs). $170 meal per diem ($51st day, $68 full day, $51 last day). $336 miles (480mi x $0.70/mi) x 2 people	This will be an important presentation of our work because it will highlight the research conducted in Minnesota while also soliciting feedback on our approaches so that our research is improved and has higher impact.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	**-**
Non-State				
In-Kind	54% MTDC un-recovered indirect costs	Indirect costs are "costs that are incurred for common or joint objectives and, therefore, cannot be identified readily and specifically with a particular sponsored project, an instructional activity, or any other institutional activity." If this award is reduced from the requested amount, the proposed cost sharing will be reduced proportionate	Secured	$235,186
			Non State Sub Total	**$235,186**
			Funds Total	**$235,186**

Total Project Cost: $690,186

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: e7e5322c-d8d.pdf

Alternate Text for Visual Component

A map of urbanization in the Twin Cities Metro...

Supplemental Attachments

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

Title	File
UMN SPA Letter	c818a0dc-c17.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I understand the UMN Policy on travel applies.

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:

University of Minnesota

Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements

N/A