



Environment and Natural Resources Trust Fund

2027 Request for Proposal

General Information

Proposal ID: 2027-404

Proposal Title: Empowering Youth to Participate in Urban Wildlife Research

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: We will integrate K–12 curricula with a new Twin Cities urban wildlife monitoring grid to enhance conservation literacy and provide critical data for biodiversity management.

ENRTF Funds Requested: \$809,000

Proposed Project Completion: June 30, 2030

LCCMR Funding Category: Education and Outdoor Recreation (C)

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, SW, SE, NW, NE,

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 urbanization accelerates across Minnesota, the disconnect between human populations and the natural world poses a significant threat to long-term conservation efforts. While urban areas host surprisingly diverse wildlife communities, these spaces are often overlooked as sites for scientific inquiry or ecological stewardship. This "extinction of experience" is particularly acute among 8th–12th grade students, who lack opportunities to engage with the biodiversity in their own backyards. Furthermore, there is a critical data gap regarding how wildlife species adapt to the urban-rural gradient in the Twin Cities. Current monitoring efforts are often siloed, limiting the ability of researchers to predict how human land use and climate change will affect future animal distributions. There is an urgent need for a unified framework that simultaneously addresses these educational deficits and research gaps. By integrating high-tech monitoring tools—such as trail cameras and autonomous recording devices (ARUs)—into secondary school curricula, we can empower the next generation of conservationists while generating the robust, longitudinal data necessary to manage Minnesota's changing landscapes.

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.

Our solution is to empower Minnesota's youth through a participatory science initiative that integrates 8th–12th grade classrooms into the front lines of wildlife research. In collaboration with the Cedar Creek Ecosystem Science Reserve, we will develop a standardized curriculum and "train-the-trainer" workshops that equip educators with the hardware and protocols to manage school-based wildlife monitoring sites using trail cameras and acoustic sensors. To provide a professional ecological context for these student-led observations, we will simultaneously establish the first Twin Cities node of the Urban Wildlife Information Network (UWIN). This grid of 40–50 research stations will span the urban-to-rural gradient, providing a robust, professional-grade dataset that students can access to compare their local findings against regional trends. By centering the project on classroom integration and educator support, we transform students from passive observers into active contributors to a global monitoring network. This dual approach—educational capacity building supported by a new regional research infrastructure—will be accessible via a public digital portal, fostering a conservation-minded citizenry while generating the critical data needed to manage Minnesota's biodiversity in a changing world.

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?

This project enhances Minnesota's natural resources by creating a comprehensive baseline for urban wildlife occupancy and phenology. By standardizing camera-trap data through a centralized repository, we provide state managers with data they can use to mitigate human-wildlife conflict and preserve critical corridors. Most importantly, the project provides direct opportunities for students to contribute to and take ownership of large-scale wildlife monitoring. By engaging youth in the scientific monitoring of their local ecosystems, we ensure the long-term protection of the state's resources through increased public literacy and a demonstrated commitment to preserving the biodiversity found within Minnesota's rapidly evolving urban landscapes.

Activities and Milestones

Activity 1: Develop educational curriculum, recruit K-12 educators, and implement tailored education plans with a diverse range of schools

Activity Budget: \$356,800

Activity Description:

To ensure high-quality educational outreach, we are collaborating with experts in environmental education and K–12 instruction. Working with an initial cohort of motivated educators, we will leverage the expertise of Cedar Creek staff to develop a pilot program featuring outdoor monitoring activities and classroom modules tailored to different age groups. Following preliminary planning, we will host a full-day workshop at Cedar Creek to refine the curriculum with participating teachers and train them in the deployment of trail cameras and autonomous recording devices (ARUs). After establishing this pilot, we will distribute interest surveys across the greater metropolitan area to recruit additional educators, allowing them to develop plans tailored to their specific school needs. To support recruitment, our team will visit schools to highlight the importance of wildlife monitoring and share preliminary results, offering students direct engagement with the scientific process. Overall, this program will transform students from passive observers into active researchers, providing them with the hardware and analytical frameworks to manage their classroom’s research sites. By the end of this activity, we will have established a sustainable network of school-based monitoring sites and helped to demystify wildlife ecology for a diverse cohort of Minnesota youth.

Activity Milestones:

Description	Approximate Completion Date
Recruit 5-10 K-12 educators to participate in pilot curriculum development and module creation program	October 31, 2027
Host full-day workshop at Cedar Creek to develop a range of educational modules with teachers	April 30, 2028
Recruit 10+ additional K-12 educators to create and implement education plans for monitoring activities	September 30, 2028
Visit 10-20 new K-12 classrooms to highlight project, provide educational outreach, and recruit new schools	April 30, 2029
Recruit 10+ additional K-12 educators to create and implement education plans for monitoring activities	September 30, 2029

Activity 2: Establishing the Twin Cities Urban Wildlife Monitoring Grid to Support Regional Research and Science Education.

Activity Budget: \$342,200

Activity Description:

For this activity, we will establish a wildlife monitoring infrastructure that will expand on the equipment deployed in Activity 1 to generate a robust, longitudinal dataset on Minnesota’s metropolitan fauna. We will deploy a grid of 40–50 additional trail cameras and acoustic sensors across the urban-to-rural gradient of the Twin Cities. These deployments will follow standardized Urban Wildlife Information Network (UWIN) protocols, ensuring data compatibility with urban ecological studies worldwide. Crucially, these professional-grade data will serve as a high-quality supplement to the data collected by students in Activity 1. By providing students with access to this broader regional dataset, we enable them to situate their local observations within a larger ecological context, allowing for more sophisticated classroom analyses of how species respond to human density and habitat fragmentation. This integrated approach not only provides the empirical foundation necessary for evidence-based land-use planning but also enhances the educational impact of the project by giving Minnesota youth a "scientist’s-eye view" of biodiversity across the entire metropolitan landscape.

Activity Milestones:

Description	Approximate Completion Date
Identify 50 sites across the urban to rural gradient	September 30, 2027
Deploy cameras and ARUs.	October 31, 2027
Collect and classify first round of image and acoustic data	May 31, 2028
Collect and classify second round of image and acoustic data	May 31, 2029
Complete classification of image and acoustic data	May 31, 2030
Submit manuscript for publication	June 30, 2030

Activity 3: Digital Outreach and the "Minnesota Wildlife Portal" for Interactive Ecological Education**Activity Budget:** \$110,000**Activity Description:**

To ensure that our research findings are accessible to all Minnesotans, we will develop a public-facing digital platform titled the "Minnesota Wildlife Portal." This activity creates the primary interface for students, educators, and the public to interact with the high-resolution imagery and acoustic data collected in Activities 1 and 2. The portal will feature an automated "Discovery Dashboard" where users can visualize wildlife activity patterns, view images and listen to audio recorded across the study area, and download standardized datasets for classroom use. By providing a window into the "hidden" lives of urban wildlife—such as the daily activity of foxes, coyotes, and white-tailed deer and the seasonal migration of songbirds—the platform will foster a sense of place and ecological connectivity. The site will also serve as a repository for the 8-12th grade curriculum developed in Activity 1, allowing teachers across the state to adopt these modules. This activity bridges the gap between the University of Minnesota's quantitative research and the broader community, transforming raw spatio-temporal data into a shared educational asset that highlights the value of urban biodiversity and the critical importance of habitat preservation in a rapidly changing landscape.

Activity Milestones:

Description	Approximate Completion Date
Develop initial project website	December 31, 2027
Create database to hold spatially referenced image and acoustic data with species tags.	March 31, 2028
Create secure web framework for spatial queries of project database	June 30, 2028
Publish interactive webpage for project data	August 31, 2028

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Elena West	University of Minnesota	Lead collection and analysis of audio recording data.	Yes
Caitlin Potter	Cedar Creek, University of Minnesota	Lead development of classroom curriculum and teacher training.	No
David Wolfson	University of Minnesota	Manage field crew and data processing effort, manages website development, assists with curriculum development, leads classroom interactions, gives public presentations on the findings.	Yes
Ferin Davis Anderson	Shakopee Mdewakanton Sioux Community	Manage cameras and ARUs on SMSC land. Assist with SMSC youth engagement and provide links to Shakopee-based schools.	No

Dissemination

Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.

To maximize the project's impact, we will employ a tiered dissemination strategy targeting the scientific community, K–12 educators, and the general public. Research findings will be submitted to high-impact journals such as *Journal of Animal Ecology* and *Landscape Ecology*, focusing on the spatio-temporal dynamics of urban wildlife. For educational outreach, we will host professional development workshops at the Cedar Creek Ecosystem Science Reserve and distribute standardized curricula through the Minnesota Science Teachers Association. Finally, broad public engagement will be facilitated through the "Minnesota Wildlife Portal," a digital platform providing interactive visualizations of regional biodiversity and occupancy trends. This multi-channel approach ensures that our data not only advance quantitative ecology but also serve as a practical resource for state land managers and a catalyst for STEM education in Minnesota.

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?

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
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 data and public distribution, assists with curriculum development and classroom visits			36.6%	0.39		\$82,626
Elena West / Assistant Teaching Professor / Co-PI		Provide lead role in analyzing audio recorder data, assists with developing ARU aspects of curriculum			36.6%	0.24		\$39,978
David Wolfson (Researcher 5)		Manage field crew and data processing effort, manages website development, assists with curriculum development, leads classroom interactions, gives public presentations on the findings.			36.6%	3		\$313,551
Zachary Buell (Researcher 3)		Process audio data			36.6%	0.51		\$44,359
Master's Student		Lead the field effort for initial deployment. Graduate student fringe is 23.2% + tuition for 4 semesters + funding for two summers.			46.45%	2		\$125,321
Cedar Creek Education Apprentice (stipend)		Assist with educational programming development and delivery			0%	2		\$42,960
Undergraduate technicians		Assist with field work (ARU and trail camera deployment and data collection), image and sound file processing			0%	0.33		\$12,760
							Sub Total	\$661,555
Contracts and Services								
TBD	Service Contract	Website development and maintenance				-		\$50,000
							Sub Total	\$50,000
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 (100 cameras [including supplementary cameras] * 8 deployments * 6 batteries @ \$2.26 each)	Long-lasting batteries to power the trail cameras						\$10,848
	Tools and Supplies	Flagging tape, poles, post hole digger, and bolts, label making supplies	Tools and equipment to mark and secure the camera sites						\$344
	Equipment	75 autonomous recording unit (ARU) sets (ARUs @ \$150 each, lock and cable @ \$50)	record audio for identifying birds						\$15,000
	Tools and Supplies	Alkaline batteries	Power 75 audio recorders * 8 deployments * 4 batteries @ \$0.62 each						\$1,488
	Equipment	Internal hard drives and Graphical Processing Unit (GPU \$4500, 3x20 TB Hard drives @ \$479)	equipment to store and process images and audio on a RAID						\$5,937
	Equipment	Server upgrade parts	Parts to upgrade server for image processing and data storage (Motherboard, processor, memory)						\$2,400
	Equipment	15 external hard drives	8TB drives that are portable for teachers @ \$209 each						\$3,135
								Sub Total	\$65,552
Capital Equipment									
								Sub Total	-
Acquisitions and Stewardship									
								Sub Total	-
Travel In Minnesota									
	Miles/ Meals/ Lodging	Vehicle mileage for fieldwork to deploy, check, and recover trail cameras (400 miles per trip x 32 trips), Mileage for Cedar Creek and UMN staff to visit participating classrooms (50 visits, 100 miles per visit) all miles @ \$0.725/mile)	Vehicle mileage for fieldwork to deploy, check on, and recover trail cameras and ARUs and to visit classrooms.						\$12,905
	Conference Registration	Graduate student and Researcher to present at MN TWS meeting, \$256 conference registration.	Presenting at the Minnesota Chapter of The Wildlife Society will highlight						\$1,588

	Miles/ Meals/ Lodging	\$165/n lodging. \$102 meal per diem (\$51/day 1st & last day of travel). \$77 miles (110 miles @ \$0.725/mile)	the research in the state and serve and outreach function					
	Miles/ Meals/ Lodging	Mileage and meals for teachers attending workshops at Cedar Creek (\$200/teacher, 20 teachers x 2 workshops)	Support K-12 educators to attend workshops.					\$8,000
	Other	Bus rentals (\$700 / school visit, 10 visits)	Bus travel to bring students to field trip at Cedar Creek					\$7,000
							Sub Total	\$29,493
Travel Outside Minnesota								
	Conference Registration Miles/ Meals/ Lodging	\$300 conference registration. \$330 lodging (\$165/ng x 2ngs). \$170 meal per diem (\$51st day, \$68 full day, \$51 last day). \$400 airfare. x 2 travellers	The postdoc and graduate student will each present the outcomes of our classroom engagement and research at a national conference	X				\$2,400
							Sub Total	\$2,400
Printing and Publication								
							Sub Total	-
Other Expenses								
							Sub Total	-
							Grand Total	\$809,000

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	\$300 conference registration. \$330 lodging (\$165/ng x 2ngs). \$170 meal per diem (\$51st day, \$68 full day, \$51 last day). \$400 airfare. x 2 travellers	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	15% 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	\$116,863
			Non State Sub Total	\$116,863
			Funds Total	\$116,863

Total Project Cost: \$925,863

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [d1edb200-aa7.pdf](#)

Alternate Text for Visual Component

Example map and data from camera trap and audio recording device....

Supplemental Attachments

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

Title	File
Letter of support SES	32427202-fc7.pdf
Letter of support Open World Learning	3079aac1-423.pdf
Letter of support Harding High School	5809e663-1bb.pdf
Letter of support SMSC	16dd4698-9de.pdf
Budget Letter	b78dca90-e75.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?

No

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

Yes, I understand