



Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-113

Proposal Title: Expanding the Statewide Motus Wildlife Tracking Network

Project Manager Information

Name: Mary Mallinger

Organization: Minnesota Zoological Garden

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Project Basic Information

Project Summary: We will expand the statewide Motus wildlife tracking system network to fill in critical gaps, guiding the conservation of imperiled grassland and boreal migratory birds, their habitats, and other wildlife.

ENRTF Funds Requested: \$234,000

Proposed Project Completion: June 30, 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?

Region(s): NE, SW,

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.

In 2019, researchers released a shocking comprehensive assessment of changes in North American bird populations. The study found a staggering 3 billion birds lost since 1970 in the U.S. and Canada, with declines seen in nearly every biome. Our understanding of these causes is incomplete yet habitat loss proved to be a major driver. Birds are often indicators of overall environmental health and their decline signals the likelihood that other wildlife species are experiencing similar stressors.

Minnesota is located along the Mississippi River flyway and tens of millions of birds fly through each spring and fall on their way to seasonal breeding grounds. Researchers have gathered valuable data on both resident and migratory birds in Minnesota but gaps remain. Grassland birds have lost the majority of their habitat, leading to dramatic population declines, yet how these species continue to utilize migratory stopover sites is not well understood. In addition, the northern shore of Lake Superior in Minnesota is a critical pathway for migrators on their way from boreal breeding grounds. Disconcertingly, approximately half of boreal forest species are in decline. As natural habitats across biomes are lost and altered, many other species of wildlife face uncertain futures as well.

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.

The Motus Wildlife Tracking System (Motus) is a global network of researchers that uses automated radio telemetry stations to track hundreds of species of migratory wildlife to understand their movements and survival across the landscape. By utilizing over 1,200 Motus stations strategically placed throughout the hemisphere, valuable data are gathered from many migratory bird species that cover vast distances. Researchers utilizing Motus stations can detect the many thousands of birds carrying telemetry tags from hundreds of research projects across continents.

Minnesota currently hosts about 12 active Motus stations located mainly along the Mississippi and Minnesota Rivers. There are large gaps throughout the western portion of the state and along the northern shore of Lake Superior. To address these, we will install approximately 4-6 Motus towers along the I-90 corridor in western Minnesota and repair 9 towers along the Lake Superior shoreline. Towers will be mounted on existing infrastructure when possible to limit costs and increase reliability. Each tower will be outfitted with at least 4 antennas to maximize detection probability.

Interpretive signage for stations in public access areas will also be developed to educate the public on this technology and its relevance to conservation of Minnesota's wildlife.

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?

Researchers continent-wide continue to deploy wildlife telemetry tags and a robust Motus network is needed to maximize their effectiveness. By installing Motus stations throughout Minnesota, we will build the infrastructure needed to improve the conservation of grassland and boreal birds here and generate data to inform land use planning.

Technology is also advancing such that transmitters may be deployed on other migratory wildlife including bats, dragonflies, and butterflies, allowing the utility of an expanded Motus network to extend across taxa.

Finally, we will raise awareness about our migratory wildlife and introduce the public to how Motus technology is advancing conservation.

Activities and Milestones

Activity 1: Planning and installation of Motus towers across western MN and Lake Superior coastline.

Activity Budget: \$189,830

Activity Description:

The Minnesota Zoo will work with project partners to identify 4-6 locations in southwestern Minnesota, primarily along the I-90 corridor, and approximately 9 locations along the shore of Lake Superior that can reasonably accommodate Motus stations. Locations that allow for public engagement through interpretation will be prioritized such as rest stops and visitor centers. We will partner with the Minnesota Department of Transportation for installation logistics and support for locations along highways. The Natural Resources Research Institute (NRRI) in Duluth has nine Motus stations along Lake Superior that are no longer operable, but infrastructure remains. We will work with NRRI to repair and reinstall these stations, capitalizing on in-tact infrastructure.

Once locations have been identified and relevant partner organizations engaged, we will begin installation of Motus stations. The exact set-up for stations will vary based on location details but will generally consist of a 20–40-foot mast mounted on a building or tower with 4-6 antennas installed on each mast. Each station will require its own receiver and, if needed, an LTE modem and data plan. Locations with access to ethernet and Wi-Fi will be prioritized to increase reliability and minimize cost.

Activity Milestones:

Description	Approximate Completion Date
Select sites for Motus tower installation along two important migratory corridors.	August 31, 2025
Installation of first two Motus stations complete.	November 30, 2025
Installation of next six Motus stations complete.	November 30, 2026
Installation of remaining (4-7) Motus stations complete.	June 30, 2027

Activity 2: Develop and install interpretive materials to educate the public on the relevance of Motus technology for wildlife conservation in Minnesota.

Activity Budget: \$44,170

Activity Description:

The Motus wildlife tracking system is a unique opportunity to utilize technology to benefit a multitude of species across taxa and help protect their habitats. Informing the public on these efforts is critical in ensuring support. Not only does the protection of our state’s wildlife directly impact the species most in need, it helps ensure our shared natural resources are supported for many future generations to enjoy.

We will partner with conservation staff at Audubon Minnesota to develop content on the threats migratory birds are facing and the importance of taking timely action to help them. Information on how Motus stations work and their usefulness in the field will be highlighted. We will coordinate with Audubon's Communications Manager to develop interpretive content that is impactful and digestible and install signage to accompany up to four Motus stations.

Activity Milestones:

Description	Approximate Completion Date
Selection of sites with optimal opportunity to engage with the public completed.	August 31, 2025
Creation of interpretive text and graphics related to Motus and its usefulness in conservation completed.	July 31, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Dale Gentry	Audubon Minnesota - Upper Mississippi River	Will help with implementation of Activities 1 and 2 and provide direction for Audubon's Communications Manager who will be supporting Activity 2.	Yes
Chris Smith	Minnesota Department of Transportation	Will support implementation of Activity 1- selection of sites and installation of Motus stations along the I-90 corridor.	No
Brian Smith	U.S. Fish and Wildlife Service	Will provide support for Activity 1 and expert guidance as needed as they have extensive experience with Motus station installation and use.	No
Kristin Hall	Minnesota Department of Natural Resources - Ecological and Water Resources	Will support Activity 1 and provide expert guidance as she has an extensive background in Motus station installation and operation.	No
Molly Tranel Nelson	Minnesota Department of Natural Resources - Parks and Trails	Will provide support and assistance with Activities 1 and 2 as it relates to Motus station installation at State Parks and Trails.	No
Alexis Grinde	Natural Resources Research Institute	We will work with NRRI to restore their Motus stations along coast of Lake Superior. They will provide support of Activity 1 and 2 as it relates to Motus stations on the north shore and have extensive background knowledge in the Motus wildlife tracking network.	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?

This project contributes to wildlife conservation goals statewide. By expanding the Motus network we can fill gaps in our knowledge of prairie and boreal birds and create the infrastructure to support future research. Motus stations can be used by any research project that utilizes associated tags, including for species like bats, other mammals, and insects. We anticipate that subsequent research will be a part of the Minnesota Zoo's conservation portfolio and we are committed to continuous support of the project. The Minnesota Zoo and Audubon Minnesota will explore options for funding to secure the ongoing functionality of the Motus towers.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Mapping Migratory Pitstops in Minnesota	M.L. 2023, , Chp. 60, Art. 2, Sec. 2, Subd. 03c	\$340,000

Project Manager and Organization Qualifications

Project Manager Name: Mary Mallinger

Job Title: Conservation Biologist, Minnesota Zoo

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

Mary Mallinger received a Bachelor of Science in Wildlife Ecology from the University of Wisconsin-Madison and a Master of Science degree from the University of Rhode Island where she studied both invasive-native forest insect interactions and public engagement with science. Mary joined the Minnesota Zoo in 2019 and has worked in community engagement, communications, and wildlife conservation. She is currently a Conservation Biologist working closely with a team of scientists dedicated to the conservation of Minnesota's wildlife and the habitats they depend on. Throughout her career, Mary has studied prairie nesting birds, forest insects, prairie butterflies, freshwater turtles and mussels, and North American bison. Mary is experienced in field research, data analysis, grant writing and reporting, project management, and communications.

Organization: Minnesota Zoological Garden

Organization Description:

The Minnesota Zoo is a unique state agency. Established in 1978 to provide Minnesota residents and guests with an opportunity to experience animals from the exotic to the familiar, today the Zoo is one of the State's premier cultural, educational, and conservation institutions.

The Zoo's mission is to connect people, animals and the natural world to save wildlife. With 1.3 million guests annually, and state-wide outreach programs reaching thousands more, the Zoo is well-positioned to strengthen Minnesotans' awareness and understanding of our state's commitment to wildlife, science, and conservation. The Zoo is the State's largest environmental educator with >500,000 participants annually in Zoo education programs.

The Zoo is also a leader in conservation – directing efforts and partnering with others on a variety of initiatives in Minnesota and across the globe. Over the past decade, the Zoo has enhanced efforts to focus on Minnesota wildlife, including projects to conserve moose, bison, turtles, prairie butterflies, and mussels. Advancing the science of wildlife conservation is an important part of the Zoo's work.

The Zoo has a proven record of using its resources effectively and matching the State's investment.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Conservation Biologist		Project Manager- Overall project management and coordination to complete Activities 1 and 2.			30%	0.5	X	\$64,840
							Sub Total	\$64,840
Contracts and Services								
Audubon Minnesota	Professional or Technical Service Contract	Audubon Minnesota will support the project through the following: Conservation Director and Communications Manager will help with Motus installation and coordination and development of interpretive materials related to Activities 1 and 2; travel funds to support Motus station and interpretation installation and partner networking.				0.5		\$44,500
TBD	Professional or Technical Service Contract	Hire a contractor to help with Motus station installation at sites where installation cannot be completed by project staff alone. Some sites may be more challenging to install Motus stations and may require rental of a lift, climbing or complex electrical work.				-		\$25,000
TBD	Professional or Technical Service Contract	Contract with a graphic designer to make customized illustrations for interpretive displays that are digestible and eye-catching. Graphics will explain the technology and use of Motus stations and be used on all interpretive displays.				-		\$1,500
TBD	Professional or Technical Service Contract	LTE Data plan, if needed. A few stations may not have access to WI-FI or ethernet and would need an annual data plan.				-		\$960
							Sub Total	\$71,960
Equipment, Tools, and Supplies								
	Equipment	Motus station equipment. Each tower along I-90 costs ~\$9,000 in materials (x 6) and repairing stations (x 9) along Lake Superior costs ~\$25,000 total.	Will need antennas, masts, cables, and a station receiver at each Motus station. The stations along Lake					\$79,000

			Superior already have working antennas and will only need new cables and receivers and miscellaneous hardware.					
	Tools and Supplies	Will need miscellaneous tools for Motus station installation such as: drills, wire cutters, screws/bolts, electrical tape, etc.	Tools and miscellaneous hardware is needed to install antennas to masts, masts to a building or structure, secure the station, and hardwire the station to an electrical source.					\$5,000
							Sub Total	\$84,000
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Fuel, food, and accommodation for work in state: Estimating 8 trips are needed with an average of 300 miles roundtrip each. Food and overnight lodging will be required for longer distances and trips that require installation at multiple sites. Reimbursement rates as allotted per the State of Minnesota travel regulations.	Travel will be needed to sites in western MN and northern MN to plan for and install Motus stations and interpretive displays.					\$6,000
							Sub Total	\$6,000
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Printing	Creation and installation of interpretive signage at ~4 Motus station sites. Each sign costs ~\$1,800 to print and install, x4 signs.	We will develop interpretive signage for 4 Motus station sites that are public facing to raise awareness of Motus technology and its implications for Minnesota's natural resources.					\$7,200

							Sub Total	\$7,200
Other Expenses								
							Sub Total	-
							Grand Total	\$234,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Personnel - Conservation Biologist		Project Manager- Overall project management and coordination to complete Activities 1 and 2.	Classified : A classified staff position will be partially supported by these ENRTF funds. This staff member will have the necessary expertise required to successfully coordinate Activities 1 and 2. The ENRTF funding will make it possible for the staff member to work on this project for the percentage of time indicated in the budget. Without this funding they would not be able to support this project with their time. Responsibilities for the classified staff will be reprioritized and reallocated as necessary to support this project.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
Cash	Minnesota Zoo's General Operating Budget	Administrative costs, utilities and other expenses associated with implementation of activities, estimated at 15% of the total request	Secured	\$35,100
			State Sub Total	\$35,100
Non-State				
			Non State Sub Total	-
			Funds Total	\$35,100

Total Project Cost: \$269,100

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [4c5e8ba3-c12.pdf](#)

Alternate Text for Visual Component

Title is: Expanding the Statewide Motus Wildlife Tracking Network with Minnesota Zoo and Audubon logos. Goal: Address critical gaps to guide conservation of imperiled grassland and boreal birds and other wildlife. Photos of birds and a Motus station surround primary photo of Canada warbler. Text highlighting project displayed....

Supplemental Attachments

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

Title	File
Letter of Support- USFWS	a692d6fa-2bd.pdf
Letter of Support- Natural Resources Research Institute	f5595ea0-010.pdf
Letter of Support- Minnesota Department of Transportation	4a5ab0b8-6e8.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?

No

Does the organization have a fiscal agent for this project?

No

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:

Dale Gentry, Audubon Minnesota; Sarah Hewitt, Audubon Minnesota; Seth Stapleton, Minnesota Zoo.