



Environment and Natural Resources Trust Fund

2022 Request for Proposal

General Information

Proposal ID: 2022-068

Proposal Title: Minnesota Mammal Atlas

Project Manager Information

Name: Ron Moen

Organization: U of MN - Duluth - NRRRI

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Project Basic Information

Project Summary: The Minnesota Mammal Atlas will be a one-stop solution for knowledge on all Minnesota mammal species

Funds Requested: \$116,000

Proposed Project Completion: June 30 2024

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.

The Problem: There is no single clearinghouse for current information on mammals in Minnesota. The definitive book on Minnesota mammals is 39 years old. A field guide is 15 years old. The MNDNR website has overview summaries for 48 species. Literature searches for 10 mammal species found 1,349 papers referencing Minnesota. The ENRTF has invested over \$35 million in 51 projects with a mammal component.

The Opportunity: Create a Minnesota Mammal Atlas that provides efficient and effective access to data and knowledge on the 80+ mammal species that live in Minnesota.

One example: Minnesota has lost 8 mammal species since the 1800s. Over the next 50 years, we could lose an additional 18 species and 37 species will expand northward. Where would you find out which species will remain, or what new species might move into Minnesota?

As a professional Mammalogist, I could answer those questions better than most, but it would be desirable to have answers to those questions (and many more) with a few mouse clicks. Being able to access ENRTF funded research on mammals with a few mouse clicks instead of sifting through thousands of google search results would be nice.

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

Our solution is the Minnesota Mammal Atlas (MMA), which will summarize and synthesize knowledge and data on all Minnesota mammal species. Current knowledge, including natural history, historical distribution and abundance, future distribution, habitat use, and photographs will be available for each species, with links to relevant literature.

Example information sources include Mammals of Minnesota and similar books, published research, M.S. theses, Ph.D. dissertations, and gray literature. We will include descriptions of available distribution data (e.g., ENRTF funded projects like the Bell Museum Biodiversity Atlas and the Minnesota Biological Survey).

The ENRTF has invested \$2.4 million into 3 Atlas projects with biological components (birds, bees, and biodiversity). Phase 1 of the MMA is initial planning we are doing now. For MMA Phase 2 we are requesting only \$116,000 over two years to develop a fully-functional and complete MMA. After documenting the value of MMA Phase 2 to users, we will request about \$200,000 to add additional resources and make design changes based on user feedback.

We envision the MMA to be a one-stop solution to learn about the mammals of Minnesota, with live links to other species information sources as appropriate.

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 project outcome is the Minnesota Mammal Atlas, which will provide a comprehensive summary of existing knowledge and data on each mammal species in Minnesota. The MMA will be an efficient method for natural resource managers and the citizens of Minnesota to access data on all Minnesota mammal species. The Minnesota Mammal Atlas content would be immediately accessible and useful for protection, conservation, preservation, and enhancement of the state's natural resources.

Activities and Milestones

Activity 1: Develop Minnesota Mammal Atlas (MMA) website

Activity Budget: \$116,000

Activity Description:

The activity has three parts:

Part 1: Create an account for each Minnesota Mammal species

Part 2: Create MMA website with species accounts

Part 3: Update based on user feedback, new research, and dissemination

In Part 1, we will use existing resources to create a comprehensive species account for each species. Each species account will require 2 to 3 days to complete. We have already compiled and written some of the material for teaching (e.g., <https://beaver.nrri.umn.edu/MNMammals/>) or other projects.

In Part 2 we will create the website, with multiple content pages in each species account. We will use existing websites (e.g., Minnesota Breeding Bird Atlas, ENRTF funded) and past experience with mammal specific websites (for teaching Mammalogy, and the Canada lynx, moose, and carnivore websites) to design the MMA.

The timeline of Activity Milestones results in completion of Phase 2 of the MMA website in 1.5 years. In Part 3, we will do at least one update based on user feedback after targeted distribution to an advisory board and dissemination to educators, agencies, and Minnesota citizens.

Activity Milestones:

Description	Completion Date
Finish Species accounts for 40 Minnesota Mammal species	March 31 2023
Initial release of Minnesota Mammal Atlas website (not all species done)	March 31 2023
Finish species accounts for remaining Minnesota Mammal species	December 31 2023
Complete website with all Minnesota Mammal species published	December 31 2023
Website updates and documentation of use	June 30 2024

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 be funded?

We will build the Minnesota Mammal Atlas (MMA) in four phases.

Phase 1, 2021 - 2022: Initial Design (e.g., <https://mnmammals.d.umn.edu/>, <https://beaver.nrri.umn.edu/MNMammals/>)

Phase 2, 2022 - 2024: This proposal, completes the MMA and demonstrates value to Minnesota

Phase 3: 2024 – 2026: Updates and additions with new funding (2024 – 2026, source TBD)

Phase 4: 2026 – 2036: Maintenance

The MMA will be hosted by the University of Minnesota for the foreseeable future, and we would develop maintenance funding from agencies or foundations for future updates estimated at about \$10K / year.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Endangered Bats, White-Nose Syndrome, and Forest Habitat	M.L. 2015, Chp. 76, Sec. 2, Subd. 03i	\$1,250,000
Genetic and Camera Techniques to Estimate Carnivore Populations	M.L. 2015, Chp. 76, Sec. 2, Subd. 03l	\$200,000

Project Manager and Organization Qualifications

Project Manager Name: Ron Moen

Job Title: Associate Professor / Senior Research Associate

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

Key Qualifications: Ron is a Wildlife Ecologist and Research Lab Manager at the Natural Resources Research Institute, University of Minnesota Duluth. He has over 25 years of research experience focusing on mammals, telemetry, and wildlife ecology.

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.

RELEVANT RESEARCH EXPERIENCE:

Dr. Moen has worked on and managed research projects on many different species while at NRRI, with over \$4 million of research projects on Minnesota mammals funded. In addition, Dr. Moen has taught Mammalogy at the University of Minnesota Duluth since 2003, and guided over 20 graduate students doing research on mammals in Minnesota to M.S. and Ph.D. degrees.

PUBLICATIONS ON MAMMALS (Examples, > 50 peer-reviewed, > 60 Technical Reports):

Moen, R.A., C.L. Burdett, and G.J. Niemi. 2008. Movement and Habitat use of Canada Lynx during denning in Minnesota. *Journal of Wildlife Management* 72:1507-1513.

Moen, R., G.J. Niemi, and C. Burdett. 2008. Canada lynx in the Great Lakes. NRRRI Technical Report No. NRRRI/TR-2008/14.

McCann, N. and R.A. Moen. 2011. Mapping potential core areas for lynx (*Lynx canadensis*) using snowshoe hare (*Lepus americanus*) pellet counts and satellite imagery. *Canadian Journal of Zoology* 89:509-516.

Ditmer, M.A., J.R. Fieberg, R.A. Moen, S.K. Windels, S.P. Stapleton, and T.R. Harris. 2018. Moose movement rates are altered by wolf presence in two ecosystems. *Ecology and Evolution* 8(17):9017-9033.

Moen, R., and M. Swingen. (2018). Historical northern long-eared bat occurrence in Minnesota based on acoustic surveys. NRRRI Technical Report No. NRRRI/TR-2018-40.

Organization: U of MN - Duluth - NRRRI

Organization Description:

The Natural Resources Research Institute (NRRRI) is an applied research and economic development engine for the University of Minnesota research enterprise. NRRRI 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. NRRRI collaborates broadly across the University system, the state and the region to address the challenges of a natural resource based economy.

NRRRI researchers have extensive experience in managing large, interdisciplinary projects. NRRRI'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.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Project Manager		Manage project, develop information content			26.7%	0.2		\$32,358
Content developer		Develop website content and design, assist with content creation			26.7%	0.66		\$57,234
Website developer		Website design			24.1%	0.16		\$12,938
Undergraduate Research Assistant		Assist with literature searches, content development			0%	0.4		\$10,202
							Sub Total	\$112,732
Contracts and Services								
University of Minnesota Duluth	Internal services or fees (uncommon)	NRRI GIS Lab fee. Standard user fee for access to NRRI GIS lab				-		\$200
							Sub Total	\$200
Equipment, Tools, and Supplies								
							Sub Total	-
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								

	Miles/ Meals/ Lodging	Meetings to demonstrate Minnesota Mammal Resource website.	Costs include mileage, hotel, per diem using the current GSA approved rate.					\$800
	Conference Registration Miles/ Meals/ Lodging	Conference attendance (e.g., The Wildlife Society meetings, DNR Roundtable). Costs include conference registration fee and GSA approved rates for mileage, hotel, per diem.	Presentations/Discussion on Minnesota Mammal Resource website					\$769
							Sub Total	\$1,569
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Publication	Page charges for manuscripts describing the MMR process/website	Demonstrate utility and increase use					\$1,499
							Sub Total	\$1,499
Other Expenses								
							Sub Total	-
							Grand Total	\$116,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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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	\$63,800
			Non State Sub Total	\$63,800
			Funds Total	\$63,800

Attachments

Required Attachments

Visual Component

File: [bf7b46ee-727.pdf](#)

Alternate Text for Visual Component

Figure showing mock up of species account for Minnesota Mammal Atlas and past websites we have developed on mammals....

Optional Attachments

Support Letter or Other

Title	File
UMD Sponsored Projects Transmittal Letter	2872e100-1a4.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?

Yes

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

No

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

No

Does your project include original, hypothesis-driven research?

No

Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration

Minnesota Mammal Atlas

Problem: How do I learn about mammals in Minnesota? I could search in these:

Mammals of ... Books

Minnesota Biodiversity Atlas

Species Experts

Published Research

Minnesota Biological Survey

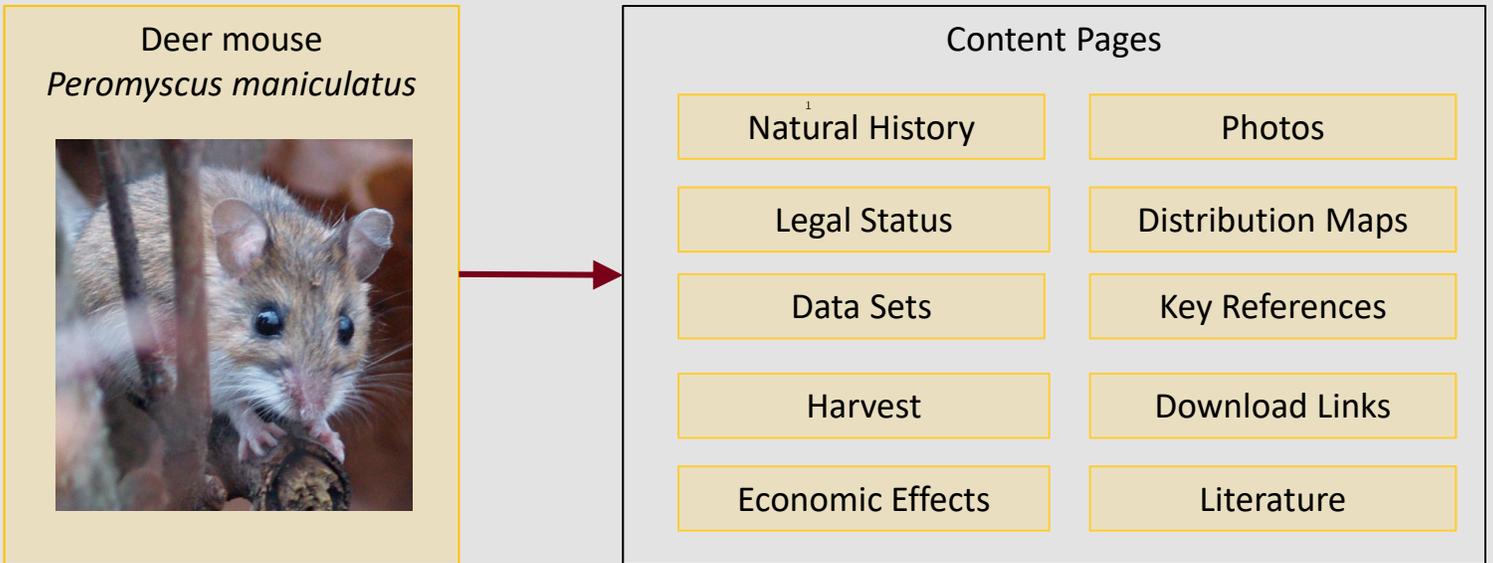
Google Search

Gray Literature

Mammal Websites

Dissertations

Solution: Or I could go to the Minnesota Mammal Atlas:



Example websites we have already developed:

