Environment and Natural Resources Trust Fund

2026 Request for Proposal

General Information

Proposal ID: 2026-131

Proposal Title: Building a Superior Understanding of Minnesota's Small Mammals

Project Manager Information

Name: Catherine Early

Organization: Science Museum of Minnesota

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Project Basic Information

Project Summary: This project will make data on the small mammals specimens from Superior National Forest in our collection publicly available through organization and digitization.

ENRTF Funds Requested: $428,000

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?

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.

Small mammals play an important role in ecosystems as food sources for larger wildlife. They are hosts of ticks that spread pathogens like those that cause Lyme disease. And due to climate change, boreal forests like Superior National Forest (SNF) are declining and predicted to decline further in Minnesota in coming years. Museum specimens document biodiversity of the recent past, which forms the basis for all conservation work. Data about where and when specimens were collected contribute to studies on phenology, species distributions, diseases, and how these factors have changed through time and in response to changes in climate and land use. Studying the specimens themselves can also help researchers understand species' responses to natural and human-caused changes to their environments. The Science Museum of Minnesota (SMM) houses a collection of ~15,000 small mammal specimens collected in SNF between 1983-1999 which includes rare specimens like the first state record of the smoky shrew. The collection is currently mostly inaccessible to researchers because it isn't digitized. Therefore, its data can't yet be leveraged to understand, for example, public health risks faced by Minnesotans who recreate in our natural areas, or changing wildlife diversity in a disappearing ecosystem in the state.

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.

With the requested funding, we will organize and digitize the ~15,000 small mammal specimens from SNF that are stored at SMM. Many of these specimens are prepared as fluid-preserved carcasses, stored in degrading plastic buckets, and dry skulls, and their data are handwritten in field catalogs. We will first inventory all SNF carcasses and skulls in our collection, rehouse the carcasses into archival glass jars, and create a record for each specimen in our collection management system (CMS). Next, we will reorganize existing storage spaces and move SNF skulls to optimal storage locations. We will scan the field catalogs, transcribe specimen data from the field catalogs into our CMS, and georeference the records so they can be placed on a map. Once specimens have been digitized, they will receive unique catalog tags to associate individuals with their relevant data. Finally, we will disseminate project results to increase specimen visibility and usability by researchers working to preserve Minnesota wildlife. We will share the data to aggregators like iDigBio and the Minnesota Biodiversity Atlas (MNBA) (LCCMR ENRTF 2023-248) so they can be freely accessed by anyone with an Internet connection and will present project results at the American Society of Mammalogists.

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?

Data on where and when our SNF specimens were collected will provide baselines of small mammal diversity and biogeography in one of the state's largest boreal forests. For example, natural resource managers can use the data to understand how wildlife populations change along with tree composition. Our specimens can help conservation scientists better understand the biology of small mammals: for example, the morphological information we will digitize will illustrate how body size has changed through time in response to climate or environmental changes. And fluid-preserved carcasses include parasites that can be studied to understand diseases encountered during outdoor recreation.

Activities and Milestones

Activity 1: Inventorying and rehousing SNF skulls and fluid-preserved carcasses

Activity Budget: $124,803

Activity Description:
To improve the storage and use of our data-rich SNF small mammal specimens for research and conservation, we need to inventory those holdings and rehouse them into appropriate storage containers and spaces. We will first inventory the carcasses by removing them from the degrading buckets they were stored in, creating a record in our CMS tied to the unique field number on each specimen, and then placing them in archival glass jars for long-term storage. Next, we will inventory the SNF dry skulls, creating a record in our CMS for each of them or adding to the record of the carcass if the skull and carcass are from the same individual. We will use this inventory to guide our reorganization of the osteology section of the collection to make room for addition of the SNF skulls, then we will move the skulls to this more appropriate long-term storage location. This activity will result in a complete inventory of the SNF small mammal holdings in our collection formatted for the addition of more data, and in these specimens being moved to spaces or containers that will safely house them for future use.

Activity Milestones:

Description	Approximate Completion Date
Inventory and rehousing of SNF fluid-preserved carcasses into archival glass jars	November 30, 2026
Inventory of SNF skulls	March 31, 2027
Reorganization of osteology collection and moving SNF skulls	June 30, 2027

Activity 2: Digitizing SNF specimen records and disseminating project results

Activity Budget: $303,197

Activity Description:
The objective of this activity is to digitize all of our SNF small mammal specimens and share their data publicly. To do this, we will scan the SNF field catalogs, which record detailed data on each specimen. From these scans, we will transcribe data of and georeference each specimen with a record in our CMS from the comprehensive inventory of SNF holdings. We will format these transcribed data into tags which we will print and attach to each specimen. These digitized records will be shared with external databases like the MNBA and iDigBio. Minnesota natural resource managers like Department of Natural Resources staff use the MNBA, and biodiversity researchers across the country use iDigBio. At the end of this activity, data of all our SNF small mammal specimens will be findable in public databases. Researchers anticipate use of our digitized data (see Support Letters), and we will communicate this resource to new audiences through SMM events like Earth Day and presentations to groups like the Minnesota Tribal Environmental Council and the American Society of Mammalogists. As a result, data from our collection will improve knowledge and conservation of biodiversity of one of Minnesota's last boreal forests.

Activity Milestones:

Description	Approximate Completion Date
Scanning and transcribing field notes and georeferencing specimens	November 30, 2028
Printing and attaching data tags to specimens	February 28, 2029
Sharing SMM's database records with data aggregators	June 30, 2029
Presenting project results	June 30, 2029

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?

The specimens being organized in this proposal are part of SMM's Biology Collection, the maintenance of which is funded by SMM's operating budget and the curation of which is led by an endowed position. The digitized specimen data will be stored in SMM's collection management system, which is also funded by SMM's operating budget and is backed up nightly. That data will also be shared with data aggregators like the MNBA, which is currently supported by LCCMR funding and will be sustained by the Bell Museum, and iDigBio, which is currently supported by National Science Foundation funding.

Project Manager and Organization Qualifications

Project Manager Name: Catherine Early

Job Title: Barbara Brown Chair of Ornithology

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

Catherine Early has a PhD in Ecology and Evolutionary Biology from Ohio University and worked at the North Carolina Museum of Natural Sciences, the Smithsonian National Museum of Natural History, the Florida Museum of Natural History before joining the Science Museum of Minnesota (SMM) as the Curator of Ornithology and Chair of the Biology Department. As a Postdoctoral Fellow at the Florida Museum of Natural History, she organized and ran a multi-institution effort to digitize ~20,000 vertebrate specimens at US collections. In her current role at the Science Museum of Minnesota, she plans digitization projects, grows the collection, and oversees the volunteers and interns who assist with these activities in the Biology Collection that she leads. Some of these projects have been funded by subawards from the LCCMR ENTRF-supported Minnesota Biodiversity Atlas (2023-248) and Salvage Wildlife (2023-146) projects led by the Bell Museum.

Organization: Science Museum of Minnesota

Organization Description:

The Science Museum of Minnesota (SMM) was founded as the St. Paul Academy of Arts and Letters in 1907. The Academy offered lectures on scientific issues relevant to the community; in its first year, the Academy sponsored over 100 lectures, attracting thousands of attendees. In the over one hundred years since, SMM has grown from an exclusive scientific literary society to an institution nationally and internationally recognized for its innovative programming, dynamic exhibits, research, and science learning resources, from professional development workshops for K--12 teachers and student programming to cutting-edge digital resources to share our assets internationally. Today, we are one of Minnesota's leading cultural attractions and educational resources, focused on equitable and impactful STEM learning opportunities for all. We specialize in interactive STEM (science, technology, engineering, and math) exhibits that emphasize hands-on learning while integrating our tradition as a natural history museum with interpretive exhibits, collections featuring two million artifacts and specimens, and scientific research that address issues vital to our collective future. Our stewardship of a world-class collection of artifacts and specimens, along with the ongoing active research in our Center for Research and Collections, plays a crucial role in informing policies, practices, and solutions.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Barbara Brown Chair of Ornithology		Supervising project-funded Collection Assistant and planning all aspects of project activities.			24%	0.6		$73,053
Director of Collections Stewardship		Consulting on and helping to plan moving, rehousing, and long-term storage of specimens.			24%	0.18		$23,539
Registrar		Planning digitization, data management, and data sharing of specimens			24%	0.18		$19,267
Biology Collection Manager		Assists in all aspects of project planning and tracks progress on the project, adjusting project plans as needed in response to changes in timelines to ensure that project goals are still met.			24%	0.6		$49,402
Collection Assistant		Executes all project activities (inventory, uninstalling, reinstalling, rehousing, transcription, data management, adding tags) and trains and supervises volunteers who support those activities.			24%	3		$198,387
Senior Director of Museum Technology		Project oversight on managing and sharing digitized data			24%	0.02		$4,284
Technology Project Manager		Management of IT project resources and scheduling			24%	0.07		$7,394
Technology Infrastructure Manager		Management of technical infrastructure that supports Collections Management system			24%	0.02		$2,515
System Administrator		Technical maintenance of Collections Management system			24%	0.07		$7,425
Software Development Manager		Management of web development team for SMM's public collections portal			24%	0.07		$10,808
Full Stack Developer III		Development of technical interfaces between Collections Management System and 3rd party aggregators for research			24%	0.09		$14,755

Full Stack Developer II		Continued web development on public collections portal.			24%	0.07		$8,663
							Sub Total	**$419,492**
Contracts and Services								
							Sub Total	**-**
Equipment, Tools, and Supplies								
	Equipment	Computer and accessories	Taking inventories, adding records to digital database, transcribing data	X				$1,944
	Tools and Supplies	280 1-gallon archival glass jars with archival plastic lids at $4.49 per piece, plus $386 for shipping	Rehousing 17,000 fluid-preserved specimens currently stored in non-archival opaque HDPE buckets that frequently crack when opened to access specimens					$1,643
							Sub Total	**$3,587**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
							Sub Total	**-**
Travel Outside Minnesota								
	Conference Registration Miles/ Meals/ Lodging	For a conference in Purdue University, the location of the next American Society of Mammalogists conference: 1 roundtrip flight to West Lafayette, IN on a commercial airline at basic economy level - $575, 6 nights of lodging for 1 person at $100/night - $600, ground transportation to and from airports for	Presenting the results of this project at the American Society of Mammalogists	X				$2,058

		1 person - $90, 6 days of meals at rate approved by Commissioner's Plan ($11 breakfast, $13 lunch, $19 dinner) - $258, conference registration for 1 person - $475						
							Sub Total	**$2,058**
Printing and Publication								
	Printing	23 rolls of pre-printed waterproof specimen data tags from TLS Printing LLC at $124.48 per roll	Associating field data with fluid-preserved specimens					$2,863
							Sub Total	**$2,863**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$428,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Equipment, Tools, and Supplies		Computer and accessories	A computer is a necessary piece of equipment for digitizing data and inventories and working in digital databases, which is the main activity of this project.
Travel Outside Minnesota	Conference Registration Miles/Meals/Lodging	For a conference in Purdue University, the location of the next American Society of Mammalogists conference: 1 roundtrip flight to West Lafayette, IN on a commercial airline at basic economy level - $575, 6 nights of lodging for 1 person at $100/night - $600, ground transportation to and from airports for 1 person - $90, 6 days of meals at rate approved by Commissioner's Plan ($11 breakfast, $13 lunch, $19 dinner) - $258, conference registration for 1 person - $475	Presentation of project results at this conference will empower the largest gathering of professional mammalogists in the country to use our collection of small mammals from Superior National Forest to study and conserve Minnesota's wildlife.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	**-**
Non-State				
In-Kind	Science Museum of Minnesota	Unrecovered indirect costs	Secured	$208,565
			Non State Sub Total	**$208,565**
			Funds Total	**$208,565**

Total Project Cost: $636,565

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: 6cbfd4ff-563.pdf

Alternate Text for Visual Component

This graphic explains how proper storage and digitization of small mammal specimens allows researchers to learn more about zoonotic diseases and wildlife population dynamics, and that this especially important in a disappearing ecosystem like Superior National Forest. Images of our specimens show the collection we are seeking funding to curate....

Supplemental Attachments

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

Title	File
Science Museum of Minnesota institutional commitment	4c2f52e6-b08.pdf
Science Museum of Minnesota evidence of good standing	c90882de-b8f.pdf
Science Museum of Minnesota audit	cd86226e-d30.pdf
Science Museum of Minnesota Form 990	ddf0bdbf-012.pdf
Letter of Support - American Society of Mammalogists	e7e6457e-f21.pdf
Letter of Support - Gerda Nordquist	08341e9d-4d9.pdf
Letter of Support - Dr. Sharon Jansa	df8d94a1-c5c.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 Commissioner's Plan 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?

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:

Science Museum of Minnesota: Dakota Rowsey, Adele Porter

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