



Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-070

Proposal Title: Digitizing the Science Museum of Minnesota's Mollusk Specimens

Project Manager Information

Name: Catherine Early

Organization: Science Museum of Minnesota

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Project Basic Information

Project Summary: This project will make the Minnesota mollusk specimens in our collection available for research and education by organizing all relevant specimens and digitizing their data.

ENRTF Funds Requested: \$399,000

Proposed Project Completion: December 31, 2027

LCCMR Funding 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): 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.

Minnesota waterways are special. Freshwater mussels play a critical role in our state's aquatic ecosystems, and over half of the freshwater mussel species in Minnesota are endangered, threatened, or of special concern. Other mollusks like snails document the buildup of toxins in our watersheds. Given the high risk of losing species that our waterways rely on, we need to use all available tools to understand these animals and how to conserve their populations for future generations. Museum specimens document where and when species were found in the recent past and how species have changed in response to natural and human-caused changes to their environments. Therefore, museum specimens form the basis for all current and future conservation work. They also provide an opportunity for people to learn from the remains of animals they may never encounter otherwise. Researchers and educators can only access museum specimens if they are well-organized and documented, ideally in a database, which the Science Museum of Minnesota's (SMM) specimens currently are not. The collection of Minnesota mollusks at SMM thus represents an important, currently inaccessible tool for understanding and protecting our state's environmental resources.

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 identify, organize, and digitize ~9,000 mollusk specimens from Minnesota in SMM collections. This includes a large collection of freshwater mussels from the Minnesota Natural History survey in the 1980's. In addition, more freshwater mussel and mollusk specimens such as snails are stored throughout the shell collection. There is also a significant collection of freshwater mussels currently stored at SMM's St. Croix Watershed Research Station (SCWRS). We will first perform an inventory of all areas where Minnesota mollusks are located in our collection. Next, we will better organize the existing storage space so that it can accommodate the additional freshwater mussel specimens from other locations by removing shell specimens without data that were not collected in Minnesota, and will rehouse and organize all Minnesota mollusk specimens found in our collection. This will bring all of the scientifically-valuable collections together in one space. Finally, we will digitize our Minnesota mollusks by photographing the shells and transcribing their associated data into our collection management system, which we will use to share the data to aggregators like iDigBio and the Bell Museum's Minnesota Biodiversity Atlas.

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 Minnesota mollusk specimens were collected will provide baselines of mollusk diversity and biogeography in the state. For example, natural resource managers will use the data to identify suitable sites for freshwater mussel repopulation. Our specimens can help conservation scientists better understand the biology of each species, for example, how body size has changed through time in response to climate or environmental changes. Any specimen found without data will be incorporated into SMM's Education Collection, where they will inspire curiosity about and passion for mollusk conservation in all Minnesotans through our statewide STEM programming.

Activities and Milestones

Activity 1: Inventorying and organizing Minnesota mollusk specimens

Activity Budget: \$207,088

Activity Description:

To improve the accessibility, storage, and use of our data-rich Minnesota mollusk specimens for research and conservation, we will inventory our shell storage spaces to identify all data-rich Minnesota mollusk specimens. Guided by these inventories and research from our archives to clarify specimen questions, we will remove non-Minnesota mollusks from our cabinets, send Minnesota mollusks that lack data to SMM’s STEM Education department, and rehouse and install the research-grade Minnesota mollusks that were located in other areas of our collection and at the SCWRS into the appropriate locations in our cabinets. At the end of this activity, all research-grade Minnesota mollusk specimens in our collection will be stored in taxonomic order in our archival cabinetry, resulting in much more accessible and efficient use of this Minnesota natural history resource by researchers. The no-data Minnesota mollusk specimens will be used by staff in STEM Education, who visit schools in all 87 counties of Minnesota, and in Visitor Experiences, who interact with ~250,000 visitors every year, to educate about our state’s natural history and conservation and spread the word about this new resource.

Activity Milestones:

Description	Approximate Completion Date
Inventory of all shell specimens	April 30, 2026
Researching no-data Minnesota mollusk specimens	May 31, 2026
Uninstalling non-Minnesota mollusk and no-data Minnesota mollusk specimens	June 30, 2026
Rehousing and installing Minnesota mollusk specimens in collection cabinets	October 31, 2026

Activity 2: Digitizing Minnesota mollusk specimens

Activity Budget: \$191,912

Activity Description:

We will digitize all our Minnesota mollusk specimens into our digital database, which will be shared with external databases. Following a digitization protocol that has been successfully implemented in our Biology Collection, we will add specimen barcodes and photograph each research-grade specimen of Minnesota mollusk and its data tag. We will add a record for each specimen to our database, data from each specimen’s tag will be transcribed, and the specimen’s photograph will be attached to its record using the barcode. These records and images will be shared with external databases like the Minnesota Biodiversity Atlas and iDigBio, for which we are currently developing data-sharing pipelines. Minnesota natural resource managers like Department of Natural Resources staff use the Minnesota Biodiversity Atlas, and biodiversity researchers across the country use iDigBio. At the end of this activity, data and images of all our research-grade Minnesota mollusk 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 conferences like the St. Croix Research Rendezvous. As a result, data from our collection will improve knowledge and conservation of Minnesota’s mollusks.

Activity Milestones:

Description	Approximate Completion Date
Photographing specimens	May 31, 2027
Transcribing data into SMM’s digital database	November 30, 2027
Sharing SMM’s database records with data aggregators	December 31, 2027

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 a permanent 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 Minnesota Biodiversity Atlas, 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 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 and oversees the volunteers and interns who execute digitization and organization of the Biology Collection that she leads. Some of these projects have been funded by subawards from the LCCMR ENTRF-supported Minnesota Biodiversity Atlas led by the Bell Museum.

Organization: Science Museum of Minnesota

Organization Description:

The Science Museum of Minnesota (SMM) has held and exhibited collections since its charter in 1907. Its first scientific collections came from the St. Paul Academy of Science. These early collections were mostly donations from private collections, with some predating the charter of SMM. Collecting expeditions for the Biology Collection began in earnest in the 1970s, and through targeted collecting as well as donations, it has grown to almost 190,000 specimens, the majority of which are from Minnesota and the Upper Midwest of the United States. Today, it is the second largest biodiversity collection in the state of Minnesota (after the Bell Museum and its associated collections at the University of Minnesota), holding the largest mammalogy collection in the state and other notable collections of terrestrial arthropods and freshwater mussels. In addition to its collections, SMM's exhibits and its on- and offsite education offerings serve as important resources for Minnesotans learning about science and the environment and natural resources of their state.

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.			26%	0.47		\$62,674
Director of Collections Stewardship		Consulting on and helping to plan moving, rehousing, and digitizing objects			26%	0.33		\$47,121
Registrar		Planning and supervising digitization, data management, and data sharing of specimens			26%	0.18		\$19,835
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.			26%	0.47		\$42,508
Collection Assistant		Executes all project activities (inventory, uninstalling, reinstalling, rehousing, photography, transcription, data management) and trains and supervises volunteers who support those activities.			26%	2.9		\$200,676
Director of Aquatic Research and Collections		Locate, pack, and collate mollusk specimens and accompanying data at the St Croix Watershed Research Station			26%	0.04		\$5,007
							Sub Total	\$377,821
Contracts and Services								
							Sub Total	-
Equipment, Tools, and Supplies								
	Equipment	Computer station, including 1 laptop, 1 docking station, 2 external monitors, 1 mouse, and 1 keyboard	Taking inventories, adding records to digital database, taking and processing photographs, transcribing data	X				\$1,944
	Equipment	Imaging setup, including 1 Ortery lightbox and 1 color standard	Generating standardized, research-grade specimen images with balanced					\$4,782

			color that can be used in scientific studies					
	Equipment	Camera setup, including 1 camera, 2 lenses, 1 cable, and 1 level	Generating standardized, research-grade specimen images with balanced color that can be used in scientific studies	X				\$2,226
	Tools and Supplies	Imaging software	Editing, renaming, and saving specimen photographs					\$345
	Equipment	Barcode printer, paper, and software license	Adding barcoded data tags for individual identification of each specimen to aid in moving, imaging, and organizing specimens	X				\$4,882
	Tools and Supplies	Archival storage materials	Providing archival, stable storage containers for each specimen so they are not damaged during long-term storage					\$7,000
							Sub Total	\$21,179
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
							Sub Total	-
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
							Sub Total	-
Other Expenses								

							Sub Total	-
							Grand Total	\$399,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Equipment, Tools, and Supplies		Computer station, including 1 laptop, 1 docking station, 2 external monitors, 1 mouse, and 1 keyboard	All of the activities proposed in this project require use of a computer, either by the Collection Assistant hired by this project or by the volunteers or interns they may supervise in execution of project activities.
Equipment, Tools, and Supplies		Camera setup, including 1 camera, 2 lenses, 1 cable, and 1 level	Capturing photographs of each specimen, which can be used for research and documentation, requires the purchase of a camera and its accessories.
Equipment, Tools, and Supplies		Barcode printer, paper, and software license	This specialized printer and paper is required to add barcodes to each specimens. Barcodes are the most precise method to label each specimen and ensure that it stays associated with its data, which is critical to a specimen's scientific importance.

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	\$159,959
			Non State Sub Total	\$159,959
			Funds Total	\$159,959

Total Project Cost: \$558,959

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [1b4cf5e7-614.pdf](#)

Alternate Text for Visual Component

Photos of freshwater mussel specimens, a map showing where other freshwater mussel specimens were collected in Minnesota, and a researcher holding a freshwater mussel in the wild. The graphic demonstrates how digitizing our freshwater mussel specimens will add to researchers' understanding of where freshwater mussels are found in the state....

Supplemental Attachments

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

Title	File
Support Letter - MN DNR	27d7b74e-63e.pdf
Support Letter - Dr. Lea Pollack	b5df02f7-75d.pdf
Authorization Letter	b99f378d-c46.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:

