



# Environment and Natural Resources Trust Fund

M.L. 2023 Approved Work Plan

## General Information

**ID Number:** 2023-146

**Staff Lead:** Michael Varien

**Date this document submitted to LCCMR:** May 28, 2023

**Project Title:** Salvaged Wildlife to Inform Environmental Health, Ecology, Education

**Project Budget:** \$486,000

## Project Manager Information

**Name:** Sushma Reddy

**Organization:** U of MN - Bell Museum of Natural History

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## Project Reporting

**Date Work Plan Approved by LCCMR:** June 22, 2023

**Reporting Schedule:** April 1 / October 1 of each year.

**Project Completion:** June 30, 2026

**Final Report Due Date:** August 14, 2026

## Legal Information

**Legal Citation:** M.L. 2023, Chp. 60, Art. 2, Sec. 2, Subd. 03i

**Appropriation Language:** \$486,000 the first year is from the trust fund to the Board of Regents of the University of Minnesota, Bell Museum of Natural History, to establish a statewide network to collect, analyze, and archive salvaged dead wildlife and build a foundation of biodiversity resources to track ecosystem-wide changes, monitor environmental health, and educate Minnesotans about the value of scientific specimens.

**Appropriation End Date:** June 30, 2026

## Narrative

**Project Summary:** Establish a statewide network to collect, analyze, and archive salvaged dead wildlife and build a foundation of biodiversity resources to track ecosystem-wide changes, monitor environmental health, and promote public education.

**Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.**

Everyday thousands of animals are injured or killed due to natural and anthropogenic causes, such as collisions with windows, buildings, powerlines, windmills, vehicles, etc. While it is illegal for most people to handle wildlife, several local organizations and agencies have the permits to salvage deceased animals for scientific or educational resources. Current practices utilize only a limited portion of these specimens for taxidermy or specific research. We aim to expand the value of these dead wildlife, often discarded or overlooked, to inform across a broad spectrum of environmental health. Different parts of animal carcasses are useful for tracking the spread of diseases, tracing the prevalence of toxins, assessing environmental conditions, and understanding ecological interactions with other animals and plants (such as diet, migration). Each animal carries a wealth of information, not just of what species it is but also a record of where, when, and how it existed - offering a powerful lens into a shared ecosystem that humans also inhabit. Given the current pandemics (COVID19, HPAI) and fears of declining populations of animals critical to ecosystem health (pollinators, dispersers), building a strong system of environmental surveillance is key to being ahead of new threats and managing future impacts.

**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.**

We propose to convert deceased birds and mammals, into valuable scientific data to advance understanding of ecosystem health and educate future scientists. First, we will build a network of organizations to systematically collect salvage wildlife across the state. This will be a unique collaboration bringing together efforts of wildlife officials, animal rehabilitation centers, and amateur naturalists acting through organized programs. Second, we will extract multiple types of information from specimens and archive them (freeze, store, organize) at the Bell Museum & SMM as resources of Minnesota biodiversity for future studies. We will dissect different body parts that potentially contain diseases (viruses, parasites, microbes), toxins (pesticides, heavy metals, microplastics), and ecological interactions (diet, microbiomes). These samples will contribute to ongoing and future studies on toxins (i.e. heavy metals in animals) and diseases (i.e. avian malaria) and to construct a baseline to identify emerging health and environmental threats, such as pandemics or ecological catastrophes. Finally, we aim to train students and educate the public about the value of scientific specimens and the interconnectedness of human and natural systems. We are partnering with veterinary and research groups to develop innovative protocols for dissections of wild species and expand natural history collections.

**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?**

Natural history museums are repositories of past and present biodiversity information. Our project will inform on various risks impacting wildlife and ecosystems across the state. This information can be crucial for understanding current conditions, invaluable for comparing to what we know of the past, and critical for establishing a baseline with which to predict future changes. Our project will be instrumental to monitor environmental health, advance knowledge of hidden and known ecological connections across species, and develop innovative ways to gather scientific knowledge from biodiversity samples. Results from our study will contribute to making informed management decisions.

## 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

## Activities and Milestones

### Activity 1: Coordinate network of organizations to acquire carcasses and educate the public about threats to wildlife

**Activity Budget:** \$170,394

#### Activity Description:

We will create a formal network of wildlife and conservation organizations to collect fresh carcasses from natural and anthropogenic sources like collisions with windows, buildings, powerlines, windmills, vehicles, etc. The Bell Museum and Science Museum of Minnesota will coordinate a system to gather these carcasses several times per year from state, federal, and tribal natural resource managers (such as MN-DNR, USGS, Fond du Lac Reservation), amateur naturalist groups who monitor window strikes (e.g., STOP the THUD program), non-profit groups (e.g., Friends of Sax-Zim Bog), environmental consultant companies (e.g., Western EcoSystems Technology) and wildlife rehabilitation centers (The Raptor Center, Wildlife Rehabilitation Center). Groups listed above have contributed specimens to our museums in the past. We will expand this network by inviting all organizations and agencies who are interested and have the appropriate state and federal permits to handle wildlife. We will implement careful protocols to maximize the amount of information that we can extract from each specimen with information-rich data sheets and provide freezers (on long-term loan) to store carcasses in-between transfers. Three times per year, museum staff will coordinate pick-ups across the state. We will create communication channels across the network to share information about project results.

#### Activity Milestones:

Description	Approximate Completion Date
Invite wildlife organizations and agencies to join network - establish protocols, permits, supplies, agreements	December 31, 2023
Coordinate pickups between institutions - 3x in 2023-24	June 30, 2024
Disseminate reports to partner organizations to inform the public (annually) - 2024	June 30, 2024
Coordinate pickups between institutions - 3x in 2024-25	June 30, 2025
Disseminate reports to partner organizations to inform the public (annually) - 2025	June 30, 2025
Coordinate pickups between institutions - 3x in 2025-26	June 30, 2026
Disseminate reports to partner organizations to inform the public (annually) - 2026	June 30, 2026

### Activity 2: Extract and archive samples for diseases, toxins, ecological interactions

**Activity Budget:** \$241,023

#### Activity Description:

The Bell Museum and Science Museum of Minnesota will coordinate efforts to receive, divide, and conduct the work needed to dissect specimens, properly take samples of different body parts, organize information in a database, and archive for future use. Both museums have a long history of being biodiversity repositories and have necessary storage facilities; however we aim to go beyond traditional natural history techniques. We will get training from veterinary professionals (at UMN College of Veterinary Medicine; The Raptor Center) to learn proper methods of sampling for environmental health. We will preserve (cryogenically or dry, as appropriate for long-term storage and use) minimally five different tissue types - muscle for genomics; gastrointestinal tract for diet, microbiomes, microplastics; liver for disease and toxicity screens; nasopharynx for respiratory diseases; blood or heart for parasites, heavy metals, toxins. Then we will prepare an anatomical specimen by preserving the feathers/fur/skeleton. There are few existing protocols so part of our efforts will be to develop procedures that can work across the diversity of mammals, birds, and their associated parasites, symbionts, and diet species in MN. We will use the Biodiversity Atlas (previously funded by LCCMR) to organize and disseminate information from each specimen.

**Activity Milestones:**

Description	Approximate Completion Date
Establish protocols for dissections and data collection	December 31, 2023
Training workshops by College of Veterinary Medicine and The Raptor Center	January 31, 2024
Coordinate workflow between institutions with quarterly meetings - 2023-4	June 30, 2024
Process specimens - dissect, extract, organize, archive 500-1000 samples - 2023-24	June 30, 2024
Coordinate workflow between institutions with quarterly meetings - 2024-5	June 30, 2025
Process specimens - dissect, extract, organize, archive 500-1000 samples - 2024-25	June 30, 2025
Coordinate workflow between institutions with quarterly meetings - 2025-6	June 30, 2026
Process specimens - dissect, extract, organize, archive 500-1000 samples - 2025-26	June 30, 2026

### Activity 3: Train, Educate, Inform - train students, educate about the value of biodiversity to understand our world, inform public and policy makers

**Activity Budget:** \$74,583

**Activity Description:**

All project partners will work together to train and educate students - future wildlife managers and scientists - and the public about the often hidden value and interconnectedness of biodiversity. First, the Bell Museum will coordinate training of students with proper dissection techniques, organization of complex relational information, analysis of biodiversity networks, and relationships with other organizations. Thousands of students, both undergraduate and graduate, come to the University of Minnesota to pursue careers related to conservation. We will open this opportunity to students from other universities as well as high school students during the summers. It is critical for the future of conservation to train students with innovative data collection and analytical tools. Second, we request funding to conduct outreach activities at collaborating organizations at least three times a year. These public engagement activities will inform on the importance of biodiversity specimens and our ability to utilize them to uncover hidden connections between species. Finally, we will use the information gathered from these incidental deaths to inform the public and policy makers about human-related impacts on wildlife. All of the data associated with this project will be easily accessible to the public via the MN Biodiversity Atlas database.

**Activity Milestones:**

Description	Approximate Completion Date
Develop outreach programs for disseminating project information	December 31, 2023
Train Students in dissection techniques - 2023-24	June 30, 2024
Public engagement programs in 3 partner institutions statewide - 2023-24	June 30, 2024
Summer internship program for high school, undergraduate and graduate students - 2024	December 31, 2024
Train students in dissection techniques - 2024-25	June 30, 2025
Public engagement programs in 3 partner institutions statewide - 2024-25	June 30, 2025
Summer internship program for high school, undergraduate and graduate students - 2025	December 31, 2025
Train students in dissection techniques - 2025-26	June 30, 2026
Public engagement programs in 3 partner institutions statewide - 2025-26	June 30, 2026

## Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Catherine Early	Science Museum of Minnesota	Curator of Zoology. Will coordinate sampling and communicate information.	Yes
F. Keith Barker	Bell Museum, University of Minnesota	Curator of Genetic Resources; Will coordinate sampling, train students, and communicate information.	Yes
Sharon Jansa	Bell Museum, University of Minnesota	Curator of Mammals; Will coordinate sampling, train students, and communicate information.	Yes
Victoria Hall	The Raptor Center, University of Minnesota	Director; Will coordinate samples and training between wildlife rehabilitation centers and museums	Yes

## 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.**

We will disseminate information about the progress and results of our project in multiple ways. All of activities, communication products, and outreach program will acknowledge the Environment and Natural Resources Trust Fund through use of the trust fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the ENRTF Acknowledgment Guidelines. Here are specific plans for dissemination of information -

- 1- create a website to provide collaborating institutions and the public information about our project and ways to participate. This site will be publically accessible and will include annual progress reports.
  - 2- establish communication network between participants to share information and develop new collaborations. We expect to be able to use internet technology to bring together different organizations related to wildlife. In-person meetings might also be facilitated by some of public engagement programs (see below).
  - 3- prepare information-rich samples to be stored at Bell Museum and SMM and available for researchers. The main resource resulting from this project will be a repository of samples and associated data that can be the basis of numerous analyses. These will be made freely available to researchers and the public (see next).
  - 4- use MN Biodiversity Atlas (previously funded by LCCMR) to organize location, time, species, and associated environmental information. This public and easy to use tool is a great way for the public to interact with the data produced from our project.
  - 5- provide public engagement programs several times a year across the state. We aim to showcase the importance of biodiversity specimens and our ability to utilize them to uncover hidden connections between species. As we travel the state to collect samples from different institutions, we aim to work with our collaborators to provide informal talks, demonstrations, and/or educational events.
  - 6- create annual reports for our network about our progress and highlights of the project. These reports will be distributed to all collaborators as electronic newsletters and be uploaded on the website.
  - 7- publishing scientific publications. We will use the data from this project to produce scientific publications of our analyses. All collaborators will be invited to be co-authors on all publications resulting from this project.
- We aim to use the information gathered from our project to inform the public and policy makers about human-related impacts on wildlife. We will acknowledge all participants and funding sources in all our communications and products.

## 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?**

Our aim is to create a systematic network to collect, analyze, and archive samples. Once the network is established and workflows developed, we believe the new activities will be integrated into standard operating procedures. Additionally, we intend to continue the benefits of this project by developing research collaborations. The acquisition of substantial samples will stimulate research and connect scientists across the state who are interested in analyzing them for various studies related to environmental health and conservation management. Finally, we believe this project will excite students to participate in innovative and integrative science and can lead to new educational opportunities.

## Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
<b>Personnel</b>								
Sushma Reddy, Curator of Birds		project coordination and training; Budget includes 1 month of summer salary per year; Dr. Reddy is on a 9-month salary with UMN that does not include summer research			33.5%	0.24		\$36,251
Sharon Jansa, Curator of Mammals		project organization; Budget includes 1 month of summer salary per year; Dr. Jansa is on a 9-month salary with UMN that does not include summer research			33.5%	0.24		\$39,912
F. Keith Barker, Curator of Genetic Resources		coordination and training of genetic resources; Budget includes 1 month of summer salary per year; Dr. Barker is on a 9-month salary with UMN that does not include summer research			33.5%	0.24		\$34,351
Research Technician		specimen data analysis, organization; Full-time position to prepare samples and organize data			28.7%	3		\$166,187
Veterinary Technician		specimen processing, training; 1 month salary per year for veterinary technician			28.7%	0.24		\$15,030
Dana Franzen-Klein, Veterinarian - The Raptor Center		training; 1-month salary per year to train students			33.5%	0.15		\$17,000
6 student interns (undergraduate or high-school)		specimen data analysis; 4 undergraduate and 2 HS per year for 2 years; 3rd year - 4 undergrad only			0%	12		\$33,853
2 Research Assistants - Graduate Students		specimen data analysis; outreach			23.6%	3		\$51,154
							<b>Sub Total</b>	<b>\$393,738</b>
<b>Contracts and Services</b>								
Science Museum of Minnesota	Sub award	To collect, analyze, and archive samples. Specifically, travel (~25%) to locations around the state, process and archive some of the specimens				0.48		\$47,637



		(~25%), and store specimens long-term for use in this and future research projects.						
Veterinary Diagnostics Laboratory	Professional or Technical Service Contract	To train technicians and students at museum to collect diagnostic samples for assessing animal health.				0.1		\$5,000
							<b>Sub Total</b>	<b>\$52,637</b>
<b>Equipment, Tools, and Supplies</b>								
	Tools and Supplies	samples tubes, storage boxes, specimen prep supplies	Supplied needed to analyze 500 specimens per year for 3 years					\$19,350
	Tools and Supplies	laboratory tube printer, labels	To organize samples and associated data using barcodes					\$1,175
	Equipment	5 chest freezers	To store specimens at partner organizations.					\$10,000
							<b>Sub Total</b>	<b>\$30,525</b>
<b>Capital Expenditures</b>								
							<b>Sub Total</b>	<b>-</b>
<b>Acquisitions and Stewardship</b>								
							<b>Sub Total</b>	<b>-</b>
<b>Travel In Minnesota</b>								
	Miles/ Meals/ Lodging	To collect samples - 2 roundtrips per year (total distance is 1229 miles; mileage rate is 0.585) for 1 day and 2 persons plus meals during travel days (\$59.20 GSM). To conduct outreach activities 3 time per year, includes lodging, per diem for 4 persons for 1 overnight stay (\$96 lodging and \$59 M&I).	To collect samples from collaborating organizations in northeast, northwest, and southern MN - 2 roundtrips per year and to conduct outreach activities 3 time per year.					\$9,100
							<b>Sub Total</b>	<b>\$9,100</b>
<b>Travel Outside Minnesota</b>								

							<b>Sub Total</b>	-
<b>Printing and Publication</b>								
							<b>Sub Total</b>	-
<b>Other Expenses</b>								
							<b>Sub Total</b>	-
							<b>Grand Total</b>	<b>\$486,000</b>

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				
			Non State Sub Total	-
			Funds Total	-

## Attachments

### Required Attachments

#### *Visual Component*

File: [408e433a-a3d.pdf](#)

#### *Alternate Text for Visual Component*

Salvaged wildlife to inform environmental health, ecology, education; 1: Create MN network to collect salvaged wildlife; 2: Extract samples for diseases, toxins, ecological interaction; 3: Train, educate, inform students and public...

### Optional Attachments

#### *Support Letter, Photos, Media, Other*

Title	File
Support Letter - VDL	<a href="#">6db6533a-dea.pdf</a>
UMN Authorization	<a href="#">d016b53f-572.pdf</a>
Background Check Certification Form	<a href="#">8431d96e-875.pdf</a>

## Difference between Proposal and Work Plan

#### *Describe changes from Proposal to Work Plan Stage*

We added a few more milestones to each activity to clarify the timeline for progress. We added a dissemination plan.

## Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

**Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?**

N/A

**Do you agree travel expenses must 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 agree to the UMN Policy.

**Does your project have potential for royalties, copyrights, patents, or sale of products and assets?**

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?**

Yes

**Does the organization have a fiscal agent for this project?**

Yes, Sponsored Projects Administration