



Environment and Natural Resources Trust Fund

M.L. 2025 Approved Work Plan

General Information

ID Number: 2025-111

Staff Lead: Noah Fribley

Date this document submitted to LCCMR: June 5, 2025

Project Title: Maximizing the Impact of Wildlife Movement Data

Project Budget: \$216,000

Project Manager Information

Name: John Fieberg

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

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Project Reporting

Date Work Plan Approved by LCCMR: June 24, 2025

Reporting Schedule: March 1 / September 1 of each year.

Project Completion: June 30, 2028

Final Report Due Date: August 14, 2028

Legal Information

Legal Citation: M.L. 2025, First Special Session, Chp. 1, Art. 2, Sec. 2, Subd. 03i

Appropriation Language: \$216,000 the first year is from the trust fund to the Board of Regents of the University of Minnesota to create a centralized and accessible database of wildlife movement data from prior trust fund-supported studies and demonstrate tools biologists can use to analyze these data to benefit Minnesota wildlife.

Appropriation End Date: June 30, 2028

Narrative

Project Summary: We will create a centralized database of movement data from LCCMR-funded studies and develop tools for visualizing movement of species through their environments with biologists working to conserve Minnesota wildlife.

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

LCCMR has allocated millions of dollars to support projects that have collected fine-scale data on the movements of white-tailed deer, moose, fox, coyotes, sandhill cranes, trumpeter swans, and other species that are integral to Minnesota's ecosystems and cultures. These studies have provided unique insights that are of interest to both wildlife managers and the public. The website we developed as part of our LCCMR-funded study showcasing movements of tracked trumpeter swans has been viewed over 30,000 times by ~19,000 unique viewers in 60 different countries. Yet, it can be difficult to locate the data from past studies or to expand data use to address management questions beyond those that led to the initial study. Data collected across large spatial areas and over many years are important for linking movements to environmental drivers (e.g., snow depth, human activity patterns), making it possible to forecast movements in response to environmental change. This project will ensure the long-term preservation of data in a common format that facilitates data sharing and collaboration and will provide tools and examples of their use for understanding and forecasting future movements of wildlife species important to Minnesota and its citizens.

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 will collaborate with PIs from past LCCMR-funded projects and others who have collected animal movement data on species in Minnesota and help them archive their data in Movebank, a free repository for animal movement and bio-logging data that currently stores > 6.1 billion animal locations from > 1380 species worldwide. We will also develop a Movebank fact sheet that can be shared with future PIs. This will ensure data from past and future LCCMR projects are preserved for future generations. As part of a Minnesota/LCCMR collection of studies, users will be encouraged to make their data public where appropriate (with options for licensing and DOIs); however, data owners can choose to restrict access, and data license terms and sharing agreements can ensure proper use and attribution. Movebank's common data format will help facilitate data discovery, management and sharing.

Our project will then leverage free online tools available on MoveApps (<https://www.moveapps.org/>) to visualize and analyze movements of species in Minnesota. We will conduct workshops and webinars to train others in the use of these tools so that they can create visual summaries of their movement data for wildlife managers and public engagement.

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?

This project will ensure the preservation of movement data collected using public funds and facilitate their reuse to benefit Minnesota wildlife. By providing data in a common format and discovery point, researchers will be able to combine datasets spanning more years and larger areas, allowing for more informative analyses that showcase data collected from LCCMR-funded studies. We will provide tools and training to allow wildlife managers and research staff to visualize and analyze their movement data in relation to important environmental variables (e.g., snow depth, land-use categories). These tools will improve wildlife conservation and management decision-making for many species.

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: Create a Minnesota-species collection of movement data from past LCCMR-funded studies and from State, Tribal, Federal, and University partners.

Activity Budget: \$70,000

Activity Description:

We will contact PIs from past LCCMR-funded studies and State, Tribal, Federal, and University partners to identify movement data collected in Minnesota. We will work with the data owners to archive their data in a Minnesota-species collection within Movebank. The data in the collection will provide a much-needed baseline for quantifying current species distributions and habitat requirements. The collection will also serve as a living archive that will support data discovery and data sharing/reuse and future collaborations among wildlife biologists across Minnesota and more broadly. Movebank currently supports several large-scale collaborations including Audubon's Bird Migration Explorer (<https://explorer.audubon.org>), Smithsonian's Shorebird Science and Conservation Collective (<https://nationalzoo.si.edu/migratory-birds/shorebird-collective>), the Global Initiative on Ungulate Migration (<https://www.cms.int/en/gium>), and the Global Wader Tracking Data Project (<https://www.waderstudygroup.org/projects/global-wader-tracking-database-project/>).

We will create a Movebank fact sheet with a link to a landing page showing all data currently in the Minnesota-species collection to encourage future PIs to store their data in Movebank. Importantly, Movebank offers the option of live data feeds for many commonly used tag manufacturers and data providers, making the process of archiving data from new studies seamless.

Activity Milestones:

Description	Approximate Completion Date
Initiate the Minnesota-species collection with sandhill crane and trumpeter swan data from past LCCMR studies	September 30, 2025
Develop a fact sheet for archiving data in Movebank	December 31, 2025
Identify movement data from past LCCMR studies and work with PIs to archive their data	June 30, 2027
Identify and archive movement data collected by other State/Federal/Tribal/University partners	June 30, 2027

Activity 2: Develop a series of case studies highlighting the use of online tools (MoveApps) for visualizing animal movements.

Activity Budget: \$136,000

Activity Description:

We will develop a series of visualizations and analyses that demonstrate the power of MoveApps using data from past LCCMR studies. MoveApps is a free analysis platform that supports various features for managing movement data and for constructing repeatable and customizable visualization and analysis procedures, which biologists and other staff can use even if they lack experience with statistical software and/or access to fast internet speed or local computing resources. We will begin by creating visualizations and analyses that link movements of sandhill cranes and trumpeter swans to measures of wind speed. We will also work with researchers who we identify during Activity 1 to develop at least one data visualization or analysis using MoveApps for inclusion on a project website showcasing movement data collected from previously funded LCCMR studies. The website will serve as a public facing outreach tool, demonstrating the value of past and present LCCMR investments. We have reached out to colleagues at the Minnesota DNR, and they have expressed interest in both Movebank and MoveApps (e.g., to explore movements of white-tailed deer in relation to cattle farms to better understand disease dynamics).

Activity Milestones:

Description	Approximate Completion Date
Develop visualizations and analyses linking movements of sandhill cranes and trumpeter swans to wind metrics	December 31, 2026
Develop visualizations and analyses linking movements of other Minnesota species to environmental variables	June 30, 2027
Create a website to host visualizations and analyses showcasing data from past LCCMR studies	June 30, 2027

Activity 3: Conduct workshops and webinars for wildlife biologists demonstrating how MoveApps can be used to help inform management decisions.

Activity Budget: \$10,000

Activity Description:

We will provide an introduction to MoveApps at the annual meeting of the Minnesota Chapter of The Wildlife Society. We will work with participants to archive their data in the Minnesota-species collection on Movebank ahead of time so that they can explore a variety of MoveApps tools using their own data, but we will also make data from our case studies available for those who do not yet have data archived in Movebank. We will also conduct a free webinar for State, Tribal, Federal and University partners (and others) to demonstrate a variety of MoveApps for visualizing and analyzing movement data. We will consider additional workshops and webinars for more targeted groups (e.g., State or Tribal biologists) upon request. These training activities will allow data owners to create visualizations of their movement data to support wildlife conservation and management decision-making and for public outreach.

Activity Milestones:

Description	Approximate Completion Date
Conduct a workshop at the Minnesota Chapter meeting of the Wildlife Society	February 28, 2026
Conduct a webinar to demonstrate MoveApps for analyzing movement data	May 31, 2027

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Smith Freeman	University of Minnesota	Graduate student, will lead the work to create the Minnesota-species archive, collaborate on case studies, develop the website to host the case studies, and lead the workshops and webinar.	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.

Our project is focused on the preservation, visualization, and analysis of movement data from LCCMR (and other) studies. We will work directly with researchers, including PIs from current and past LCCMR studies, to archive their data in Movebank, a free repository for animal movement and bio-logging data. We will also demonstrate tools (MoveApps) for visualizing and analyzing movement data in relation to important environmental variables. We will provide an introduction to MoveApps at the annual meeting of the Minnesota Chapter of The Wildlife Society and develop a fact sheet highlighting benefits of archiving data in Movebank and steps required to do so, which can be shared with research biologists, including future PIs of LCCMR projects. We will also conduct a free webinar for State, Tribal, Federal and University partners (and others) to demonstrate a variety of MoveApps for visualizing and analyzing movement data. These training activities will allow data owners to create visualizations of their movement data, which can be shared on a public website that we develop as part of this project.

The Environment and Natural Resources Trust Fund will be acknowledged 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.

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?

In the first year, we will contact wildlife biologists and PIs of previously-funded LCCMR projects to identify potential movement data (past, present, and future) to include in a Minnesota-species collection on Movebank. We will also develop a fact sheet highlighting benefits of archiving data in Movebank and steps required to do so, which can be shared with research biologists, including future PIs of LCCMR projects. Lastly, we will develop a series of case studies demonstrating the use of MoveApps for visualizing the many unique movements exhibited by Minnesota wildlife species. These case studies will be shared on a public website.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Minnesota Trumpeter Swan Migration Ecology and Conservation	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03d	\$300,000

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Professor John Fieberg		Will oversee the project, mentor the graduate student, and help conduct the workshops and webinars.			37.1%	0.18		\$43,831
Graduate Student		Will be responsible for creating the Minnesota-species archive, collaborate on case studies, develop the website to host the case studies, and lead the workshops			25.1%	1.5		\$166,344
							Sub Total	\$210,175
Contracts and Services								
							Sub Total	-
Equipment, Tools, and Supplies								
							Sub Total	-
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Conference Registration Miles/ Meals/ Lodging	2 people, registration \$300 (\$150 each), mileage 320 miles x 0.67 = \$214 (320 miles round trip - using Duluth as best guess of location), lodging (4 nights x 2 rooms x \$200/night), meals \$711 (2 people x 2 days travel @ \$59.25, 3 full days @ \$79)	We will offer a workshop at the MN TWS Annual Meeting	X				\$2,825
							Sub Total	\$2,825

Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Publication	1 open access journal article publication	Publish a paper showcasing the Minnesota-species archive and movement visualizations					\$3,000
							Sub Total	\$3,000
Other Expenses								
							Sub Total	-
							Grand Total	\$216,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Travel In Minnesota	Conference Registration Miles/Meals/Lodging	2 people, registration \$300 (\$150 each), mileage 320 miles x 0.67 = \$214 (320 miles rounds trip - using Duluth as best guess of location), lodging (4 nights x 2 rooms x \$200/night), meals \$711 (2 people x 2 days travel @59.25, 3 full days @ \$79)	The workshop we propose to offer at the Minnesota Chapter meeting of The Wildlife Society relates directly to our project (see activity 3) and its dissemination goals. Specifically, we will demonstrate, using data from past LCCMR studies contained in the Minnesota Collection that we will create on Movebank, how MoveApps can be used to visualize and analyze animal movement data. We will also encourage participants from Minnesota to archive their data in the Minnesota Collection on Movebank if they have not done so already.

Non ENRTF Funds

Category	Specific Source	Use	Status	\$ Amount
State				
			State Sub Total	-
Non-State				
			Non State Sub Total	-
			Funds Total	-

Total Project Cost: \$216,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [4ce846cb-edb.pdf](#)

Alternate Text for Visual Component

Graphic describes the problem and solution. It depicts the Minnesota-species archive of movement data that we will create in Movebank and the opportunities for informing management decisions and public outreach made possible by visualizing movements using MoveApps....

Supplemental Attachments

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

Title	File
Approval, Sponsored Projects Office	40bc1dd2-05b.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

We did not make any changes (other than adding the section on dissemination efforts and changing the completion date to June 30, 2028 as instructed in the comments section).

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 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 UMN Policy on travel 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 project:

Patrick McDonald (Finance Professional 3 Supv, Division of Environmental Science, Policy and Management, College of Food, Agricultural, and Natural Resource Sciences, University of Minnesota) and Kelsey Grachek (Senior Grant & Contract Officer, Office of Sponsored Projects, University of Minnesota)

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