



## Environment and Natural Resources Trust Fund

M.L. 2025 Approved Work Plan

### General Information

**ID Number:** 2025-150

**Staff Lead:** Noah Fribley

**Date this document submitted to LCCMR:** June 5, 2025

**Project Title:** Impact of Statewide Conservation Practices on Stream Biodiversity

**Project Budget:** \$300,000

### Project Manager Information

**Name:** Christine Dolph

**Organization:** U of MN - College of Biological Sciences

**Office Telephone:** (612) 868-1565

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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. 04m

**Appropriation Language:** \$300,000 the first year is from the trust fund to the Board of Regents of the University of Minnesota to use existing monitoring data to evaluate the effects of wetlands and riparian buffers on stream and river biodiversity and biological condition and develop tools and materials to inform the public and natural resource managers.

**Appropriation End Date:** June 30, 2028

## Narrative

**Project Summary:** Evaluate the effects of wetlands and riparian buffers on stream and river biodiversity and biological condition statewide, to inform stream management decisions.

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

Minnesota streams and rivers provide essential ecosystem services including drinking water, fisheries production, recreation and spiritual connection, and biodiversity protection. According to the MPCA's 2024 Impaired Waters List, 46% of streams that have been assessed in Minnesota do not meet the standards of the Clean Water Act. Most of these impaired streams are in poor biological condition; i.e., they do not support the expected biodiversity of freshwater species. Local and state agencies need to make decisions about how to prioritize resources for conservation measures that most effectively protect and restore these waters. While conservation practices such as wetland and riparian buffer restoration have received increased attention in recent years for their potential to cost-effectively mitigate water quality pollutants (such as nitrogen and phosphorus), the ways these practices affect stream biological condition at the watershed scale have not been thoroughly demonstrated. At the same time, state and local organizations have invested significant resources to collect detailed information about the diversity of aquatic communities in Minnesota streams. These data represent a vast and underutilized public resource that can be used to answer questions about the drivers of ecosystem health. However, these data have not yet been brought together in one place.

**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.**

This project seeks to leverage the state's large investment in monitoring of streams and rivers to analyze the links between wetlands, riparian buffers and the biological health of freshwaters across the state. Quantifying these relationships will enable conservation managers, policy makers and the public to evaluate the impact of conservation practices from a holistic ecosystem-wide perspective and consider whether a fuller range of potential benefits can be achieved by conservation measures that target the river network at the watershed scale as opposed to restoration or management practices that only target an individual stream reach or farm field. We will apply advanced statistical and machine-learning techniques to identify current biodiversity status, trends over time, and key drivers impacting aquatic ecosystems in Minnesota, including hotspots of degradation in the Twin Cities Metro Area and Minnesota River Basin. We will investigate the linkages between conservation practice implemented at the watershed scale, including wetlands and riparian buffers, and the biological conditions of streams. We will partner with The Freshwater Society to communicate our findings to legislators, watershed districts boards, relevant state and tribal agency management-level staff, and the public.

**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?**

Based on our analysis, we will develop information for managers and decision makers about the impact of wetlands, riparian buffers, and other drivers on biodiversity at a watershed scale, for watersheds across the state of Minnesota. This project will also compile the array of biological monitoring data available from different local, state and federal agencies into a comprehensive, accessible database for Minnesota streams. ENRTF funds will be used for educational purposes but not for any lobbying for recommended policy changes.

## 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: Assembly of existing biological monitoring data from local, state, and federal agencies into a single database

**Activity Budget:** \$125,005

**Activity Description:**

We will compile biological monitoring data for streams in Minnesota, including fish and insect data. A very large amount of such information exists that has not yet been brought together in one place to address the causes and effective solutions to streams exhibiting impaired biological health. Such data are collected by the MPCA, DNR, EPA, USGS, MetCouncil, and watershed management organizations. Working with agency partners, these data will be pre-processed and harmonized by identifying common freshwater species assessed across datasets. To assist in completing this sizeable data compilation task, our team is collaborating with a graduate student (Claire Bass) advised by Co-PI Finlay in the University of Minnesota's Ecology, Evolution and Behavior program. We will gather environmental data for sampled streams, including the vast wealth of water chemistry data available from state agencies and USGS. Once assembled, this dataset will represent a novel and highly valuable resource for researchers and practitioners to examine questions related to stream biodiversity, water quality and restoration. In collaboration with agencies who collected the data, we will make this database publicly available to support future research efforts. This activity is anticipated to occur over the first year of the project from July 2025-July 2026.

**Activity Milestones:**

Description	Approximate Completion Date
Assembly of biomonitoring datasets from relevant local, state, and federal agencies	January 31, 2026
Processing and harmonization of freshwater species data	May 31, 2026
Availability of statewide database for freshwater species to the public	July 31, 2026

### Activity 2: Analyze drivers of biological condition and freshwater species occurrence across the state of Minnesota

**Activity Budget:** \$75,632

**Activity Description:**

We will use compiled biological and environmental data sets together with statistical approaches to identify drivers of biological condition and the occurrence of freshwater species across Minnesota streams and rivers. We will explore statistical approaches for capturing temporal and spatial trends in biodiversity. We will also examine the relationship between two land-use practices currently under consideration by watershed managers – wetlands and riparian buffers – and biological outcomes at the watershed scale. This work will leverage our previous experience evaluating the impacts of wetlands and riparian practices on water-quality outcomes for streams and rivers across Minnesota. This work will culminate in the development of an interactive online web tool (using the web app R Shiny; <https://www.rstudio.com/products/shiny/>), where users can view data and examine relationships between environmental drivers and the biological health of Minnesota streams. This activity is anticipated to occur over the second and third year of the project from July 2026-January 2028.

**Activity Milestones:**

Description	Approximate Completion Date
Analysis of stream and river biological monitoring data	July 31, 2027
Creation of app for data viewing	January 31, 2028

### Activity 3: Communication of results to practitioners

**Activity Budget:** \$99,363

**Activity Description:**

Freshwater communications and education staff will distill salient research results into a high-level document and fact sheet for the purposes of communicating with legislators, watershed districts boards, and relevant, state and tribal agency management-level staff. Freshwater will share results with watershed districts and watershed management organizations through presentation of results at the Minnesota Association of Watershed Districts (December), the DNR Roundtable, and Minnesota Association of Soil and Water Conservation Districts annual conferences. Freshwater will also engage in one-on-one outreach to natural resource managers working for the Upper, Lower, and Shakopee Mdewakanton Sioux communities who manage reaches of the Minnesota River and its tributaries. Findings from the project will be incorporated into Minnesota Water Steward training modules. Minnesota Water Stewards is a community leadership development program that has partnered with 23 cities, counties, watersheds and nonprofits to train and certify 513 volunteers over 11 years. Graduates of the 9-month certificate program receive ongoing communication from Freshwater and convene annually. They work

**Activity Milestones:**

Description	Approximate Completion Date
Create high level summary of findings for communication to general audience	October 31, 2027
Present results to professionals in Natural Resource careers	December 31, 2027
Incorporate results into Minnesota Water Steward training modules	March 31, 2028
Communicate results to tribal natural resource managers in the Minnesota River watershed	June 30, 2028
Create and submit a manuscript describing project methods and findings for publication.	June 30, 2028

## Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Jacques Finlay	University of Minnesota	Co-Investigator - Finlay will contribute to study design, data analysis and communication of findings.	Yes
Carrie Jennings	Freshwater	Communications Support - Freshwater will help communicate results to stakeholders and partners across Minnesota.	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.**

This project involves compiling biological monitoring data for streams in Minnesota from multiple local, state and federal agencies including MPCA, DNR, EPA, USGS, MetCouncil, and watershed management organizations. Once assembled, this dataset will represent a novel and highly valuable resource for researchers and practitioners to examine questions related to stream biodiversity, water quality and restoration. In order to assure longevity and accessibility of this dataset, we will make this database publicly available in an open access data repository to support future research efforts. We will also consult with agency partners to ensure any sensitive information (such as the location of vulnerable fish species) is protected according to state and federal policy.

A second goal of this project is to identify potential drivers of biological conditions and the occurrence of freshwater species across Minnesota. To make data and exploration and our analyses more accessible to the public, we will develop an interactive online web tool (using the web app R Shiny; <https://www.rstudio.com/products/shiny/>), where users can view data and examine relationships between environmental drivers and the biological health of Minnesota streams.

To ensure results are being shared in ways that can practically impact stream conservation, Freshwater communications and education staff will distill salient research results into a high-level document and fact sheet for the purposes of communicating with legislators, watershed district boards, and relevant, state and tribal agency management-level staff. Freshwater will share results with watershed districts and watershed management organizations through presentation of results at the Minnesota Association of Watershed Districts (December), the DNR Roundtable, and Minnesota Association of Soil and Water Conservation Districts annual conferences. Freshwater will also engage in one-on-one outreach to natural resource managers working for the Upper, Lower, and Shakopee Mdewakanton Sioux communities who manage reaches of the Minnesota River and its tributaries. Findings from the project will be incorporated into Minnesota Water Steward training modules. Minnesota Water Stewards is a community leadership development program that has partnered with 23 cities, counties, watersheds and nonprofits to train and certify 513 volunteers over 11 years. Graduates of the 9-month certificate program receive ongoing communication from Freshwater and convene annually. They work with their local watershed districts to collaboratively identify water issues and engage their communities in actions to address them.

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?**

A publicly available and searchable database of biodiversity and environmental information will be permanently maintained by the University of Minnesota Data Repository (DRUM). This database will support future research investigating spatial and temporal drivers of ecosystem health. Findings from our research can be used to inform local, state and national funding and implementation priorities for conservation of Minnesota streams. This information can also be incorporated into existing biophysical models used to predict outcomes of management practices. We anticipate seeking additional state and federal funding in future to support the ongoing development of this knowledge.

## Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
<b>Personnel</b>								
Principal Investigator		Leads project team in accomplishing project objectives			37.1%	2.01		\$215,485
Co-PI		Advises on study design, data analysis, and dissemination of findings.			37.1%	0.33		\$63,811
							<b>Sub Total</b>	<b>\$279,296</b>
<b>Contracts and Services</b>								
Freshwater Society	Subaward	Freshwater communications and education staff will work with the project team to communicate project findings with legislators, watershed districts boards, state and tribal agency management-level staff, as well as the public through their Minnesota Water Steward program.				0.15		\$17,200
							<b>Sub Total</b>	<b>\$17,200</b>
<b>Equipment, Tools, and Supplies</b>								
							<b>Sub Total</b>	-
<b>Capital Expenditures</b>								
							<b>Sub Total</b>	-
<b>Acquisitions and Stewardship</b>								
							<b>Sub Total</b>	-
<b>Travel In Minnesota</b>								
							<b>Sub Total</b>	-



<b>Travel Outside Minnesota</b>								
							<b>Sub Total</b>	-
<b>Printing and Publication</b>								
	Publication	Publication of scientific findings in open access journals	To communicate findings to the scientific community and general public.					\$3,504
							<b>Sub Total</b>	<b>\$3,504</b>
<b>Other Expenses</b>								
							<b>Sub Total</b>	-
							<b>Grand Total</b>	<b>\$300,000</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
<b>State</b>				
			<b>State Sub Total</b>	-
<b>Non-State</b>				
In-Kind	University of Minnesota	Indirect costs associated with this proposal	Potential	\$164,000
			<b>Non State Sub Total</b>	<b>\$164,000</b>
			<b>Funds Total</b>	<b>\$164,000</b>

**Total Project Cost: \$464,000**

**This amount accurately reflects total project cost?**

Yes

## Attachments

### Required Attachments

#### *Visual Component*

File: [6ed24524-178.pdf](#)

#### *Alternate Text for Visual Component*

An image shows MPCA staff standing in a stream, a fish specimen, and MPCA's stream sampling manual. A map shows locations where stream biological data have been collected by MPCA. A flow diagram summarizes major project steps and outcomes. An illustration shows how biodiversity can be compared across watersheds....

### Supplemental Attachments

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

Title	File
UMN approval letter	<a href="#">ab641eef-0fc.pdf</a>
UMN approval letter for revised proposal	<a href="#">93a2fca9-7cc.pdf</a>
2025-150 Research Addendum revised_Final	<a href="#">e620ddf0-572.docx</a>

### Difference between Proposal and Work Plan

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

Dissemination Efforts section was added. On 2/6/25, we included the following revisions to address LCCMR staff comments: 1. Included a statement in the Narrative about the use of ENRTP for educational purposes; 2. Included a milestone in Activity 3 for creating a manuscript for publication; 3. Added minor changes to Activities and Milestones to include collaboration with a University of Minnesota graduate student in database compilation and the exploration of statistical approaches to explain spatial and temporal changes in biodiversity; 4. Included a statement in the Dissemination section a statement about acknowledgement of Environment and Natural Resources Trust Fund.

## 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?**

N/A

**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?**

Yes

**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:**

Jacques Finlay - University of Minnesota, Carrie Jennings - Freshwater, Michelle Stockness - Freshwater, Kris Meyer - Freshwater, Launa Shun - 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