



Environment and Natural Resources Trust Fund

M.L. 2024 Approved Work Plan

General Information

ID Number: 2024-023

Staff Lead: Lisa Bigaouette

Date this document submitted to LCCMR: June 10, 2024

Project Title: Supporting Minnesota Teachers to Implement Culturally Sustaining Environmental Education

Project Budget: \$295,000

Project Manager Information

Name: Seth Thompson

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Project Reporting

Date Work Plan Approved by LCCMR: June 20, 2024

Reporting Schedule: June 1 / December 1 of each year.

Project Completion: June 30, 2026

Final Report Due Date: August 14, 2026

Legal Information

Legal Citation: M.L. 2024, Chp. 83, Sec. 2, Subd. 05c

Appropriation Language: \$295,000 the second year is from the trust fund to the Board of Regents of the University of Minnesota to provide workshops across Minnesota to train middle school and high school teachers in how to meet new state science standards by integrating western science and Indigenous perspectives in sustainability and water conservation education.

Appropriation End Date: June 30, 2027

Narrative

Project Summary: To support teachers in addressing new science standards , we propose a series of workshops across Minnesota facilitating conversation about sustainability and water conservation, specifically integrating western science and Indigenous perspectives.

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

Water is a fundamental resource for supporting life and a central part of Minnesotan culture. Protecting Minnesota's water requires commitment from Minnesotans to take action and an examination of the fundamental relationship between humans and our environment. Indigenous communities across Minnesota have a long history of engagement with environmental conservation and sustainability, yet much of the science and education that informs Minnesota's approach to water conservation omits Indigenous knowledge and perspectives. Additionally, the recent revamping of the Minnesota State Science Standards included a number of new benchmarks related to teaching conservation perspectives of MN Tribes & communities. While this represents a significant step forward in ensuring that traditional knowledge and Indigenous ways of knowing are reflected in the teaching of Science for Minnesota youth, few teachers have been prepared to instruct their students on these topics. In particular, most teachers across MN have no formal training on Indigenous science philosophy, history, or methods, which makes instruction on the convergence of Indigenous science and Western science a challenge. To create an environmentally literate society that is equipped to protect Minnesota's waters, we must create and implement culturally supportive educational resources that help learners make informed choices that support sustainable natural resource management.

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.

Here we propose to unite multidisciplinary scientists with teachers and students to promote environmental literacy and intercultural understanding. Through culturally integrated environmental education, we will engage students in practices that emphasize sustaining tribal heritage alongside scientific advancement. To better support teachers in effectively meeting new standards and to create resources for science learning that highlights Indigenous Science knowledge, we propose to host a series of summer teacher professional development workshops for middle/high school science teachers across Minnesota. Teachers will consider the environmental impacts of human behaviors from multiple perspectives and grapple with the complexities of our relationship to natural ecosystems. We will further support these teachers during the school year with a culturally responsive curriculum and opportunities for field-based learning experiences to ensure that students have access to a culturally integrated science experience. By providing teacher support and integrated classroom education focused on protecting Minnesota's water, we aim to help cultivate a community that cares about the natural world and has the tools to protect it. This work will enhance the scientific literacy and environmental ethos of our communities, and build meaningful relationships with marginalized communities across Minnesota to engage in impactful environmental conservation.

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?

Achieving a future of sustainability for water resources requires committed community actions. Realizing this collective action depends on communities dedicated to environmental stewardship and possess a strong environmental ethos. This proposal will facilitate this through teacher workshops that highlight Indigenous perspectives on environmental sustainability in communities throughout the state. In total, we expect this project to directly engage ~80 middle/high school teachers resulting in curriculum delivery to 12,000 Minnesota youth over the two year project. This reach will have a cascading effect of building public environmental literacy as well as supporting ongoing dialogue on environmental sustainability across Minnesota.

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: Design and Deliver Teacher Workshops

Activity Budget: \$203,000

Activity Description:

We will host a series of annual 1-day workshops that use a combination of hands-on outdoor education with community-centered dialogue. We aim to develop and lead workshops covering four topics that are of critical importance to Minnesota's water resources: invasive species, climate change, urbanization and agriculture/industrial impacts. To align with the new Minnesota Science Standards, we will incorporate the three-dimensional learning framework that emphasizes science practices, disciplinary core ideas, and crosscutting concepts while also blending Indigenous funds of knowledge. By explicitly integrating these aims and perspectives, we will provide science educators with a more holistic knowledge base of both Indigenous science and practical applications of the new science standards. We propose to host four workshops per year (two workshops in the Twin Cities, one in Bemidji, and one in Duluth). We will recruit 10 teachers for each workshop in year one. In year two, each teacher will return and we will recruit 10 additional teachers per workshop (for 20 teachers total per workshop), creating mixed experience cohorts that will enhance collaborative learning. In total, we expect to work with 80 unique Minnesota teachers over the two years resulting in curricula delivering to at least 12,000 students.

Activity Milestones:

Description	Approximate Completion Date
Co-develop material for workshops with community leaders	December 31, 2024
Recruit 40 teacher participants for 1st workshop offering	April 30, 2025
Host 1st iteration of 4 professional development workshops	July 31, 2025
Recruit 2nd cohort of 40 teachers	May 31, 2026
Host 2nd interaction of 4 professional development workshops	June 30, 2026
Publish all workshop materials on project website for public dissemination	June 30, 2026

Activity 2: Delivery of Culturally Integrated Curriculum

Activity Budget: \$92,000

Activity Description:

Effective professional development (PD) for educators relies on approaches that support self-efficacy while also building meaningful relationships across participants. That method, called the professional learning community (PLC) model, has long been a standard used in education to support educator growth while also developing a cohort that learns from and supports one another. In relation to PD concepts that may be challenging, such as culturally responsive pedagogies, science educators need a scaffolded approach that both builds their understanding during initial training, and then follows-up with support throughout and after implementation. To support science teachers in this capacity, we will offer two pre-classroom implementation meetings with PLC groups to address concerns about the activities they will integrate into their instruction. Teachers will have an opportunity in those meetings to brainstorm and troubleshoot ideas with each other, as well as the PD leaders. Following implementation, teachers will also engage in two post-implementation meetings where they will debrief whether and how the activities were successful, thus aiding the revision process for future PDs. Undergraduate researchers will be available throughout the year to assist in data collection and analysis and help identify areas where teachers may need additional support.

Activity Milestones:

Description	Approximate Completion Date
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Assemble 4 Professional Learning Community Groups for first cohort of 40 teachers	July 31, 2025
Complete 2 pre-implementation meetings with each Professional Learning Community	December 31, 2025
Complete 2 post implementation meetings with each Professional Learning Community	May 31, 2026
Delivery of culturally sustaining curriculum to 12000 Minnesota students	May 31, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Hillary Barron	Bemidji State University	Co-PI; Barron will be responsible for facilitating partnerships with tribal colleges and community partners. She will also provide expertise in cultural responsiveness and educational best practices for the project.	Yes
James Cotner	University of Minnesota - College of Biological Sciences	Cotner is a Professor in the Department of Ecology, Evolution, and Behavior and will provide expertise in aquatic biogeochemistry and field ecology. He will advise on workshop development and implementation.	Yes
Katie Johnston-Goodstar	University of Minnesota - College of Education and Human Development	Johnston-Goodstar is an Associate Professor in the Department of Social Work and will provide expertise in indigenous youth development and advise on development and implementation of the teacher workshops.	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 propose to use a three-pronged dissemination plan to practitioners, education researchers, and Indigenous community stakeholders. This approach is aligned to the developmental nature of our project and will create separate dissemination pathways for the products developed during our design process and the broader knowledge generated from the iterative study of our products during the design process.

Dissemination of Curricula and Program Frameworks to the Practitioner Community

The primary audience for our dissemination of products will be teachers, administrators, and educational policy makers. We will leverage the vast networks of the project Co-PIs to disseminate our programming across the Twin Cities and Greater MN. This work will be based on relationship-centered conversations that aim to find alignment between our programming objectives and the needs of the educational users. Most locally, this will happen through annual project reports to all schools that are participating in our programming. These reports will be shared with participating teachers, their building administrators, and district administrators to inform the revisions and future directions of our work together.

More broadly, we will present our work at local meetings and workshops for middle and high school practitioners. Our research findings will be made available to Minnesota science educators through the Minnesota Science Teachers Association annual conferences (MnCOSE), and through resource portals with the Minnesota Department of Education. These pathways will provide a rich opportunity for developing relationships that would support future dissemination efforts and to broaden our recruitment base for future participants. All of our curricular materials (for both classroom programming and professional development programming) will be made freely available online at the end of the project so that they will be broadly accessible to users. While these materials don't represent the entirety of the intervention we are developing (as they do not replace the mentoring and sustained support), they do represent an entry point into partnership that we can make broadly available.

Dissemination of Research Findings to the Researcher Community

In addition to the products produced by this project, we anticipate to generate novel contributions to the knowledge-base on effective approaches for implementation of culturally sustaining environmental education. Our team is well positioned to distribute this information broadly to educational researchers through the publication of open access

research articles, presentations at research conferences, and through research networks. Findings will be disseminated across broader science education research spaces, such as the National Association for Research in Science Teaching (NARST) and the National Association for Science Teachers (NSTA). We anticipate sharing our findings related to students at the North American Association for Environment Education (NAAEE) annual conference, and in peer-reviewed journals such as Cultural Studies in Science Education and Journal of Research in Science Teaching.

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?

With this support, we will develop a scalable model of teacher professional development and curricular programming. We will pursue financial sustainability through state and federal grants and engage with the University of Minnesota Foundation to secure funding with local foundation partners. The data collected on sustainability pedagogies will also lead to additional research questions and we anticipate building upon the research in this proposal with future applications to the NSF Discovery PreK-12 program. Teacher toolkits and classroom curriculum will be made freely available online to increase dissemination and impact.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Academic Faculty		James Cotner, PhD, Co-PI: 8% paid effort (1 calendar month) the project. Cotner will be responsible for managing the scientific merit of the program and the alignment of outreach programming to most recent research in limnology and water conversation. Cotner will provide scientific mentorship and supervision for the summer graduate student			27%	0.08		\$14,000
Graduate Student		Graduate Student, TBD: 50% support for all project periods. The graduate student will collaborate with the Co-PIs to offer the summer workshop series and support the overall management of the proposed programming. calculation includes tuition			45%	1		\$107,000
Academic Faculty		Katie Johnston-Goodstar, PhD, Co-PI: 8% paid effort (1 calendar month) the project. Johnston-Goodstar will provide expertise in indigenous youth development and advise on development and implementation of the teacher workshops.			27%	0.08		\$14,000
Undergrad		Undergraduate research assistants are paid at a rate of 16.50 per hour and will support data collection and project implementation efforts.			0%	1		\$14,000
							Sub Total	\$149,000
Contracts and Services								
Bemidji State University	Sub award	Dr. Hillary Barron at Bemidji State will serve as the project Co-lead and provide exercise in teacher professional development and Indigenous pedagogy. Subaward will support 1 month of summer salary for Barron per year as well as support for undergraduate research assistants and mileage reimbursement for travel to workshops.				0.16		\$74,000
Community Member Honorarium	Professional or Technical Service Contract	We request funds to pay a stipend for an Indigenous community member to join the event facilitation team for each workshop. We budget for \$500 honoraria per person per workshop (8 in year 1 and				-		\$12,000

		16 in year 2). Co-facilitating this work with Indigenous community members is vital.							
								Sub Total	\$86,000
Equipment, Tools, and Supplies									
	Tools and Supplies	Consumable supplies (such as water quality testing reagents, plastic lab ware, sample bottles, etc) and classroom curriculum kits for teachers participating in the summer workshop. We budget for \$150 in supplies per participating teacher for a total of \$18,000 over the 2 year project.	Operational/Event Supplies						\$18,000
	Tools and Supplies	Curriculum Supplies to be purchased for teachers in support of their classroom activities implemented during the academic year. Budgeted at \$200 in classroom supplies for each participation teacher during the course of the project.	The purpose of these items are to allow teachers to implement the curriculum that is provided during the summer workshops in their classrooms after they participate in the teacher professional development workshops.						\$24,000
								Sub Total	\$42,000
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								
		Participant Support - Teacher Participants	We request \$150 per participating teacher to cover their cost of attendance at the workshops and follow up PLC meetings. Stipends will be provided as a direct one-time payment to teachers of \$150.					\$18,000
							Sub Total	\$18,000
							Grand Total	\$295,000

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				
In-Kind	Indirect costs associated with this proposal at 55% MTDC.	Indirect costs cover both facilities costs and administrative costs that are incurred by the University of Minnesota when conducting sponsored research, instruction, and public service projects.	Potential	\$108,877
In-Kind	Cost share and indirect for PI	PI will not be paid directly from funds for this grant, but will committing effort to make sure objectives of grant will be performed.	Secured	\$2,561
			State Sub Total	\$111,438
Non-State				
			Non State Sub Total	-
			Funds Total	\$111,438

Attachments

Required Attachments

Visual Component

File: [30ed6f1c-384.pdf](#)

Alternate Text for Visual Component

Figures representing the logic model guiding the proposed work as well as a conceptual diagram of the structure of summer workshops....

Supplemental Attachments

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

Title	File
Authorization to Submit from SPA	b8e1f034-e9e.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

In response to the requested updates we have made the following changes:

- 1) Adjusted the FTE information on Dr. Barron's budget to reflect her 1 month per year contribution
- 2) Have clarified participant support costs by breaking them into their individual components and rewriting the budget justification statements with more details.
- 3) Updated milestones to remove acronyms and make them measurable. Added milestones as suggested.
- 4) Updated the supplemental visual so it is on a single page.

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?

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?

Yes, Sponsored Projects Administration

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")?

Yes

Do you certify that background checks are performed for background check crimes, as defined in Minnesota Statutes, section 299C.61, Subd. 2, on all employees, contractors, and volunteers who have or may have access to a child to whom children's services are provided by your organization?

Yes