



# Environment and Natural Resources Trust Fund

## 2021 Request for Proposal

### General Information

**Proposal ID:** 2021-041

**Proposal Title:** Connecting Minnesotans to Water Through Environmental Education

### Project Manager Information

**Name:** Seth Thompson

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

**Office Telephone:** (605) 431-7747

**Email:** thom2587@umn.edu

### Project Basic Information

**Project Summary:** The primary goal of this project is to cultivate a new generation of environmental stewards by providing inquiry-based learning opportunities in the environmental sciences to Minnesotans across the state.

**Funds Requested:** \$287,000

**Proposed Project Completion:** 2023-06-30

**LCCMR Funding Category:** Environmental Education (C)

### 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

## Narrative

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

In the land of 10,000 lakes, clean water is a central part of the culture of Minnesota. By providing high-quality, inquiry-based educational programming focused on water for Minnesotans across the state, we help cultivate a community who cares about the natural world and has the tools, knowledge, and networks to protect it. Imagine the impact of learning about the importance of water quality, native and invasive aquatic species and water management by getting the opportunity to go scoop for macroinvertebrates, conduct water quality testing, and meet scientists who study water issues for a living! Ensuring the protection of Minnesota's waters into the future will be a team effort, requiring collaborations and partnerships between scientists, resource managers, and the general public. By providing access to hands-on environmental education, we will enhance the scientific literacy and environmental ethos of our communities, resulting in strong partnerships that better preserve Minnesota's natural resources.

### **What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.**

This proposal will enhance Minnesotans' connections to water by offering hands-on environmental education to over 30,000 Minnesotans. This will be accomplished by providing professional development to Minnesota teachers, implementing previously developed curriculum in middle/high school classrooms, and conducting community-based programming in counties across the state. By expanding current outreach programs in the College of Biological Sciences to more meaningfully engage communities outside of the Twin Cities, this proposal will greatly increase the College's ability to serve more Minnesotans. Currently, the College has primarily focused on providing opportunities for students within a 25 mile radius of the University of Minnesota campus because we rely heavily on equipment sharing and providing volunteers from the University of Minnesota. More recently however, we have started to explore the possibilities and logistics associated with expanding our programming to Greater Minnesota. Funding from this proposal would provide the opportunity for an expansion to Greater Minnesota, building community-based relationships between the College and Minnesotans across the state. We propose to target our expansion efforts by focusing on communities located near the College of Biological Sciences field stations in East Bethel and Itasca State Park.

### **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 provide training for 40 teachers, deliver environmentally focused curriculum to approximately 6000 new middle/high school students, and support community-based programming for more than 25000 Minnesotans.

Through our proposed programming, we will achieve the following goals:

- Bring science and scientists to community spaces across the state (Farmer's Markets, county fairs)
- Deliver hands-on learning in environmental science to start conversation between practicing scientists, students, and the public
- Provide professional development to a cohort of Minnesota's teachers to cultivate strong environmental mentors for their future students

## Activities and Milestones

### Activity 1: Professional Development Internship for K-12 Science Teachers

**Activity Budget:** \$42,500

**Activity Description:**

Our core teacher professional development is a 12-day summer program where teachers from partnering schools receive training in the areas of pedagogy, dialogue, nature of science, and environmental science. The program is developed specifically to increase teacher preparedness in implementing cutting-edge environmental modules in their classrooms. Nature of science training allows teachers to better understand the process of science and how scientific understandings are developed. Teachers then use this new understanding to bring high-level science into their own classrooms and develop a culture of scientific thinking in their schools. For this project, we will offer our full professional development program for teachers on the St. Paul campus of the University of Minnesota as well as an online version of our training with a full-day workshop at the Itasca Biological Stations and Laboratories and Cedar Creek Ecosystem Sciences Reserve. We will provide material support and access to scientific expertise for all participating teachers to run a water-quality based curriculum with their students following the completion of our professional development programming. Offer both a fully in person version and a hybrid online/workshop version of our teacher professional development should allow us to recruit teachers for across the state to participate.

**Activity Milestones:**

Description	Completion Date
Recruit 20 new teacher partners	2021-08-31
Recruit an additional 20 teacher partners	2022-08-31

### Activity 2: Providing Student-driven Classroom Activities for Students

**Activity Budget:** \$191,000

**Activity Description:**

Our environmental curriculum works by pairing stewardship experiences with inquiry-based environmental science. Students are engaged with an initial guided experience and use that experience to develop scientific questions related to the environment. In the guided experience, students would perform basic monitoring on a water body near their school (temperature, pH, oxygen, carbon, nitrogen, etc) or simply observe the different types of vegetation growing in a nearby wetland. We will collect and store all of the data that students generate and make them publicly available on the College website. This will allow us to build a network of middle/high school students that are engaging in our program and promote data sharing among participants. Students will be able to leverage this network to ask new scientific questions about how changing ecosystems may impact organisms and compare their water quality measurements from their own lake to other systems across the state. Throughout the second phase of the module, students work closely with scientist partners from the University of Minnesota (primarily undergraduate and graduate student interns) to plan and execute independent projects related to an environmental problem.

**Activity Milestones:**

Description	Completion Date
Establish the online data-sharing portal	2022-01-31
Provide science communication training for 10 undergraduate and 2 graduate research mentors	2022-06-30
Provide research-based environmental curriculum to ~2,000 new students	2022-06-30
Provide science communication training for an additional 12 research mentors	2023-06-30

Provide research-based environmental curriculum to an additional ~4,000 new students	2023-06-30
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**Activity 3: Community-based Programming Through Market Science**

**Activity Budget:** \$53,500

**Activity Description:**

Through the College’s Market Science program, we will collaborate with researchers to deliver hands-on outreach activities in communities across Greater Minnesota. By partnering with local community Farmer’s Markets and County Fairs, we will engage visitors with hands-on activities and promote informal conversations about the value of science in protecting Minnesota’s natural resources. With the funds requested here, we anticipate being able to support ~80 community events per year, with the majority of them happening outside of the Twin Cities metropolitan area. Similarly to our classroom programs, we will focus our expansion efforts on communities in close proximity to the College’s field stations and use our programming as an opportunity to connect communities to the research and conservation happening at the field stations. Additionally, we have made contacts with other UMN campuses (Morris, Duluth, Crookston, and Rochester) and will reach out MN State Universities to develop satellite Market Science groups to further support communities in Greater Minnesota. We will travel to their campuses to conduct one-day training workshops on Market Science establishment and science outreach and communication and provide supply and logistical support for programming during the project period.

**Activity Milestones:**

Description	Completion Date
Establish a Market Science presence in Greater Minnesota by hosting at least 30 new events	2022-01-31
Run 2 workshops for Market Science organization and training at satellite campuses	2022-06-30
Run 3 additional workshops for Market Science organization and training at satellite campuses	2023-06-30
Expand the Market Science presence in Greater Minnesota by hosting an additional 50 events	2023-06-30

## Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Lesley Knoll	College of Biological Science- Itasca Biological Station and Laboratories	Dr. Knoll is the station biologist at ISBL and will help facilitate connections with community partners in the area.	No
Caitlin Barale Potter	College of Biological Science- Cedar Creek Ecosystem Science Reserve	Dr. Potter is the education and outreach coordinator at the Cedar Creek field station and will help facilitate relationships with community partners in the area	No

## 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 be funded?**

The proposed project will promote Minnesotans' science literacy, excitement for environmental research, and appreciation for the role of environmental research in protecting Minnesota's natural resources. Direct interaction between researchers and thousands of citizens and students will make lasting impressions on individuals and contribute to informed communities. Sustaining these efforts long-term will require additional financial investments, but the College's outreach programs have a track record of varied and well-leveraged financial relationships. Our work has been supported through federal grants, local foundation grants, collegiate cost sharing, and broader impacts relationships with University of Minnesota Faculty on their own research grants.

## Project Manager and Organization Qualifications

**Project Manager Name:** Seth Thompson

**Job Title:** Outreach Programs Manager

**Provide description of the project manager's qualifications to manage the proposed project.**

Seth K. Thompson is the Outreach Program Manager for the College of Biological Sciences at the University of Minnesota and Co-Director of the College's Impact Exchange. He brings over a decade of experience in implementing public engagement and outreach programs to our team. Currently, he oversees the College's outreach programs, including the InSciEd Out Program Twin Cities hub, Market Science, and the SciSpark Scholars mentorship program. He has worked with the InSciEd Out program for over 5 years, developing programming from the ground up that now serve over 3,000 students annually in the Twin Cities with a focus on communities underrepresented in science. He has extensive experience working with K-12 teachers, having provided professional development programming for over 75 teacher partners and maintains strong connections with K-12 teachers and administrators across the Twin Cities. Under his leadership, the Market Science program hosted over 60 community events last year resulting in over 9,000 interactions with Minnesotans. Additionally, he has expertise in STEM education research and multiple publications relating to inquiry-based science education and STEM equity. He has mentored over 20 undergraduate researchers and several graduate students. His role in the proposed project is to oversee all programming by working with potential district partners, recruiting new teacher partners, supervising student staff (both graduate and undergraduate) and managing

the budget and administrative tasks of the proposed project. Details on his current projects and a list of publications can be found on his website (<http://thom2587.wixsite.com/sciencewithimpact>).

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

**Organization Description:**

The College of Biological Sciences encompasses the full breadth and depth of biology with departments and graduate programs spanning the discipline. In 2019, CBS enrolled 2,235 undergraduates and 279 graduate students and had 152 faculty. CBS research and programming were supported by over 2,000 active grants totaling over \$28 million in external funding, including awards from the National Institutes of Health, the National Science Foundation, and the U.S. Department of Agriculture, among others.

Earlier this year, the College launched the Impact Exchange to provide centralized support and vision for the College's outreach programs and foster a more holistic approach to community engagement. The Impact Exchange will serve as a multidisciplinary hub for innovation and training, leveraging the talents found across the University of Minnesota system to bring together experts in communication, design, and science to offer innovative training in science communication for members of the University of Minnesota community that will further support the community engagement and outreach mission. This newly formed "engagement ecosystem" provides the College with a centralized effort to connect with the broader community through public events and community-embedded programs.

## Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
<b>Personnel</b>								
Graduate Student (Academic Year)		The academic year graduate student will be mentored by SKT and will support the implementation of the project throughout the year. (Benefits include tuition.)			47%	0.74		\$88,835
Graduate Student (Summer)		Graduate students will help deliver summer programming across the state and provide support for teacher professional development programming. (3 students)			16.6%	0.74		\$51,115
Undergraduate Students (Academic Year)		Assuming a pay rate of 12.50 per hour for undergraduate students, we request support 10 students each academic year working 5 hours per week.			0%	1.92		\$50,000
Undergraduate Students (Summer)		80 hours per week of undergraduate student time to be split among several undergraduates supporting the summer programming and teacher professional development			0%	0.92		\$24,000
							<b>Sub Total</b>	<b>\$213,950</b>
<b>Contracts and Services</b>								
							<b>Sub Total</b>	<b>-</b>
<b>Equipment, Tools, and Supplies</b>								
	Tools and Supplies	Lab/Field Supplies: Chemistry Kit (\$375 x 20 x 2 years = \$15,000); Equipment Kit (\$375 x 20 x 2 years = \$15,000); Water Chemistry Testing Kit (\$375 x 20 = \$7,500)	Lab/Field supplies will be used to support the curriculum implementation and data collection from teachers in greater MN. In year 1, we will recruit 20 teachers to participate in professional development and each teacher will get an equipment kit (\$375) and water chemistry testing kit (\$375), for a total cost of \$15,000 in the first year. In					\$37,500

			year 2, we will recruit and additional 20 teachers that will each receive an equipment kit (\$375) and a chemistry test kit (\$375). Additionally, the 20 teachers that participated in the year 1 professional development will receive a chemistry testing kit (\$375) for a total of \$22,500 in year 2.					
	Tools and Supplies	Operational Supplies: Promotion and Dissemination - \$2,500 x 2 years = \$5,000; Summer Professional Development Programming - \$2,500 x 2 years = \$5,000; Community-based Programming - \$10,000 (\$125 per event X 80 events) x 2 years = \$20,000	We request \$15,000 in operational supplies for each year. This will cover promotional materials for public events featuring outreach programs (buttons, stickers, bookmarks, etc), supplies for professional development programs (consumables for activities, writing materials, etc), and activity-specific materials for community-based programming.	X				\$30,000
							<b>Sub Total</b>	<b>\$67,500</b>
<b>Capital Expenditures</b>								
							<b>Sub Total</b>	-
<b>Acquisitions and Stewardship</b>								
							<b>Sub Total</b>	-
<b>Travel In Minnesota</b>								
	Miles/ Meals/ Lodging	Mileage: \$2,775 per year	Travel costs associated with mileage reimbursement traveling to partner schools to support student programs and travel to community-based events. Based on current cost, we estimate this to be ~\$2,775 per year for the scope of programming we have proposed. Based on the current mileage rate of \$0.575 per mile and an average distance of 50 miles round					\$5,550



			trip, this would support ~90-100 trips per year covering 80 community events and ~20 trips to classroom partners per year.					
							<b>Sub Total</b>	<b>\$5,550</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>\$287,000</b>

## Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
<b>Equipment, Tools, and Supplies</b>		Operational Supplies: Promotion and Dissemination - \$2,500 x 2 years = \$5,000; Summer Professional Development Programming - \$2,500 x 2 years = \$5,000; Community-based Programming - \$10,000 (\$125 per event X 80 events) x 2 years = \$20,000	Promotional materials for public events featuring outreach programs are requested to strengthen the relationship building from community-based events. We have found that establishing a consistent presence in a community creates and enhanced sense of trust, so distributing branded materials during events to members of the community helps promote a sense of inclusion.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
<b>State</b>				
In-Kind	F&A costs associated with this project at 35% MTDC.	F&A 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	\$88,000
			<b>State Sub Total</b>	<b>\$88,000</b>
<b>Non-State</b>				
			<b>Non State Sub Total</b>	-
			<b>Funds Total</b>	<b>\$88,000</b>

## Attachments

### Required Attachments

#### *Visual Component*

File: [6a3da62a-fc0.pdf](#)

#### *Alternate Text for Visual Component*

Image gives a brief overview of the College of Biological Sciences core centers for outreach and public engagement.

### Optional Attachments

#### *Support Letter or Other*

Title	File
UMN SPA Approval	<a href="#">622f25ec-eb0.pdf</a>

## Administrative Use

**Does your project include restoration or acquisition of land rights?**

No

**Does your project have patent, royalties, or revenue potential?**

No

**Does your project include research?**

No

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

Yes, Sponsored Projects Administration

# Engagement & Outreach *at the College of Biological Sciences*

At the College of Biological Sciences, we've created an "engagement ecosystem" that integrates science communication, outreach and broader impacts. The Impact Exchange is the nexus for a range of activities that connect researchers and the community. Here are a few ways we reach people across Minnesota.



## **CBS Conservatory**

The CBS Conservatory & Botanical Collection provides students and community members with access to the most diverse collection of plants in the region.



## **Cedar Creek**

Thousands of K-12 students and members of the public visit Cedar Creek Ecosystem Science Reserve for a unique experience at the intersection of nature and ecology.



## **Itasca**

Itasca Biological Station and Laboratories is connecting University researchers with Itasca State Park visitors and community members through public programming.



## **Market Science**

Market Science is made up of volunteers who share science through hands-on learning activities and conversations with community members from diverse backgrounds.

**To learn more, go to [z.umn.edu/ImpactExchange](https://z.umn.edu/ImpactExchange)**

