



# Environment and Natural Resources Trust Fund

2022 Request for Proposal

## General Information

**Proposal ID:** 2022-083

**Proposal Title:** Connecting Minnesotans To Water Through Informal 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 informal hands-on learning opportunities in the environmental sciences to Minnesotans across the state.

**Funds Requested:** \$445,000

**Proposed Project Completion:** June 30 2025

**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 conducting community-based programming in counties across the state, innovative take home science kits for community members, and high-quality online learning modules that will be accessible to all Minnesotans with access to the internet. By scaling the infrastructure of the College of Biological Sciences Market Science program 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 learners 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 by leveraging partnerships with various stakeholders and developing portable learning materials that can better reach communities across the state.

### **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 support community-based programming for more than 30000 Minnesotans and 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
- Access to supported learning materials through innovative take home kits that allow families to engage with environmental learning together
- Create interactive online learning materials that can expose students to topics of water resource conservation and allow connections to be made between communities across the state.

## Activities and Milestones

### Activity 1: Community-based Programming Through Market Science

**Activity Budget:** \$245,000

**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
Run 2 workshops for Market Science organization and training at satellite campuses	June 30 2022
Expand the Market Science presence in Greater Minnesota by hosting an additional 50 events	June 30 2023
Establish a Market Science presence in Greater Minnesota by hosting at least 30 new events	January 31 2024
Run 3 additional workshops for Market Science organization and training at satellite campuses	June 30 2025

### Activity 2: Innovative Take-home Science Kits

**Activity Budget:** \$150,000

**Activity Description:**

To extend the reach of our informal education programs, we will create a series of science kits that will be distributed at our informal science events. Each year, we will create a series of 4 seasonal kits to engage learners with seasonally relevant topics of water quality. Kits will be composed of 3 core components: an art activity to explore a topic, an engineering component where learners use engineering principles to design a solution to a problem, and an experimental component where learners will complete a guided experiment to develop science process skills. For example, a summer take home kit may focus on the topic of eutrophication and harmful algal blooms. It could include coloring sheets of various species of phytoplankton to compare and contrast physical features. For engineering, it would supply materials to construct a filtration system to remove a "simulated toxin" and the guided experiment would have learners sample a near by water body and test where the algae form that system were nitrogen or phosphorus limited. We will also create an online portal where learners can report the results of their experiments and compare their findings to others from across the state.

**Activity Milestones:**

Description	Completion Date
Develop Kit content	December 31 2022
Create online portal for learners to record experimental data	July 31 2023
Complete first year of seasonal distribution	December 31 2023
Iteratively refine kits based on user feedback	June 30 2025

### Activity 3: Interactive Online Learning Materials for Environmental Conservation

**Activity Budget:** \$50,000

**Activity Description:**

During the COVID public health crisis, the Market Science program was forced to shift its operations to completely online delivery. While this represented a significant deviation from the traditional format of hands-on public engagement events, it did create an opportunity to pilot and test different methods for creating engagement in an online setting. We will take that learning to develop a new set of interactive online educational resources focused on water conservation. These resources will incorporate profiles of professional scientists that are engaged in research on water quality, which we have found to be an excellent resource for humanizing science and providing digital role models for students. In addition to the scientist profiles, we will create videos that further explain the scientific basis of the profiled scientists work. Finally, we will develop a pilot version of a "virtual market space" where we can host these materials and incorporate an element of interactive engagement with virtual visitors.

**Activity Milestones:**

Description	Completion Date
Recruit scientist for online profiles	December 31 2023
Complete video production related to featured scientists	June 30 2024
Finish pilot version of the digital market place for online engagement	June 30 2025

## 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 Minnesotans 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:** Director of Outreach

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

Seth K. Thompson is the Director of Outreach 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>								
Grad students (academic)		50% academic support for all project periods for a graduate student coordinator. The program coordinator will be responsible for the day to day operations of the proposed programming including scheduling events, support activity design, attending events, and managing undergraduate students. The coordinator will be supervised and mentor by Director of Outreach Seth Thompson.			62%	1.5		\$212,000
Graduate Student (Summer)		50% academic support for all project periods for a graduate student coordinator. The program coordinator will be responsible for the day to day operations of the proposed programming including scheduling events, support activity design, attending events, and managing undergraduate students. The coordinator will be supervised and mentor by Director of Outreach Seth Thompson. Three additional 25% appointments for graduate student support staff are requested for each project period. These graduate students will create learning activities, participate in events, and support the development of the science kits. These graduate students will receive supervision and mentorship from the Director of Outreach.			20%	3.75		\$96,000
Undergraduate students (Academic)		Undergraduate students (academic): Assuming a pay rate of \$15 per hour for undergraduate students, we request support for 20 hours per week in all project years. These hours would be distributed among 2 or 3 undergraduate students that would be recruited to participate in our outreach events and support the assembly and distribution of science kits.			0%	0.93		\$30,000
Undergraduate students (Summer)		40 hours per week of undergraduate student time to be split among 1-2 undergraduates to help deliver public engagement events, distribute science kits, and support the development of the online materials.			0%	0.93		\$30,000

							<b>Sub Total</b>	<b>\$368,000</b>
<b>Contracts and Services</b>								
University Printing	Internal services or fees (uncommon)	We request \$15,000 for professional design services in the first year to create the custom designed science take home kits. This would include graphic design for the box, information sheets, materials labels, etc.				-		\$15,000
							<b>Sub Total</b>	<b>\$15,000</b>
<b>Equipment, Tools, and Supplies</b>								
	Tools and Supplies	Lab and Field Supplies	\$14,000 per year to support consumable supplies for outreach events, budgeted at \$100 per event for 60 events. These will include lab reagents, water quality sampling supplies, filters, etc. We also request \$8,000 per year to create take home science kits. We plan to release 4 unique kits per year with 100 of each kit. We estimate the cost per kit to be \$20.					\$42,000
							<b>Sub Total</b>	<b>\$42,000</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	We request milage reimbursement to cover travel to program events. We have budgeted for 60 events per year with 40 events in outstate MN averaging						\$19,000



		250 round trip miles and 20 events in the greater metropolitan area averaging 50 round trip miles.						
							<b>Sub Total</b>	<b>\$19,000</b>
<b>Travel Outside Minnesota</b>								
							<b>Sub Total</b>	-
<b>Printing and Publication</b>								
	Printing	\$333 per year to cover the printing costs associate with program materials and science kits.	items include kit instructions, educational handouts, worksheets, etc.					\$1,000
							<b>Sub Total</b>	<b>\$1,000</b>
<b>Other Expenses</b>								
							<b>Sub Total</b>	-
							<b>Grand Total</b>	<b>\$445,000</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>				
In-Kind	Indirect costs associated with this proposal at 35% 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	\$125,242
			<b>State Sub Total</b>	<b>\$125,242</b>
<b>Non-State</b>				
			<b>Non State Sub Total</b>	-
			<b>Funds Total</b>	<b>\$125,242</b>

## Attachments

### Required Attachments

#### *Visual Component*

File: [ed5ef911-a1b.pdf](#)

#### *Alternate Text for Visual Component*

A 1-page flyer showing the programmatic reach of the Market Science program including growth in program size up to 2019. Data from 2020 is not included because the COVID 19 public health crisis caused us to cancel our traditional Market Science season that year....

## Administrative Use

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

No

**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?**

No

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

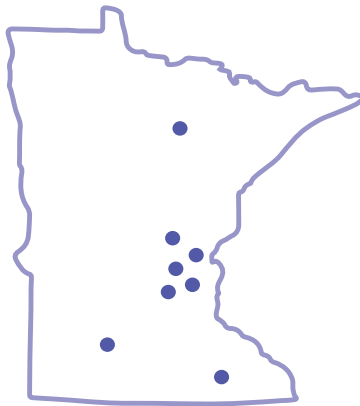
Yes, Sponsored Projects Administration

# market science

marketsci.org

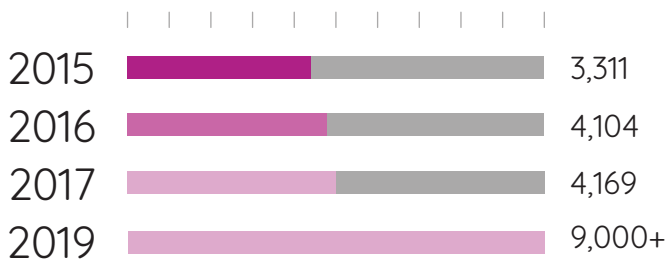
**MISSION:** To start active and lively conversations between research scientists and community members, encourage ongoing engagement, and increase awareness of the role science and technology play in our communities. Connecting Minnesotans to environmental research at the farmers market.

6  
years



15+  
locations  
throughout  
minnesota

17,000 visitors over the past three seasons



200 Minnesota volunteer scientists sharing their research in 2019



75+ new scientific topics to explore for the upcoming season



