Environment and Natural Resources Trust Fund
2019 Request for Proposals (RFP)

Project Title: **ENRTF ID: 139-CH**

Water-Focused Education Across Rural and Urban Communities

Category: H. Proposals seeking $200,000 or less in funding

Sub-Category: C. Environmental Education

Total Project Budget: $ 190,000

Proposed Project Time Period for the Funding Requested: June 30, 2022 (3 yrs)

Summary:

Combine the expertise of two established Minnesotan science education entities to provide paired hands-on classroom/outdoor experiences that build a water-focused conservation ethic for 8500 urban and rural students and teachers.

Name: Caitlin Potter

Sponsoring Organization: U of MN - Cedar Creek Ecosystem Science Reserve

Title: Education and Outreach Coordinator

Department: College of Biological Sciences

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Location

Region: Statewide, Central, Metro

County Name: Statewide, Anoka, Hennepin, Isanti, Mille Lacs, Ramsey, Washington

City / Township:

Alternate Text for Visual:

Proposed cycle of paired classroom/outdoors experience. Students learn in their classroom, then observe outdoors on a field trip, get in the water to collect real data, and then return inside to analyze and interpret their own data.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____%
____ If under $200,000, waive presentation?			

PROJECT TITLE: Water-Focused Education Across Rural and Urban Communities

I. PROJECT STATEMENT

In the land of 10,000 lakes, clean water is a vital issue for all Minnesotans and transcends established divides between rural and urban communities. Unfortunately, a lack of access to high-quality water education also transcends these divides. Urban students are often limited by access to outdoor natural areas, which hinders their ability to connect with nature and understand how natural systems impact their lives. In contrast, rural students are often familiar with the natural world, but lack access to the scientific expertise of the University of MN and its environmental mentors and programs. Our project will address these barriers through innovative programs that meet the unique needs of students and teachers from both populations. Over the planned three year project, we will provide outdoor learning experiences for 4,000 students from both urban and rural school districts and offer professional development workshops for 45 teachers from outstate Minnesota, training them as environmental mentors and educators for an additional 4,500 rural students statewide.

This project will leverage the personnel and resources of two established Minnesotan science education entities: the Integrated Science Education and Outreach program (InSciEd Out) and Cedar Creek Ecosystem Science Reserve (Cedar Creek). InSciEd Out began in Rochester and has expanded recently to the Twin Cities where it provides authentic science experiences to underrepresented and low socioeconomic status students in the West St. Paul, Richfield, and White Bear Lake school districts as well as professional development training for their teachers. Cedar Creek is a University of MN ecological field station located in rural Isanti and Anoka County with a long history of scientific research and an established presence in the St. Francis, Cambridge-Isanti, Mora, Anoka-Hennepin, Minneapolis and Brooklyn Center school districts. Collectively, our two organizations have strong connections in underserved school districts in both the Metro area and outstate, and school partners who have expressed the need for this type of integrated program for their students.

Specifically, our outcomes over three years will be: 1) to deliver water-focused outdoor learning experiences to 2400 urban elementary students, 2) to enhance access to aquatic science expertise for 1600 rural elementary students, and 3) to provide professional development and education resources to 45 teachers from outstate Minnesotan communities, creating strong environmental mentors for an additional 4500 rural students.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: *Bring underserved urban students to Cedar Creek to work with scientists and conduct hands-on field investigations about water.* **BUDGET: $ 113,250**

InSciEd Out delivers research-based environmental education to underserved urban K-12 students in the Twin Cities metropolitan area, but does not currently incorporate outdoor learning experiences in any of its programs. We will integrate Cedar Creek's long-running field trip programs into this urban, in-classroom curriculum by adding water-focused field learning for ~800 students per year, with an initial focus on 2nd and 5th grades. These students will participate in authentic science activities such as collecting water samples, measuring water chemistry, and interpreting data from water quality sensors. We will also integrate an outdoor experience into existing InSciEd Out teacher professional development (~20 teachers annually) to better prepare teachers to serve as environmental role models for their students. Funding will cover the cost of a postdoctoral research associate to oversee this integration and provide teacher and student training. Funding will also cover the cost of bus transportation and program fees for students visiting Cedar Creek on field trips and will pay for field equipment designed for student use (e.g. waders, nets, sensors).

Outcome	Completion Date
1. Integrate outdoor education into InSciEd Out teacher professional development and provide training for 20 teachers annually	*August 2020*
2. Provide outdoor educational field trips for urban students (~800 students per year;	*June 2021*

~2400 students total)	

Activity 2: *Enhance science education about water for rural students and teachers, both in and out of the classroom.* **BUDGET: $76,750**

Cedar Creek serves many rural schools who have access to the outdoors (students come from communites that hunt, fish and farm) but limited exposure to scientific expertise and the educational resources available to urban schools, particularly in the elementary grade levels. We will work with ~530 K-5 students from the St. Francis and Cambridge-Isanti school districts annually in a mix of on-site field trips as described above and in-school experiences that bring scientists, expertise and equipment into classrooms. Additionally, the project managers will organize and deliver summer professional development workshops to 15 outstate teachers each year. These workshops will bring teachers from outside our current networks to Cedar Creek to learn strategies to effectively deliver our lessons in their home districts and will receive a take-home kit with basic water sampling equipment and supplies to implement lessons. Funding will cover the cost of a postdoctoral research associate to oversee this expansion, and will pay for equipment used by students in in-classroom programs (e.g. microscopes and a Turner Designs Trilogy Fluorometer**)** and in take-home teacher kits (e.g. water quality test kits, plankton nets)

Outcome	Completion Date
1. Provide research-based environmental curriculum to rural districts in Isanti, Chisago, Sherburne, and Mille Lacs counties (~530 students annually, ~1600 students total).	*December 2021*
2. Provide professional development for teachers from outstate Minnesota to create strong environmental role models for rural students (~15 teachers annually, ~45 teachers total reaching ~4,500 total students).	*August 2022*

III. PROJECT PARTNERS:

A. Partners receiving ENRTF funding

Dr. Caitlin Potter (Education and Outreach Coordinator at Cedar Creek Ecosystem Science Reserve) and Seth Thompson (Postdoctoral Associate) will serve as the project managers for the 3-year project.

B. Partners NOT receiving ENRTF funding

Dr. Chris Pierret is the Program Director for the InSciEd Out and Assistant Professor at the Mayo Clinic in Rochester MN and provides programmatic support for all InSciEd Out classroom programs. Dr. James Cotner is a Professor in Ecology, Evolution, and Behavior at the University of Minnesota and contributes additional expertise in aquatic ecology as well as funding supporting current InSciEd Out programming in the Twin Cities.

IV. LONG-TERM- IMPLEMENTATION AND FUNDING:

Funding from this proposal will provide the start-up costs necessary to purchase equipment that can support this programming for many years after the proposed funding period. We will work with the existing and future InSciEd Out partner schools to include bussing costs and station fees for their students into the programmatic costs InSciEd Out. This will provide a sustainable funding stream for bring students to the field station. Cedar Creek will also continue to apply for additional funds (from federal agencies and local partners) to help subsidize outreach activities for school partners that need it.

V. TIMELINE REQUIREMENTS:

This project will be completed over a three year period. The first year will focus on providing outdoor experiences to urban students from Richfield and West St. Paul. This will continue in years 2 and 3, with an added focus of enhancing the environmental and science education of rural students and teachers in districts outside of the metropolitan area.

2019 Proposal Budget Spreadsheet

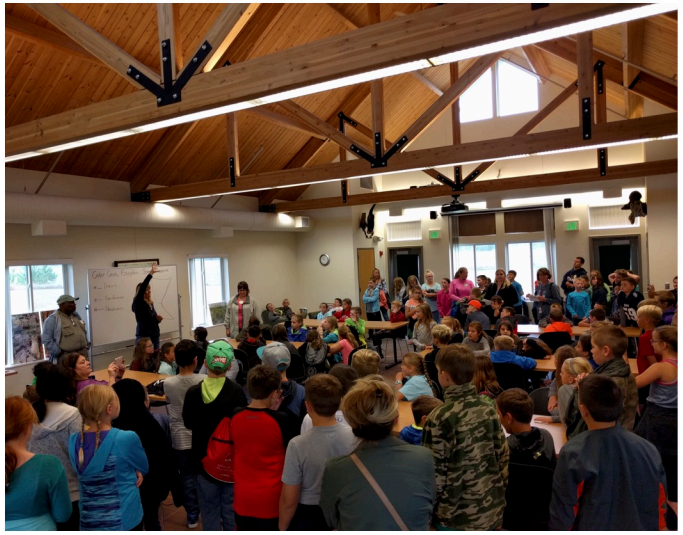
Project Title: Water-Focused Education Across Rural and Urban Communities

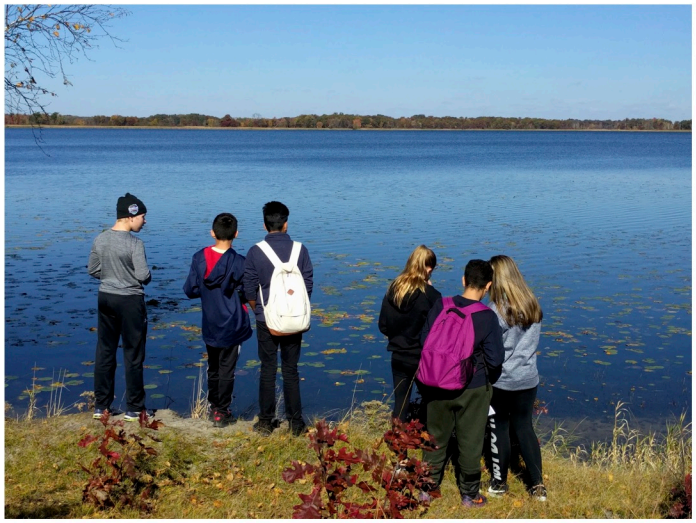
IV. TOTAL ENRTF REQUEST BUDGET 3 years

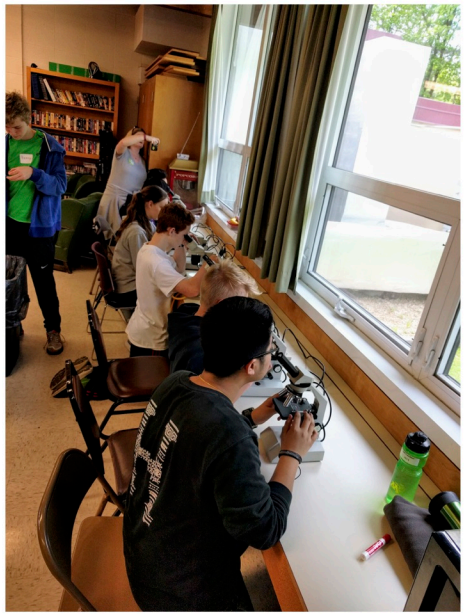
BUDGET ITEM	AMOUNT
Personnel: Seth Thompson, InSciEd Out Twin Cities leader and UMN postdoctoral research associate, 100% FTE (82% salary/18% fringe) for 2 years to train teachers, develop and lead in-classroom programming, and develop and assist with field trip programming ($60,500 per year for two years; $121,000 total).	**$ 121,000**
Professional/Technical/Service Contracts:	$ -
Equipment/Tools/Supplies:	**$ 32,000**
Water sampling equipment for student programming including secchi disks, ground water sampling pump, sampling bottles, and plankton nets, and cart to transport to sampling sites. ($4500 total)	
Classroom set of waders for students to do stream sampling (25 waders at $200 each; $5000 total)	
Classroom set of digital camera microscopes (10 scopes at $200 each; $2000 total) for students to view water samples	
Consumable supplies for student water quality testing and sample processing on field trips ($2,500 per year for three years of the project; $7500 total)	
Turner Designs Trilogy Fluorometer with classroom modules to measure chlorophyll, dissolved nurtients, and turbity for student experiments in schools ($12,000)	
Plankton nets, secchi disks, consumable water quality test supplies for teacher kits ($333 per year for three years; $1000 total)	
Acquisition (Fee Title or Permanent Easements):	$ -
Travel:	
Additional Budget Items: Cost of schoolbus rental and program fees to bring 800 students and their teachers to Cedar Creek from the Twin Cities each year for three years	**$ 37,000**
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	**$ 190,000**

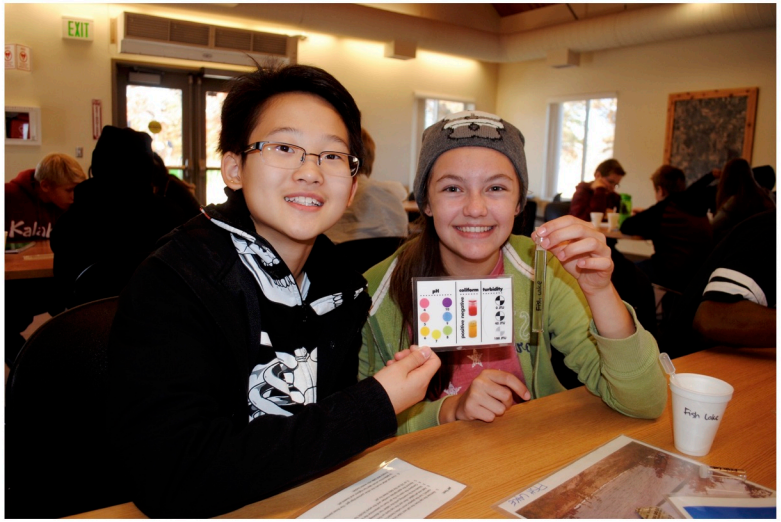
V. OTHER FUNDS *(This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)*

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ To Be Applied To Project During Project Period:		
Other State $ To Be Applied To Project During Project Period:		
In-kind Services To Be Applied To Project During Project Period: Indirect costs associated with this project waived by University of Minnesota	**$ 89,000**	*Secured*
Past and Current ENRTF Appropriation:	**N/A**	
Other Funding History: Funding provided by the National Institutes of Health Science Education Partnership Award to establish an Environmental Science based InSciEd Out hub in the Twin Cities. Money covered initial hub construction and program implementation from 2016-2018 including teacher trainings, classroom support, and curriculum development	**$ 255,000**	*Spent on previous years programing*









Our project will build a cycle of learning that instills a love and appreciation for water and science to both urban and rural Minnesotan students. ~800 urban students who already receive in-classroom water programming will come to Cedar Creek for field experiences annually. ~530 rural students who already visit Cedar Creek on field trips will receive enhanced in-classroom programming annually. Cohorts of ~15 outstate teachers will be trained and equipped each year to deliver this integrated experience in their own districts.

Project Manager Qualifications
Dr. Caitlin Potter is the education and outreach coordinator at Cedar Creek Ecosystem Science Reserve. Her background is in scientific research and field ecology, and she has been involved in science education and outreach since age 12. She develops and directs Cedar Creek's education programs, including on-site field trips, in-school programming, educator professional development workshops and science communication courses. She also leads several citizen science research projects at Cedar Creek and is experienced at connecting non-scientists and budding scientists to data and field research. Her role on the proposed project will be to manage the Cedar Creek side of Activity 1 and 2 and to oversee the entire project.

Seth Thompson is a current graduate student, transitioning to a postdoctoral associate in the College of Biological Sciences at the University of Minnesota in 2019. He is currently the leader of the InSciEd Out Program Twin Cities hub. He has experience in studying freshwater ecosystems, particularly with respect to issues related to nutrient cycling. He also has worked with the InSciEd Out program for over 5 years, helping develop a K-10 environmental science curriculum based on student-led inquiry. He has trained over 60 teachers in the Twin Cities area and supported programming for over 6,000 students over this time period. His role on the proposed project will be to execute the specifics of Activity 1 and 2, particularly in terms of managing the integration of project partners and the training of staff and students.

Organizational Description
Cedar Creek Ecosystem Science Reserve (Cedar Creek): Cedar Creek is a University of Minnesota field research station known world-wide for its contributions to modern ecology, biodiversity research, and the long-term consequences of human-driven environmental change. Its property contains natural habitats representing all three of Minnesota's biomes. These two facets make it an ideal location for students of all ages to study and explore the world around them. Through our K-12 education programs, approximately 5000 students interact with Cedar Creek scientists, research and facilities annually to learn ecology through hands-on field investigations. Additionally, we hold regular educator professional development workshops to help teachers bring our science to life in their classrooms. Our overarching goal is to be an inspiring catalyst and outstanding resource for lifelong science education in Minnesota, and to help our community better understand scientific principles, processes and concepts. Research into aquatic systems has been part of Cedar Creek's identity since the 1930s, so is an easy and obvious area to integrate into our education programs.

Integrated Science Education and Outreach (InSciEd Out) Twin Cities: InSciEd Out is an evidence-based K-10 science program that empowers young learners to investigate society's most pressing environmental health issues, so they can ignite measurable and sustainable changes in the health and wellness of their families and communities. An undertaking of this magnitude is possible because InSciEd Out partner schools share our vision for transforming the classroom into an incubator for innovation. Through summer internships with University of Minnesota and Mayo Clinic scientists, teachers from all disciplines in a single school receive expert training in research methodology and hands-on, environment-related curriculum that immerses students in scientific inquiry throughout the school day. The result is a community of learners who see themselves as scientists, asking questions and uncovering evidence to support a wide array of hypotheses. As educators, we strive to see students excel — not just academically, but personally and socially so they can achieve their true potential. Increasingly, excelling in tomorrow's workforce will require critical thinking skills, scientific curiosity, and technological aptitude. By demystifying science and instilling healthy behaviors, InSciEd Out encourages students to reach new heights and open the door to their future.