

Environment and Natural Resources Trust Fund
2014 Request for Proposals (RFP)

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Project Title:

Making a Splash in Water Resources Education

Category: C. Environmental Education

Total Project Budget: \$ 160,000

Proposed Project Time Period for the Funding Requested: 3 Years, July 2014 - June 2017

Other Non-State Funds: \$ 0

Summary:

Improve our students' appreciation for and understanding of Minnesota's water resources, and inspire their interest in pursuing science toward a potential career in natural resources.

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Sponsoring Organization: U of MN

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Location

Region: Metro

County Name: Anoka, Chisago, Hennepin, Isanti, Ramsey, Washington

City / Township: Minneapolis and St. Paul

MP: 0613-2-194-proposa

Budget: 0613-2-194-bud

Qual: 0613-2-194-qualifi

Map: 0613-2-194-map-U

Resolution:

List:

	Funding Priorities	Multiple Benefits	Outcomes	Knowledge
Base				
	Extent of Impact	Innovation	Scientific/Tech Basis	Urgency
	Capacity Readiness	Leverage	Employment	TOTAL



PROJECT TITLE: Making a Splash in Water Resources Education

I. PROJECT STATEMENT

WHY: Inspiring our Twin Cities youth to pursue careers in natural resources is our ultimate goal. Our project will directly impact 1,500 or more Twin Cities area students and 30 of their teachers through high-intensity summer workshops and hands-on field explorations of key urban and rural watershed sites. We intend to enhance student appreciation for and understanding of ecology and earth sciences—required of professional scientists and managers—and inspire interest in pursuing science in post-secondary education toward a potential career.

The Minnesota Dept. of Employment & Economic Development predicts that our need for trained natural resources professionals will grow by 15-20% over the next ten years to meet the demand for “green” technologies and better solutions to our resource management, particularly water resources. However, national studies indicate a disturbing trend toward fewer students pursuing science and technology in college and career. Only 23% of our undergraduates pursue science related fields; of those 48% (57% of minorities) leave science to pursue other disciplines and careers. We intend to help reform this downward trend in natural resources career pathways by: 1) Providing rigorous science teacher professional development to help them better prepare their students; this is in keeping with the Minnesota Dept. of Education’s *Math and Science Teacher Academy* strategy; 2) Providing students with experiences that demonstrate what a career in science and natural resources may entail.

- GOALS:**
- A) Improve public school teachers’ effectiveness in teaching ecology and earth systems science.
 - B) Improve students’ appreciation for and understanding of ecology and earth systems science.
 - C) Inspire students’ interest in pursuing science and natural resources career pathways.

OUTCOMES: We will serve secondary-level public schools located in the school districts within the urban core of Minneapolis and St. Paul, and the ex-urban and rural areas of Anoka, Washington, Chisago, and Isanti counties.

HOW: Empowering teachers with sound, inquiry-based curriculum and pedagogy, and integrating science with hands-on field experiences is the core of our approach. Studying water resources, varying from nearly pristine rural to severely impaired urban watersheds, will bring context and relevance to students’ learning. *Key activities:*

- Professional development workshops for 30 public school teachers emphasizing ecology and earth science.
- Field trips for 1,500 middle/high school students to urban and rural sites with managed water resources.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Environmental Science Workshops for Science Teachers **Budget: \$40,000**

We will conduct one-week professional development workshops for 30 science teachers, focusing on ecology and earth sciences—part of the University’s successful “Ecology for Educators” curriculum. The workshop will focus on a variety of environmental science content, concepts, laboratory and field skills that teachers are required to address when teaching key components of Life Science and Earth Science curricula in Minnesota public schools. Topics include a survey of general ecosystem and community level ecological principles, with an emphasis on energy flow, nutrient cycling and how natural disturbances and human impacts potentially affect the environment. Scientific methodology, field observation and experimental techniques are incorporated in a hands-on manner to illustrate principles. A trip to St. Anthony Falls Laboratory will demonstrate research conducted on an experimental watershed, and teachers will learn to use a mobile stream lab for classroom use. A competitive application process, with a scholarship award incentive, will be used to recruit and select teachers based on their demonstrated ability to effectively teach science and inspire students to pursue science-based careers.



Outcome	Completion Date
1. Provide five-day ecology & earth science workshop for 1st group of 10 teachers.	August, 2014
2. Provide five-day ecology & earth science workshop for 2nd group of 10 teachers.	August, 2015
3. Provide five-day ecology & earth science workshop for 3rd group of 10 teachers.	August, 2016

Activity 2: Water Resource Discovery Field Trips for Science Students Budget: \$120,000

We will conduct full-day outdoor field trips for at least 1,500 of our teachers’ students. One trip will be to University of Minnesota’s Cedar Creek Ecosystem Science Reserve (providing a rural watershed experience) and the other to Minnehaha Creek (providing an urban watershed experience). Typically, we will conduct twelve field trips during the Fall and eight during the Spring semesters each project year for a total of 60 field trips. We will encourage teachers to involve at least two to three classes, ranging from at least 50 to 75 students per visit and have the same students participate in both field site experiences. Activities will include discussions with site scientists and managers about careers in natural resources and current issues related to natural and human impacts on our water resources. Our instructors will teach students field-based scientific methods and assessment techniques, and guide students toward asking a scientific question addressing an ecosystem health issue. Examples of specific inquiries include: 1) water quality of rural vs. urban watersheds; 2) biodiversity in freshwater lakes and wetlands; and 3) sources of groundwater contamination and potential solutions.

Outcome	Completion Date
1. Provide water resource discovery field trips for 1st group of at least 500 school students.	June, 2015
2. Provide water resource discovery field trips for 2nd group of at least 500 school students.	June, 2016
2. Provide water resource discovery field trips for 3rd group of at least 500 school students.	June, 2017

III. PROJECT STRATEGY

A. Project Team/Partners

University of Minnesota: (*RECEIVE & IN-KIND*).

Cedar Creek Ecosystem Science Reserve: Jeffrey Corney, Managing Director & Adjunct Professor of Ecology [Project Manager & Instructor]; Mary Spivey, Education Coordinator [Lead Project Coordinator & Instructor].

St. Anthony Falls Laboratory: Jess Kozarek and Barbara Heitkamp, Research Associates [Instructors].

STEM Education Center: Gillian Roehrig, Associate Professor of Education [Project Evaluator].

Minnehaha Creek Watershed District: (*IN-KIND*).

Leslie Yetka, Education Manager; and volunteers from the Master Water Stewards program [Instructors].

Public School Districts: (*RECEIVE & PARTICIPATE - Teachers & Students*).

Minneapolis, St. Paul, Anoka-Hennepin, Elk River, St. Francis, Cambridge-Isanti, Chisago Lakes, and Forest Lake [Selected secondary-level Science Teachers and their current Students will participate in activities].

B. Timeline Requirements

This project requires a three-year funding period (July, 2014 – June, 2017) to effectively conduct the workshops and field trips for our target number of participants during optimal field conditions and within school semesters.

C. Long-Term Strategy and Future Funding Needs

This project is specifically designed to establish a permanent and self-sustaining partnership among higher education and public schools participants in the Greater Twin Cities area. Training and supporting a cohort of science teachers will help insure that curricula and methods continue to be shared and utilized. The University of Minnesota’s partners will continue, beyond the funding period, to provide leadership and oversight for this project, to monitor and evaluate its effectiveness, and pursue other funding sources to expand its scope and scale.

2014 Detailed Project Budget

PROJECT TITLE: Making a Splash in Water Resources Education

IV. TOTAL ENRTF REQUEST BUDGET 3 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel:	
Lead Project Instructor & Coordinator from Cedar Creek Ecosystem Science Reserve for Workshops and Field Trips @ 20% FTE salary for 3 years w/ 36.8% fringe for one (1) position.	\$ 35,000
Site Instructor from St. Anthony Falls Laboratory for Workshops and Field Trips @ 4% FTE salary for 3 years w/ 33.6% fringe for one (1) position.	\$ 9,000
Field Instructors for Workshops and Field Trips @ 25% FTE salary for 3 years w/ 36.8% fringe for two (2) new positions.	\$ 67,000
Contracts:	
District school bus service to transport students to project field sites (Cedar Creek & Minnehaha Creek) for 60 field trips @ \$400 per trip.	\$ 24,000
Equipment/Tools/Supplies:	
Instructional supplies (e.g. field investigation kits, curriculum material, mobile stream table consumables, etc.)	\$ 9,000
Travel:	
In-state travel by UMN staff between Twin Cities field sites and Cedar Creek, approximately 30 trips averaging 75-miles RT @ \$0.565/mile.	\$ 1,000
Additional Budget Items:	
Scholarship award for 30 teachers for project participation @ \$500 each.	\$ 15,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 160,000

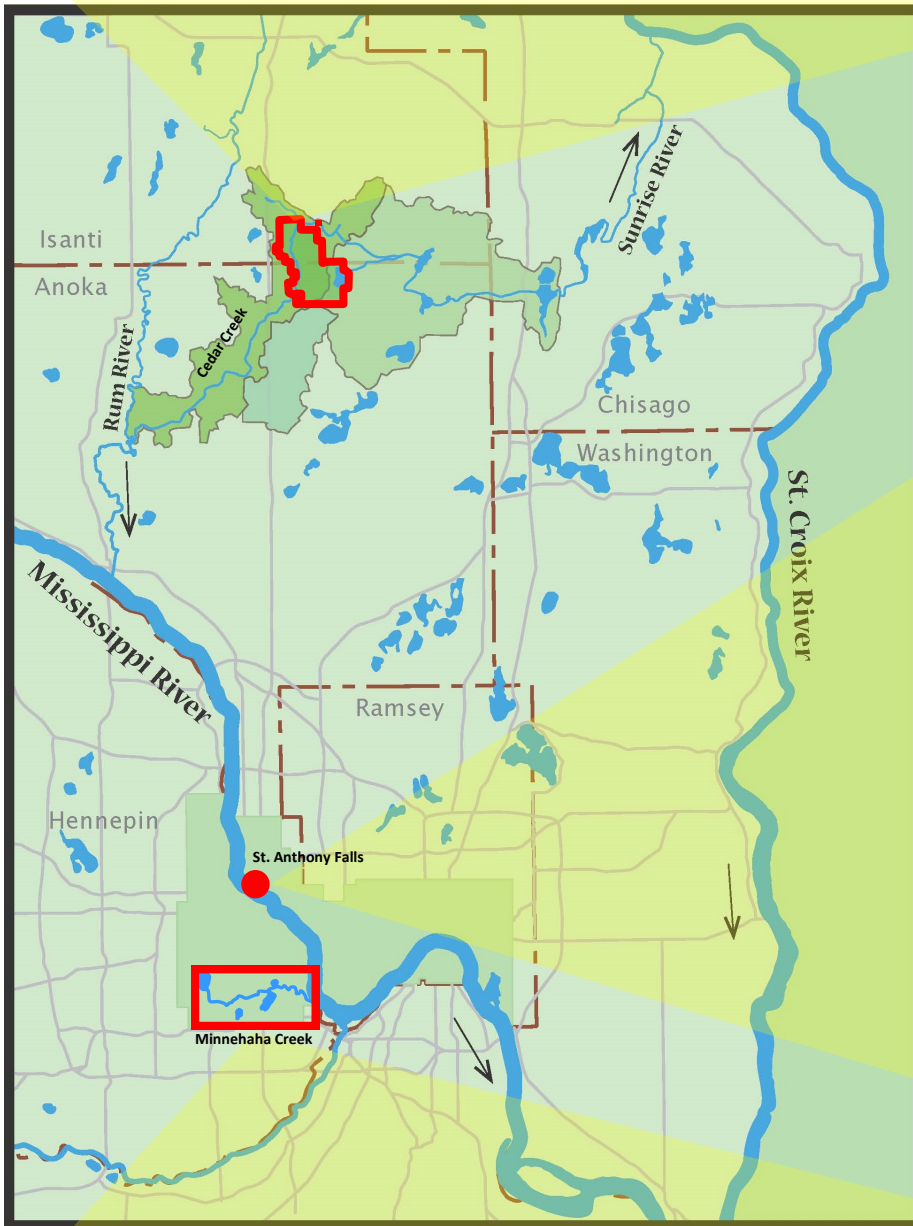
V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
In-kind Services During Project Period:		
UMN faculty co-instruction during professional development workshops @ 3% FTE.	\$ 12,000	<i>Secured</i>
UMN project administrative oversight and evaluation @ 2% FTE.	\$ 8,000	<i>Secured</i>
Funding History:		
National Science Foundation; 2007-2012 for "Schoolyard LTER" K-12 programs.	\$ 144,000	
U.S. Environmental Protection Agency; 2009-2011 for K-12 environmental education program.	\$ 68,000	

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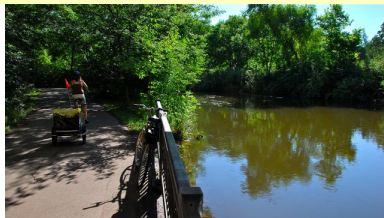
RURAL WATERSHED: Cedar Creek Ecosystem Science Reserve



EXPERIMENTAL WATERSHED: St. Anthony Falls Laboratory



URBAN WATERSHED: Minnehaha Creek Parkway



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PROJECT MANAGER QUALIFICATIONS

Jeffrey Corney, PhD, serves as managing director of the University of Minnesota's Cedar Creek Ecosystem Science Reserve (CCESR), where he oversees operations of the 5,400-acre long-term ecological research (LTER) field station, and serves as adjunct professor in the College of Biological Sciences. Corney will serve as Project Director, providing administrative oversight, including managing the budget and personnel. Corney will also serve as lead instructor for the teacher professional development workshops. Corney's primary area of study focuses on the human dimension of natural resource management, particularly how to best inform and educate the public about challenging environmental and sustainability issues. Corney has served as a professional educator for 25 years and as an academic administrator for the past 10 years; key among his duties has been developing and implementing science-based education and outreach programs for both K-12 and community audiences. Corney has served as project director for a number of grant funded environmental education projects.

PARTNER ORGANIZATION DESCRIPTIONS

Cedar Creek Ecosystem Science Reserve (www.cbs.umn.edu/cedarcreek)

The University of Minnesota's Cedar Creek Ecosystem Science Reserve (CCESR) is an internationally renowned ecological research and education facility, located 35 miles north of the Twin Cities, featuring 5,400 acres of land that encompasses a beautiful and diverse mosaic of prairie, savanna, wetlands, open water, and forests. Since its establishment in 1942, the people of Cedar Creek have been dedicated to understanding our planet's ecosystems and how they are changing under human pressures. Since 1982, Cedar Creek has been designated as one of NSF's Long Term Ecological Research (LTER) sites. The overarching goal of research at Cedar Creek is to use the interplay of long-term experimental platforms, long-term observations, and theory to gain a mechanistic and predictive understanding of the dynamics and functioning of our ecosystems, and how they are impacted by human-driven environmental changes.

St. Anthony Falls Laboratory (www.safll.umn.edu)

Located on Hennepin Island in the Mississippi River in the heart of Minneapolis, St. Anthony Falls Laboratory (SAFL) serves as a resource for departments across the Twin Cities campus and statewide University system. But our connections and collaborations reach far beyond Minnesota, across the country and all over the world. We partner with local, state and federal agencies; private consulting firms; engineering companies; technical associations; and other educational institutions to expand knowledge in the field and solve complex engineering problems. Since 2002, the laboratory has been the headquarters and administrative home of the National Center for Earth-surface Dynamics (NCED), a National Science Foundation-sponsored Science and Technology Center. SAFL is also home to the Eolos Wind Energy Research Consortium, funded by the U.S. Department of Energy.

Minnehaha Creek Watershed District (www.minnehahacreek.org)

The Minnehaha Creek Watershed District (MCWD) is the local unit of government responsible for managing and protecting the water resources of the Minnehaha Creek Watershed in parts of Minneapolis, Minnesota, and its western suburbs. The MCWD is responsible for 181 square miles that drain into the Minnehaha Creek and ultimately the Mississippi River. The watershed includes Minnehaha Creek, Lake Minnetonka, the Minneapolis Chain of Lakes, and Minnehaha Falls. There are eight major creeks, 129 lakes, and thousands of wetlands within the MCWD. The MCWD also includes all or part of 27 cities and two townships in Hennepin and Carver counties. The MCWD uses scientific research and monitoring, public education, grant programs, permitting, and collaborative initiatives with local governments, agencies, and residents, to protect the region's lakes, rivers, and streams. Protecting and managing these resources is important for recreation, fish and wildlife, the environment, and property values.