

**Environment and Natural Resources Trust Fund  
2017 Request for Proposals (RFP)**

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**Project Title:**

**ENRTF ID: 100-C**

Developing Watershed Stewardship in Northwest Minnesota Youth

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**Category:** C. Environmental Education

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**Total Project Budget:** \$ 71,861

**Proposed Project Time Period for the Funding Requested:** 3 years, July 2017 - June 2020

**Summary:**

Headwaters Science Center will implement an inquiry-based multi-year environmental science club for 20 middle school students focused on water quality, watershed evaluation, and aquatic invasive species in Northwestern Minnesota.

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**Name:** Susan Joy

**Sponsoring Organization:** Headwaters Science Center

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**Location**

**Region:** Northwest

**County Name:** Beltrami, Cass, Hubbard

**City / Township:** Bemidji

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**Alternate Text for Visual:**

Flow chart of planned environmental science club activities and map of sampling area within the Mississippi Headwaters in near Bemidji Minnesota for planned fieldwork activities.

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



**Environment and Natural Resources Trust Fund (ENRTF)**

**2017 Main Proposal**

**Project Title:** *Developing Watershed Stewardship in Northwest Minnesota Youth*

**PROJECT TITLE:**

Developing Watershed Stewardship in Northwest Minnesota Youth

**I. PROJECT STATEMENT**

Science stirs the imagination. It opens minds to new and exciting frontiers, from ridiculously tiny things in an atom to the mind-boggling hugeness of the universe. Sometimes it takes a spark to ignite a sleepy imagination to undertake the discovery of things yet to be found and to understand the complexities of our world. Headwaters Science Center (HSC) encourages these sparks through hands-on and authentic learning experiences, including our weekly after school science clubs for elementary students that focus on Science, Technology, Engineering, Math (STEM) topics during 30, 90-minute sessions during the school year.

HSC seeks funding to implement an environmental science club for 20 middle school students with a focus on environmental science concepts, including watershed evaluation, aquatic invasive species, sustainable communities, and climate change. The proposed club will meet 30 times during the school year for 90 minutes and combine hydrologic field work and water quality education. We request three years of funding to implement, evaluate, and establish this effort.

Environmental Science Club participant goals are

- develop skills for water quality testing and demonstrate importance of each parameter
- enhance understanding of scientific thinking, processes, and decision making through authentic outdoor learning experiences
- create awareness of aquatic invasive species, nutrient loading, shore land alteration, littering, and disposal of personal products such as pesticides, road salt, or petroleum products, and
- understand the relationship between watershed management practices and water quality

Our primary goal for the proposed environmental science club is to deliver high quality, hands-on environmental and STEM education curriculum to students living and working in the watershed via citizen science opportunities and watershed research.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1:** Environmental Science Club Programming

**Budget: \$69,861**

Twenty participants in environmental science club will create personal field journals, learn how to record field data, review the scientific method, and interact with local scientists to learn more about field work and scientific inquiry. Participants will collectively participate in an in-situ, physical, biological and chemical sampling experience in the Mississippi Headwaters Watershed using MPCA protocols. Participants will research and identify threats to watershed health including aquatic invasive species, nutrient loading, shoreline use, and climate change.

<b>Outcome</b>	<b>Completion Date</b>
<i>1. Twenty participants will be given a field notebook and learn how to log data and field notes into the notebook</i>	<i>September 2017</i>
<i>2. Twenty participants will learn to use a portable monitoring device to record physical properties of a water body including: temperature, pH, DO</i>	<i>October 2017</i>
<i>3. Twenty participants will take their field notebooks with them into the field during water quality sampling events and use them to record data.</i>	<i>November 2017</i>
<i>4. Twenty participants will learn and be able to collect water samples for analysis in a qualified laboratory.</i>	<i>April 2018</i>
<i>5. Twenty participants will be able to interpret lab reports and relate them to watershed health</i>	<i>April 2018</i>
<i>6. Twenty participants will be able to identify at least 3 aquatic invasive species present in</i>	<i>April 2018</i>



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<i>water bodies in the greater Bemidji area.</i>	
<i>7. Twenty participants will be able to describe and identify ways that humans can help or harm a watershed.</i>	<i>May 2018</i>
<i>8. Twenty participants will “adopt” a watershed and identify best practices, areas of improvement, human impacts, and other factors, and share their findings with fellow club participants</i>	<i>May 2018</i>

The above steps are repeated during school year 2018-19 and 2019-20 with 15 to 20 new middle school students each project period.

**Activity 2: Environmental Science Club Evaluation and Planning**

**Budget: \$2,000**

Headwaters Science Center educators use participant surveys to evaluate the learning outcomes. HSC educators plan additional sessions based on feedback. Watershed data collected during club sessions is compiled and posted as a map or other visual to the Headwaters Science Center website.

<b>Outcome</b>	<b>Completion Date</b>
<i>1. Staff create a survey for 20 participants to complete post-club</i>	<i>October 2017</i>
<i>2. Staff use feedback to modify, if warranted, science club programming</i>	<i>May 2018</i>
<i>3. Staff use data collected to create a watershed health map and post to science center website</i>	<i>June 2018</i>

The above steps are repeated during school year 2018-19 and 2019-20 with 15 to 20 new middle school students each project period.

**III. PROJECT STRATEGY**

**A. Project Team/Partners**

1. Susan Joy, Director, Headwaters Science Center (HSC). Supervise project leaders and support staff, manage grant obligations and reporting.
2. James Owens, Educator, HSC. Plan and lead science club sessions
3. Angela Morales, Educator, HSC. Assist with science club.
4. Kitura Main, Educator, HSC. Assist with science club.
5. Julie Bengtson, Chief Financial Officer, HSC. Oversee expenditures and prepares financial reporting.

**B. Project Impact and Long-Term Strategy**

The proposed afterschool environmental science club focuses on environmental education of youth so that they can protect and advocate for their watershed. The goals of our project align with ENRTF goals of public awareness of human impact on watersheds, the unique connection that people have with water in Minnesota, the relationship of biodiversity with water quality, and the importance of good watershed management practices for enjoyment by future generations. Good watershed management practices improve water quality, which will benefit fishing, tourism, swimming, boating, waterfowl production, and will generally improve the quality of life that Minnesota residents and tourists embrace.

Participants in environmental science club will pay a nominal fee in subsequent years as a way to pay for the cost of the environmental science club after the grant ends.

**C. Timeline Requirements**

The proposed project will begin August 2017 and end June 30, 2020. Headwaters Science Center (HSC) staff will prepare lesson plans for each of the 30 club sessions in August 2017 for implementation in September 2017. These proposed activities will begin September 2017 with 20 youth and 14 club sessions and continue in Spring 2018 with 16 club sessions following the academic calendar. We will repeat the environmental science club format with new middle school students in academic years 2018-19 and 2019-20.

## 2017 Detailed Project Budget

**Project Title:** *Afterschool Environmental Science Club*

### IV. TOTAL ENRTF REQUEST BUDGET 3 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
<b><u>Personnel:</u></b>	
HSC project manager salary: 3 hours per week for 90 weeks at \$22.65 per hour = \$6116 100% salary, 0% benefits	\$ 6,116
HSC Educator: 15 hours per week, for 3-30week Science Club sessions and an additional 60 hours of instructional prep time and evaluation. 1410 hours total over 3 years at \$13.31/hr = 18,767 100% salary, 0% benefits.	\$ 8,985
HSC Educator: 10hours per week, for 3-30week Science Club sessions and an additional 40 hours of instructional prep time and evaluation. 940 hours total over 3 years at \$12.06/hr = 18,767 100% salary, 0% benefits.	\$ 11,336
<b><u>Professional/Technical/Service Contracts:</u></b>	
Contract with RMB environmental in Detroit Lakes for lab analysis Estimated cost for one lab analysis = \$102. Multiplied by 5 samples x 5 sampling events x 6 sessions.	\$ 15,300
SpeedDee delivery service for shipping samples to RMB laboratory in Detroit Lakes from Bemidji	\$ 240
<b><u>Equipment/Tools/Supplies:</u></b>	
Water quality sampling supplies: pens, notebooks, flashdrive, batteries, ziploc bags, educational materials, gloves, nets, waders	\$ 4,475
Water quality sampling components: DO, conductivity and ph replacement probes, multi-parameter meters, singlets, filters,alconox, gloves, membranes	\$ 23,759
<b><u>Travel:</u></b>	
<i>Mileage to sampling locations from Bemidji. Estimated milege = 100 miles round trip, 10 sampling events per 30 week session, 3 sessions = 100 x 10 x 3 = 1500 miles at \$0.55/mile</i>	\$ 1,650
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST</b>	<b>\$ 71,861</b>

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

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
<b>Other Non-State \$ To Be Applied To Project During Project Period:</b> Office space for educators, club meeting space, consumables, copier, computers, phone and internet services. 10% of project cost. Covered by Headwaters Science Center general operating budget.	\$ 3,906	<i>pending approval of 2017-2019 Headwaters Science Center operating budget</i>
<b>Other State \$ to be Applied To Project During Project Period:</b>	NA	
<b>In-kind Services To Be Applied To Project During Project Period:</b>	NA	
<b>Funding History:</b> 2015 Minnesota Department of Education grant through Legislative appropriation in the amount of \$50,000, with 10,000 directed towards Science Club programming. All funds spent by June 30, 2016.	\$ 10,000	secured
<b>Remaining \$ from Current ENRTF Appropriation:</b>	NA	

### Activity #1: Environmental Science Club Programming

20 Bemidji area middle school students enroll in the Environmental Science Afterschool Club

Create field journals and log water quality data

Learn to use portable sampling and monitoring devices

Collect water samples for lab analysis

Learn to interpret lab analysis and relate to watershed health

Identify aquatic invasive species present in watershed and related threats

Describe and identify human impacts on watershed health

Adopt a watershed and share information with peers.

### Activity #2: Environmental Science Club Planning and Evaluation

Headwaters Science Center educators use participant feedback and data to develop deeper engagement opportunities.

Create participant survey and distribute

Use feedback to make changes to programming

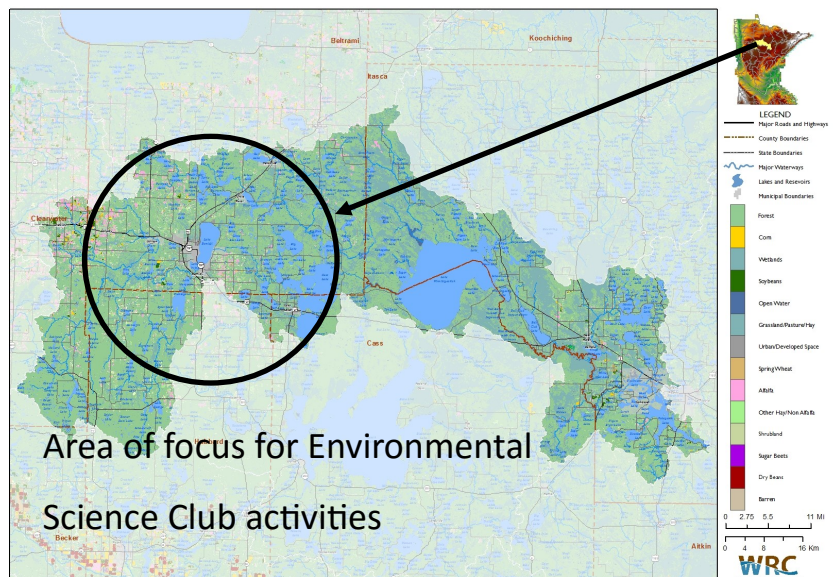
Create watershed map using participant created data



2012 RiverWatch/MPCA training with Headwaters Science Center youth crew.



2012 RiverWatch/MPCA sampling completed by Headwaters Science Center youth crew. Shingobee River near Leech Lake, Cass County



MISSISSIPPI RIVER - HEADWATERS MAJOR WATERSHED - LAND USE

#### Organization Summary:

Headwaters Science Center (HSC) was founded in 1994 by a group of dedicated community members who saw the need for science learning outside of a school setting and to provide hands-on science and technology exploration in northern Minnesota. HSC is a 501(c)3 organization with a mission *“to provide opportunities for hands-on science engagement and enjoyment for children, adults, and community organizations.”* HSC uses interactive exhibits, engaging activities, and dynamic presentations to introduce visitors to basic science concepts. We are a unique organization, located in a rural setting, staffed by passionate and highly educated individuals, with a commitment to offering high quality programs and events. Bemidji is a small rural community, yet geographic location and economic realities have not limited our ability to connect our community and region to exciting learning opportunities.

HSC programs are designed to engage and inspire. They include; Science Club, a weekly after school program for children and youth with Bemidji and Blackduck locations; Girl Scout overnight experiences, monthly Saturday Science programs for all ages, and Raptor, Cryogenics, Combustion, Animal, demonstrations. We also feature a 7,500ft<sup>2</sup> exhibit floor with over 40 interactive exhibits and live animals. In addition, HSC is a member of the Association of Science and Technology Centers, and seeks partnerships with regional museums such as the Duluth Children’s Museum and The Works Museum in Bloomington to share exhibits and ideas.

HSC is invested in, and committed to, the people of Bemidji and the surrounding region. Our contributions to the community include investment in developing our capacity for Science, Technology, Engineering, Math (STEM), strong partnerships with business, education, and non-profit sectors, and accessible learning experiences. As the only science and technology center within a 100-mile radius of Bemidji, HSC serves approximately 25,000 visitors annually with a third of the visitors from local and regional schools. Students in Beltrami County account for 44% of our school group visitors, with Cass county accounting for 15% and 17 other counties rounding out the remaining 41%.

HSC has a 22-year history of mission stewardship and fiscal accountability of more than \$1 million dollars in federal, state, and local funding awards in addition to annual contributions, memberships, and earned revenue. 2015 HSC operating revenue was \$337,000 with 53% earned income, 30% donations, and 17% grants. Our operating expenses were \$290,934 and supported 8.5 FTE staff, operations of the science center for 365 days. Our history of fiscal responsibility and responsive programming showcases our ability to sustain projects beyond initial funding through careful stewardship of assets, both in talent and finances. We invest all our resources, both financial and material, in supporting our mission.

Our ultimate goal is to eliminate barriers to STEM opportunities through tandem development of our internal STEM capacity and external partnerships with common interest groups to better serve our community

#### Project Manager Qualifications:

Susan Joy holds a BA in Geology from Gustavus Adolphus College and an MS in Geology from University of Montana. For her MS thesis, Susan focused on transport of nitrate and chloride in a fractured rock aquifer as a function of shallow septic systems. Susan is currently the director of the Headwaters Science Center, a position held since June 2012. Susan is responsible for all grant management at Headwaters Science Center, in addition to staff management, program implementation, fundraising, community engagement, exhibit development, and facility organization.