



Environment and Natural Resources Trust Fund (ENRTF) M.L. 2017 LCCMR Work Plan

Date of Submission: September 14, 2016
Date of Next Status Update Report: January 2018
Date of Work Plan Approval:
Project Completion Date: June 30, 2020
Does this submission include an amendment request? NO

PROJECT TITLE: 100-C Developing Watershed Stewardship in Northwest Minnesota Youth

Project Manager: Susan Joy
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Location: Beltrami, Cass, Clearwater, Hubbard

| | | |
|--|-----------------------------|------------------|
| Total ENRTF Project Budget: \$121,000 | ENRTF Appropriation: | \$121,000 |
| | Amount Spent: | \$0 |
| | Balance: | \$121,000 |

Legal Citation: M.L. 2017, Chp. xx, Sec. xx, Subd. xx

Appropriation Language:

[To be inserted following the MN Legislative Session in Spring 2017. This will be blank for the initial submission and will be provided to you at a later date.]

I. PROJECT TITLE: Developing Watershed Stewardship in Northwest Minnesota Youth

II. 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 will implement an environmental science club for 20 late elementary and 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 plan to partner with the Boys and Girls Club of the Bemidji Area to enroll more students, including those from traditionally underserved populations, in the environmental science club. Participants in the program will learn skills by actively engaging in the field and classroom work. Students and professionals from local natural resource employers and academic institutions, including the Leech Lake Tribal College, will join with Headwaters Science Center for single sessions as mentors and professional advisors related to the topic of the session.

The environmental science club emphasizes quality contact hours with a cohort of 20 students, over a high volume of youth with limited instruction or contact time. This approach will result in 30-35 contact hours per participant and 600 to 650 contact hours per year per cohort. The environmental science club will repeat annually with new cohorts of 20 students for a total of three years. 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
- share information with others through peer to peer feedback sessions, science fair posters, and/or websites.

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.

III. OVERALL PROJECT STATUS UPDATES:

Project Status as of January 2018:

Project Status as of July 2018:

Project Status as of January 2019:

Project Status as of July 2019:

Project Status as of January 2020:

Overall Project Outcomes and Results:

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Environmental Science Club Planning, Programming, Monitoring, and Evaluation

Description:

Headwaters Science Center (HSC) staff will partner in 2017-18 with the Boys and Girls club of the Bemidji Area to recruit participants for the environmental science club. 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 Minnesota Pollution Control Agency (MPCA) protocols. Participants will research and identify threats to watershed health including aquatic invasive species, nutrient loading, shoreline use, and climate change. HSC will seek additional partnerships with Cass Lake Boys and Girls Club, Blackduck School District, and Bagley School District. HSC will recruit environmental professionals from the Leech Lake Band of Ojibwe Division of Resource Management, Leech Lake Tribal College, Mississippi Headwaters Audubon Society, Bemidji State University and similar, to serve as advisors for individual sessions and watershed activities.

Headwaters Science Center (HSC) staff will use participant assessment surveys to evaluate progress during the sessions and the learning outcomes. HSC educators plan additional sessions based on feedback. Participants engage with peers, HSC educators, and partner mentors to review and assess their projects. Constructive feedback and interaction provides a base for participants and educators to develop and refine program objectives and outcomes. Watershed data collected during club sessions is compiled and posted as a map or other visual to the HSC website. Participants also present their projects at local science fair, Science Week at the Boys and Girls Club of Bemidji, or science night hosted by HSC.

Summary Budget Information for Activity 1:

ENRTF Budget: \$ 121,000
Amount Spent: \$ 0
Balance: \$ 121,00

| Outcome | Completion Date |
|---|----------------------------|
| <i>1. Twenty participants will be given a field notebook and learn how to log data and field notes into the notebook</i> | September 2017 |
| <i>2. Twenty participants will learn to use a portable monitoring device to record physical properties of a water body including: temperature, pH, Dissolved Oxygen (DO)</i> | October 2017 |
| <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> | November 2017 |
| <i>4. Twenty participants will learn and be able to collect water samples for analysis in a qualified laboratory.</i> | April 2018 |
| <i>5. Twenty participants will be able to interpret lab reports and relate them to watershed health.</i> | April 2018 |
| <i>6. Twenty participants will be able to identify at least three (3) aquatic invasive species present in water bodies in the greater Bemidji area and surrounding counties.</i> | May 2018 |
| <i>7. Twenty participants will be able to describe and identify ways that humans can help or harm a watershed</i> | May 2018 |
| <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 participants.</i> | May 2018 |
| <i>9. Staff create a survey for participants to complete post club experience – including Fall and Spring sessions</i> | December 2017 and May 2018 |

| | |
|--|----------------------------|
| 10. Staff use feedback to modify, science club programming to achieve meaningful results and provide enrichment to participants – Fall and Spring Sessions | December 2017 and May 2018 |
| 11. Participants and staff use data collected to create a watershed health map or related graphic, and post to Headwaters Science Center website for public access. | June 2018 |

The above activity outcomes will be repeated during school years 2018-19 and 2019-20 with new cohorts of 15 to 20 upper elementary and middle school youth.

Activity 1 Status as of January 2018:

Activity 1 Status as of July 2018:

Activity 1 Status as of January 2019:

Activity 1 Status as of July 2019:

Activity 1 Status as of January 2020:

Final Report Summary:

V. DISSEMINATION:

Description:

Students participating in the environmental science club will showcase their work during Science Week at the Boys and Girls Club of the Bemidji Area in late March and will also have an opportunity to present their work at the annual Bemidji Middle School science fair, hosted annually in February.

Headwaters Science Center will provide updates and activity reports to the public via the quarterly newsletter, “The Current” in addition to the science center web page (www.hscbemidji.org) and social media accounts.

Status as of January 2018:

Status as of July 2018:

Status as of January 2019:

Status as of July 2019:

Status as of January 2020:

Final Report Summary:

VI. PROJECT BUDGET SUMMARY:

A. Preliminary ENRTF Budget Overview:

***This section represents an overview of the preliminary budget at the start of the project. It will be reconciled with actual expenditures at the time of the final report.**

| Budget Category | \$ Amount | Overview Explanation |
|-----------------|-----------|---|
| Personnel: | \$ 50,000 | HSC project manager at 4.3% FTE per year for 3 years (\$8,000), HSC Educator I at 22% FTE per year for 3 years (\$24,000), HSC Educator II at 14% FTE per year for 3 years (\$12,000) and 3 |

| | | |
|---|----------|---|
| | | interns at 3% FTE each, one per year for three years (\$6,000) |
| Professional/Technical/Service Contracts: | \$19,200 | RMB environmental services contracted to process water quality samples (\$18,000), Spee Dee delivery services to transport samples (\$1,200) |
| Equipment/Tools/Supplies: | \$31,500 | Water quality sampling equipment (\$24,000), water quality sampling supplies (\$7,500) |
| Printing: | \$500 | Posters and graphs for science fair, family science night, presentations (\$500) |
| Travel Expenses in MN: | \$3,300 | Mileage to sampling locations, estimated 6,000 miles at \$0.55/mile |
| Other: | \$16,500 | Upload information to website (\$500), Partner mentor sessions (\$1,000), Boys and Girls Club partner contract (\$5,000/yr. for 3 years = \$15,000) |
| TOTAL ENRTF BUDGET: | | \$121,000 |

Explanation of Use of Classified Staff: NA

Explanation of Capital Expenditures Greater Than \$5,000: NA

Total Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: 1.3FTE

Total Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: 0.42FTE

B. Other Funds:

| Source of Funds | \$ Amount Proposed | \$ Amount Spent | Use of Other Funds |
|---|--------------------|-----------------|---|
| Non-state | | | |
| In-kind, through Headwaters Science Center annual budget. | \$12,000 | \$ | Office space for HSC educators, environmental science club meeting space, consumables, copier, computers, phone, internet, lights, heat, insurance for HSC Van, other overhead. |
| State | | | |
| | \$ | \$ | |
| TOTAL OTHER FUNDS: | \$12,000 | \$ | |

VII. PROJECT STRATEGY:

A. Project Partners:

Headwaters Science Center (HSC) will partner with Boys and Girls Club of Bemidji Area to recruit at least ten (10) participants for each of the the three cohorts. Participants will be identified by Boys and Girls Club staff and HSC staff as

Partners receiving ENRTF funding

- *Boys and Girls Club of Bemidji Area, \$ 15,000, recruit 10 participants from Boys and Girls club members per session, assist HSC Educator 1 and 2 with managing club participants during each meeting of the environmental science club. Assist with dissemination sessions including science fair, family science night, science week at the Boys and Girls Club.*

- *Partner Mentors from Leech Lake Tribal College, Bemidji State University, Minnesota Department of Natural Resources, Leech Lake Division of Resource Management and/or other regional partners, \$1,0000, mentors who attend environmental science club and assist participants will receive a \$100 stipend to compensate them for their time, mileage, and sharing of professional knowledge with participants.*

Partners NOT receiving ENRTF funding

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, and waterfowl production, and will generally improve the quality of life that Minnesota residents and tourists embrace.

Participants in environmental science club may 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. Funding History:

| Funding Source and Use of Funds | Funding Timeframe | \$ Amount |
|--|--------------------------|------------------|
| MPCA Surface Water Assessment Grant – “River Watch” program at HSC. A Physical, Chemical, Biological assessment of Leech Lake and Pine River Watersheds | 2/13/2012-5/30/2014 | \$45,229.85 |
| MPCA Surface Water Assessment Grant - “River Watch” program at HSC. A physical, chemical, biological assessment of the Upper Mississippi Headwaters Watershed | 4/1/2013 – 6/30/2015 | \$27,890.10 |
| MPCA Surface Water Assessment Grant - “River Watch” program at HSC. A physical, chemical, biological assessment of the Mississippi River – Grand Rapids Watershed | 3/16/2015-3/15/2017 | \$36,053.10 |
| MPCA Surface Water Assessment Grant - “River Watch” program at HSC. A physical, chemical, biological assessment of the Otter Tail River Watershed | 3/2/2016 – 1/15/2018 | \$57,028.61 |
| Minnesota Department of Education- Single Source Legislative Grant. Minnesota Omnibus E-12 Education Act (Chapter 116) signed into law May 22, 2013, amended May 20, 2014. “\$50,000 is to provide hands-on science, technology engineering, and math (STEM) education.” | 7/25/14 – 6/30/2016 | \$50,000 |

VIII. REPORTING REQUIREMENTS:

- **The project is for 3 years, will begin on 07/01/17, and end on 06/30/20.**
- **Periodic project status update reports will be submitted January 15 and July 15 of each year.**
- **A final report and associated products will be submitted between June 30 and August 15, 2020.**

IX. VISUAL COMPONENT or MAP(S):

X. FEE TITLE ACQUISITION/CONSERVATION EASEMENT/RESTORATION REQUIREMENTS: NA

**Environment and Natural Resources Trust Fund
M.L. 2017 Project Budget**



Project Title: 100-C Developing Watershed Stewardship in Northwest Minnesota Youth

Legal Citation: Fill in your project's legal citation from the appropriation language - this will occur after the 2017 legislative session.

Project Manager: Susan Joy

Organization: Headwaters Science Center

M.L. 2017 ENRTF Appropriation: \$ 121,000

Project Length and Completion Date: 3 Years, June 30, 2020

Date of Report: September 14, 2016

| ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET | Activity 1 Budget | Amount Spent | Activity 1 Balance | TOTAL BUDGET | TOTAL BALANCE |
|--|---|--------------|-----------------------|------------------|------------------|
| BUDGET ITEM | Environmental Science Club Planning, Programming, Monitoring, and Evaluation | | | | |
| Personnel (Wages and Benefits) | \$50,000 | | | \$50,000 | |
| HSC Project manager: \$8,000 (90% salary, 10% benefits); 4.3% FTE per year for 3 years. | | | | | |
| HSC Educator I, \$24,000 (90% salary, 10%benefits), 22%FTE each year for 3years | | | | | |
| HSC Educator II, \$12,000 (90% salary, 10% benefits); 14% FTE each year for 3 years | | | | | |
| HSC Intern, \$6,000 (100% salary 0% benefits) 3% FTE each year for 3 years | | | | | |
| | | | | | |
| Professional/Technical/Service Contracts | | | | | |
| Contract with Spee Dee Delivery service for transporting water quality samples to RMB from Bemidji. | \$1,200 | | | \$1,200 | |
| Contract with RMB Environmental Services in Detroit Lakes MN for lab analysis. Estimated cost for one lab analysis = \$120. Multiplied by 5 samples/ sampling event, 5 sampling events per session, 2 sessions per year for 3 years. | \$18,000 | | | \$18,000 | |
| | | | | | |
| Equipment/Tools/Supplies | | | | | |
| Water quality sampling equipment: Dissolved Oxygen (DO), conductivity, and pH replacement probes, multip-parameter meters, singlets, filters,alconox, gloves, membranes, | \$24,000 | | | \$24,000 | |
| Water quality sampling supplies: pens, notebooks, flashdrives, batteries, ziploc bags, educational materials, gloves, nets, waders | \$7,500 | | | \$7,500 | |
| | | | | | |
| Printing | | | | | |
| Printing posters and graphs for dissemination sessions, science club presentations, and science fair/science night. | \$500 | | | \$500 | |
| | | | | | |
| Travel expenses in Minnesota | | | | | |
| Mileage to sampling locations from Bemidji. Estimated mileage = 150-200 miles round trip, 5 sampling events per session, 2 sessions per year, over 3 years at \$0.55/mile. Total estimated miles = 6,000 | \$3,300 | | | \$3,300 | |
| | | | | | |
| Other | | | | | |
| Upload information to HSC website for dissemination, \$50/web upload, 10 uploads planned | \$500 | | | \$500 | |
| Partner mentor time, \$100/mentor, 10 times = \$1000 | \$1,000 | | | \$1,000 | |
| Partner with Boys and Girls Club - Bemidji, at a rate of \$5,000 per year for 3 years. | \$15,000 | | | \$15,000 | |
| COLUMN TOTAL | \$121,000 | | | \$121,000 | |

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

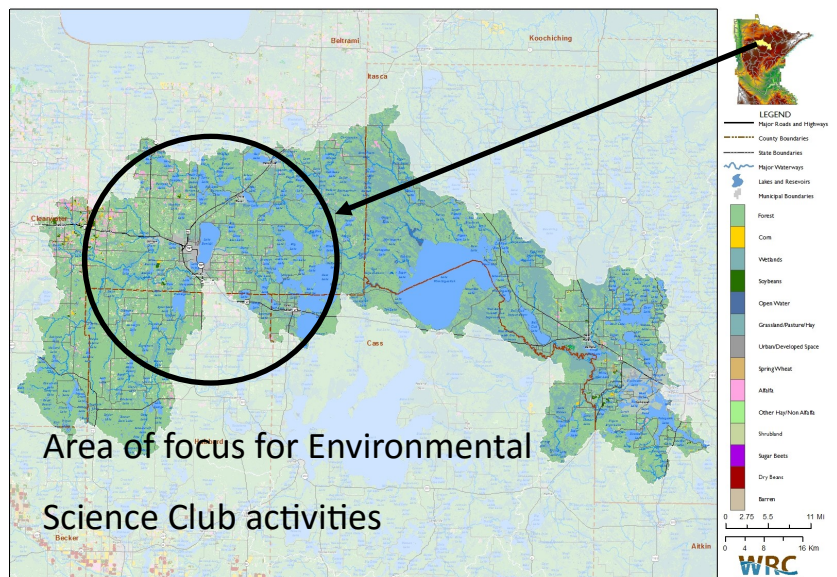
Create watershed map using participant created data



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