

**Environment and Natural Resources Trust Fund
2016 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 105-C

Promoting Stewardship through Student Mentoring and River Monitoring

Category: C. Environmental Education

Total Project Budget: \$ 39,490

Proposed Project Time Period for the Funding Requested: 2 years, July 2016 to June 2018

Summary:

A partnership for inquiry-based learning focused on water quality, connecting agriculture and stewardship. University undergraduates mentor high school and middle school students who serve as citizen scientists monitoring local rivers.

Name: Emily Deaver

Sponsoring Organization: Southwest Minnesota State University

Address: 1501 State Street
Marshall MN 56258

Telephone Number: (507) 537-6171

Email emily.deaver@smsu.edu

Web Address _____

Location

Region: SW

County Name: Lyon

City / Township: Marshall

Alternate Text for Visual:

Flow chart showing undergraduates mentoring high school and middle school students and a map of southwest MN showing the Redwood River flowing into the Minnesota River and two photos of students mentoring and monitoring.

_____ 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)

2016 Main Proposal

Project Title: *Promoting Stewardship through Student Mentoring and River Monitoring*

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I. PROJECT STATEMENT

In the temperate prairie region in southwest Minnesota, over 80% of a typical watershed is used for some type of agriculture. Stream channelization and alterations to overland flow using tile drainage systems have negatively impacted stream water quality. Area citizens must be engaged in water quality efforts and discussions if progress is to be made in protecting local waterways. Providing students the knowledge and skills to improve and maintain water quality, coupled with hands-on outdoor experiences will promote a long-lasting conservation ethic. In particular, educating agriculture students and engaging them in conservation and monitoring efforts will bridge the perceived conflict between agriculture production and water conservation efforts.

The **goals** of the program are for college, high school and middle school students in Southwest Minnesota to:

- gain knowledge and understanding of local and state water quality issues;
- develop skills needed to measure local water quality;
- develop an awareness and sensitivity to challenges connecting agriculture and water quality.

The project will provide a connection between two educational resources in the community; and demonstrate the value of individual involvement in community conservation to ensure resources for the future.

These goals are achieved through a long-term partnership between Southwest Minnesota State University (SMSU), area public schools and state agencies. SMSU undergraduates apply their knowledge by teaching high school students, who in turn, teach middle school students. Undergraduates connect with students and serve as mentors for younger students through two activities. **Activity 1:** an SMSU course that teaches water quality content and mentoring techniques to undergraduates. The course is unique in that it includes traveling to area schools and mentoring/ teaching high school students, who in turn teach middle school students. All students subsequently monitor three sites on the Redwood River. **Activity 2:** SMSU Agriculture majors attend a workshop on "Ag and Water Quality" to learn scientific principles, issues related to river water quality, and protocols for the MPCA Citizen Stream Monitoring program (CSMP). Ag majors then mentor High School Future Farmers of America (FFA) students with the goal of having students adopt sites on local rivers to monitor long-term. Through these activities students take an active role in community based conservation in which the data generated is directly applicable to local water issues, and trains students at many levels to be 'citizen scientists'.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Mentoring of Public School Students & Monitoring of Redwood River **Budget: \$35,040**

Funding would pay for a higher level of content in "Redwood River Mentoring and Monitoring" course (ENVS 115) with an added focus on the connection between agriculture and water quality. Funding would provide additional equipment to take to the high school and middle school for mentoring. Each semester SMSU students learn water monitoring techniques for 10 chemical parameters plus *E. coli* then teach this to high school (10th grade) students, who teach it to middle school (7th grade) students. All students then monitor 3 sites on the Redwood River together gathering data as 'citizen scientists'.

Outcome	Completion Date
1. Twenty-four undergraduates enroll in ENVS 115	Aug 24, 2016
2. Twenty-four undergraduates mentor 60 high school & 76 middle school students	Oct 15, 2016
3. Three sites on Redwood River monitored for 10 parameters with 160 students	Oct 25, 2016
4. Data disseminated to SMSU website, world water monitoring database, MPCA	Dec 20, 2016

The above steps are repeated additional semesters (spring 2017, fall 2017 and spring 2018) with 160 new students each time (a **total of 640 students mentored** during project period).



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Activity 2: SMSU Ag Majors Mentor Future Farmers of America (FFA)

Budget: \$4,450

Funding would pay for SMSU Agriculture majors to attend a 3-day “Ag and Water Quality” workshop to learn scientific principles related to river water quality and discuss issues such as tile drainage systems, the proposed 50-ft buffer strips, *E. coli* and connections between agriculture and water quality. Funding would also pay for equipment needed for hands-on training in Citizen Stream Monitoring methods. SMSU Ag majors teach this information to Marshall High School Future Farmers of America (FFA) students with the goal of having students adopt sites on local rivers to monitor as part of the MPCA Citizen Stream Monitoring program (CSMP).

Outcome	Completion Date
1. Ten SMSU undergrads attend “Ag and Water Quality’ workshop	Feb 25, 2017
2. Ten SMSU students mentor 40 Marshall high school FFA students	March 25, 2017
3. FFA students adopt 2 sites and monitor April –Sept; submit data to MPCA	October 30, 2017

III. PROJECT STRATEGY

A. Project Team/Partners

This project is an innovative partnership between Southwest Minnesota State University faculty from several different programs and Marshall Public Schools, with support from the DNR and MPCA.

Project Partners Receiving Funding:

- Dr. Emily Deaver[\$15427]: SMSU Environmental Science faculty, Project manager, coordinate all aspects
- Dr. Scott Peterson [\$7906]: SMSU Psychology faculty, Assessment coordinator and statistician
- Dr. Tony Greenfield[\$2907]: SMSU Microbiology faculty, coordinate *E. coli* monitoring/ methods

Project Partners Not Receiving Funding:

- Mr. Lee French: SMSU Agronomy, recruiting Agriculture majors and coordinating internship credit
- Holly Knudson: Marshall High School Biology teacher
- Dr. Carrie Sueker: Marshall Middle School Science teacher
- Jason Kaare: Marshall High School Agriculture Education teacher and FFA Advisor
- Kyle Jarcho: hydrologist at MN Department of Natural Resources (DNR)
- Diana Moe: environmental specialist, MN Pollution Control Agency (MPCA)

B. Project Impact and Long-Term Strategy

As a result of these activities students will have a better understanding of water issues and, as they grow into adults, should take better care of local water resources. By educating over 300 students a year we hope to see an improvement in local water resources over time (i.e. improved water quality and reduced litter). The students are trained at many levels to be ‘citizen scientists’ collecting data that will be available to the public, posted on the SMSU website, shared with the MPCA and submitted as part of the CSMP. Once implemented, the project will continue as a permanent addition to the university, high school and middle school curricula, with expendable chemicals and bussing costs funded through student lab fees. Ag majors will continue working with FFA students by earning internship credits through the Ag Education major.

C. Timeline Requirements

Equipment for the project (to supplement equipment already owned by SMSU) will be purchased July 2016. The ENV5 115 course will be taught fall 2016 with mentoring of high school and middle school students in late October. The course will be taught again in Jan 2017 with mentoring and monitoring in April 2017. The Ag & Water Quality workshop will be offered in Feb 2017 so that FFA students can be mentored in Feb-March 2017. Sites selected as part of the MPCA Citizen Stream Monitoring program are monitored weekly April –September 2017. The ENV5 115 course will be repeated fall 2017 and spring 2018 with the project completed by June 2018.

2016 Detailed Project Budget

Project Title: *Promoting Stewardship through Student Mentoring and River Monitoring*

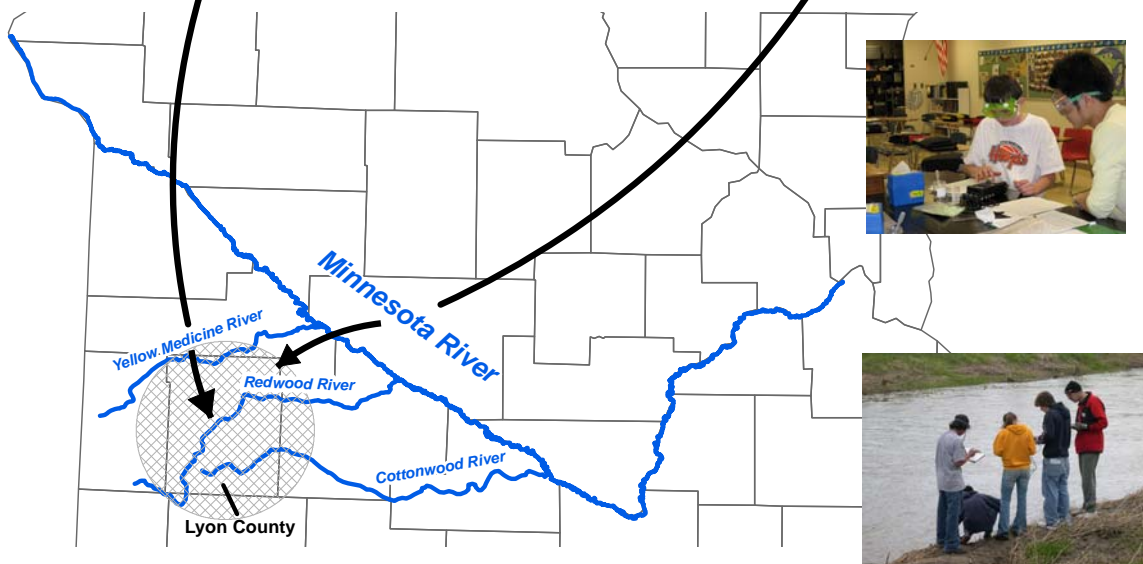
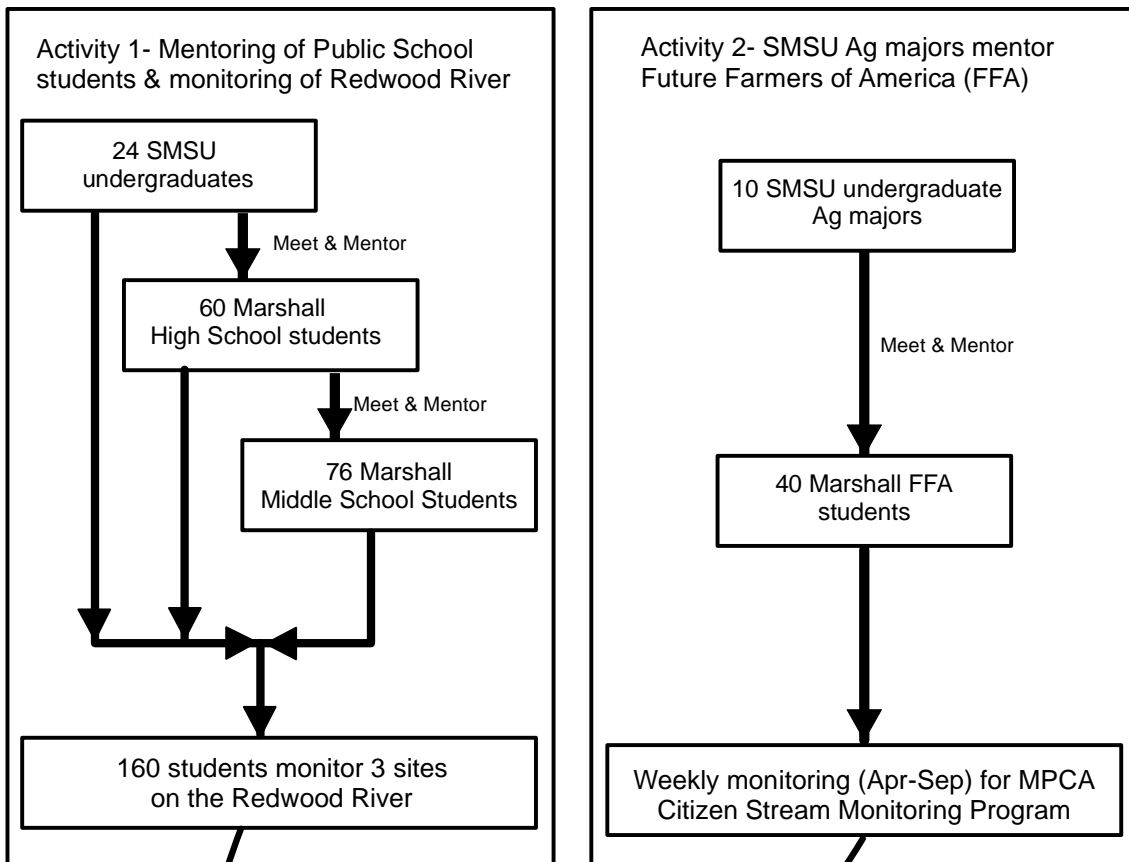
IV. TOTAL ENRTF REQUEST BUDGET 2 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel:	
Emily Deaver, Project Manager (84.1 % salary, 15.9% benefits) ; 26 days summer salary	\$ 15,427
Scott Peterson, assessment and statistics (84.1 % salary, 15.9% benefits); 15 days summer salary	\$ 7,906
Tony Greenfield, microbiology methods & evaluation (84.1 % salary, 15.9% benefits); 6 days summary salary	\$ 2,907
Equipment/Tools/Supplies:	
Vernier LabPro (12 ea) and probes (6 temperature, 2 dissolved oxygen, 2 pH, 4 turbidity, and 2 flow probes)	\$ 5,400
LaMotte Water Quality Test Kits (2 pH, 2 nitrate-nitrogen , 2 phosphate , 2 dissolved oxygen, 2 alkalinity, 2 turbidity, 2 thermometers, 2 ammonia-nitrogen)	\$ 1,000
Coliform Test kits (88 tests) ; Secchi Tubes (10 x \$60 ea)	\$ 850
Travel: Busses to transport 96 students for mentoring , and approx. 160 students and 6 teachers students to go to 3 sites on the Redwood River for monitoring (\$1500 each semester) for Fall 2016, Spring 2017, Fall 2017 and Spring 2018.	\$ 6,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 39,490

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ To Be Applied To Project During Project Period:	N/A	
Other State \$ To Be Applied To Project During Project Period: Emily Deaver teach ENVS 115 fall 2016 & spring 2017 (84.1 % salary, 15.9% benefits); 42 days, 25%FTE ; Emily Deaver teach ENVS 115 fall 2017 & spring 2018 (84.1 % salary, 15.9% benefits); 42 days, 25%FTE General office support (\$1000)	\$ 50,840	<i>Secured</i>
In-kind Services To Be Applied To Project During Project Period: Lee French, SMSU Agronomy faculty, donate time recruiting Ag majors and coordinating internship credit (\$500) Holly Knudson, Marshall High School Biology teacher, teach river ecology as part of biology class (\$4000) Dr. Carrie Sueker, Marshall Middle School Science teacher, teach river ecology as part of science class (\$4000) Kyle Jarcho, hydrologist, MN DNR; talk to classes about DNR role in river health; demonstrate flow equipment at river; time donated (\$1000) Diana Moe, environmental specialist, MPCA; talk to class about MPCA role in river monitoring and health; time donated (\$500)	\$ 10,000	<i>Secured</i>
Funding History: N/A	N/A	
Remaining \$ From Current ENRTF Appropriation: N/A	N/A	

Promoting Stewardship through Student Mentoring and River Monitoring



Project Manager Qualifications:

Dr. Emily Deaver, Professor of Environmental Science, Southwest Minnesota State University

EDUCATION

Ph.D., Biology, The University of Mississippi, Oxford, MS (December 1995)

M.S., Biological Oceanography, Old Dominion University, Norfolk, VA (August 1980)

B.S., Biology, the College of William and Mary, Williamsburg, VA (May 1977)

Environmental Educators Certification, State of North Carolina Certification Program (completed 2002)

PROFESSIONAL EXPERIENCE

Professor of Environmental Science (Aug 2003 to present)

Southwest Minnesota State University (SMSU), Marshall, MN

Associate Professor of Biology and Coordinator of Environmental Biology Program (Aug 1996 to 2003)

Dept. of Science, Chowan College (now Chowan University) Murfreesboro, NC

Post-doctoral Research Associate (Jan 1996 to June 1996)

Dept. of Biology, University of Mississippi, Oxford, MS

Instructor (Aug 1995 to Jan 1996)

Dept. of Biology, University of Mississippi, Oxford, MS

HONORS AND AWARDS

- SMSU Cowan Award, for outstanding service to the University and the region, spring 2010
- SMSU Alumni Association, "WOW I Made a Difference" Award for Dec. 2009
- Minnesota State Colleges & Universities, *2008 Innovative Partnering & Collaboration Award* "In Recognition of Outstanding Educational Achievement" (Spring 2008)
- Excellence in Teaching Award, Chowan College, May 2001

PROFESSIONAL AFFILIATIONS

- Associate Editor, *Bulletin of Environmental Contamination and Toxicology (BECT)*, Jan 2013 to present
- Society of Sigma Xi, The Research Society (1993-present)
- Society of Environmental Toxicology and Chemistry (1985-present)
- Society of Wetland Scientists (1992-present)
- Minnesota Association of Environmental Education (MAEE) (2003-present)

Organization Description: Southwest Minnesota State University is a regional state university that is part of the MnSCU system. There is no graduate program in the Sciences at SMSU, so the primary focus is on high quality teaching and undergraduate research.