

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

Project Title:

ENRTF ID: 089-B

Shagawa Lake Contaminants of Interest: Source, Fate, Movement

Category: B. Water Resources

Total Project Budget: \$ 171,635

Proposed Project Time Period for the Funding Requested: 3 years, July 2016 to June 2019

Summary:

This proposed project will augment an existing USGS database, provide a comprehensive contaminant of interest characterization of a vital local water resource, and provide unique student research and project experiences.

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Sponsoring Organization: Vermilion Community College

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Location

Region: NE

County Name: St. Louis

City / Township: Ely

Alternate Text for Visual:

Pictured here = Google Earth map of proposed sampling locations in Shagawa Lake system.

_____ 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: *Shagawa Lake Contaminants of Interest: Source, Fate, Movement*

PROJECT TITLE: Shagawa Lake Contaminants of Interest: Source, Fate, Movement

I. PROJECT STATEMENT

The proposed study focuses on characterizing the Shagawa Lake system, in terms of **LCCMR contaminants of interest** by sampling water at four inputs to this system: 1-Ely, MN, WWTP (USGS sampling site); 2-Burntside R. (USGS sampling site; outflow from Ely, MN, potable water source); 3-Longstorff Cr.; and 4-an Unnamed Cr. north of the Longstorff Creek inflow; Shagawa R. outflow; Burntside Lk. (Ely, MN, potable water source); Mitchell Lk., Longstorff Cr. headwater; and two downstream Shagawa R. locations. Also included is Longstorff Cr. downstream from State Highway 169, the primary (tourist) traffic entryway to Ely. Focus will be paid to those previous USGS sampling locations; particularly the outflow from Ely WWTP. **Contaminants of interest** for this study are: nitrates (as NO₂+NO₃), phosphates (total, dissolved), specific pharmaceuticals (those measured for the USGS study), and PAHs and pesticides (as suites). This study will **supplement a 2009 USGS study** which focused on many of the same **contaminants of interest**.

Several peer-reviewed publications just in the past five – seven years have been published detailing the extent and concentrations of anthropogenically-associated compounds in surface water resources of the United States. Multiple publications are specific to **Minnesota surface water resources**. Multiple sampling locations were located within Northeastern Minnesota. More specifically, two of the sampling locations were within Shagawa Lake, the receiving system for the City of Ely, MN, Wastewater Treatment Plant (WWTP) effluent.

The **overall goals of this study** are to: **1)** add to the existing USGS study, while **increasing the knowledge base** of sources, fate, and transport of contaminants of concern such as **nitrates, phosphates, pharmaceuticals, PAHs, and pesticide suite**; and **2)** provide critical experience to Vermilion Community College (VCC) students enrolled in **Water Resource** and / or **Natural Resource** management degrees, and wanting / needing experience in these vital areas of study for employment. Field measurements of pH (SU), temperature (°C), dissolved oxygen (mg O₂ / L), and conductivity (µS / cm) will also be obtained.

Specific outcomes of this project include: **1)** monthly sampling events throughout the duration of this project (proposed July 2016 – July 2019); and **2)** collaboration between multiple VCC faculty and students. The **student population of VCC and the general population of Ely, MN**, will be served throughout this project by adding to an existing database of **contaminants of interest**, enhancing the student and College partnership with the community and State of Minnesota, and providing invaluable student experience with critical water resource management not typically available to students at the Community College level. Students will communicate with local residents during sampling events, and will also be provided the opportunity to present their findings in classroom settings (to the extent allowable by LCCMR regulations).

NOTE: Shagawa and Fall Lks. are listed by the Minnesota Department of Natural Resources as ‘Aquatic Invasive Species’ waters; Spiny Water Flea (*Bythotrephes longimanus*) infested. The proper MNDNR AIS sampling permit will be obtained prior to project initiation.

II. PROJECT ACTIVITIES AND OUTCOMES:

Activity 1: Project Initiation

Budget: \$22,600.00

During this phase of the project, all necessary supplies and materials for project initiation will be purchased, tested, and prepared for use. All necessary project training (AIS) will also be acquired. Goals = verify equipment functionality, obtain project-specific training, and become familiar with sampling locations.

Outcome	Completion Date
1. Purchase all required project sampling and monitoring equipment and supplies.	July – August 2016
2. Write MNDNR AIS sampling work plan.	July 2016
3. Complete MNDNR AIS training.	July – August 2016
4. Obtain necessary MNDNR AIS water sampling Permit.	July – August 2016
5. Obtain GPS coordinates and complete mapping of each sampling location.	July – August 2016



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Activity 2: System Characterization

Budget: \$149,035.00

For approximately three (3) days each month throughout the duration of this study, water samples from each location will be obtained for measurement of **contaminants of interest** as detailed above.

Outcome	Completion Date
1. Complete water sampling at each location as defined above.	July 2016 – July 2019
2. Provide data deliverables to LCCMR, other personnel as requested / required.	July 2016 – July 2019
3. Provide requested / required annual reporting deliverable(s).	July 2016 – July 2019
4. Funding for continued equipment maintenance, and \$1,500.00 for shipping if needed.	July 2016 – July 2019

III. PROJECT STRATEGY

A. Project Team/Partners Receiving Funds from Project

- O’Niell Tedrow, MS. VCC Biology instructor. O’Niell will serve as the project manager, and will receive funds from the ENRTF commensurate with work on the project.
- Rita Koch, VCC Natural Resources Program Instructor. Rita will serve as a project co-manager, and will receive funds from the ENRTF commensurate with work on the project.
- Students (multiple) enrolled in VCC Water Resources or Natural Resources Technology degrees will receive funds from the ENRTF commensurate with work on the project.

B. Project Team/Partners NOT Receiving Funds from Project

- Wade Klingsporn, VCC Water Resources Program Coordinator. Wade will serve as a project co-manager, but will not receive funds from the ENRTF project.

B. Project Impact and Long-Term Strategy

The **long-term strategy** for the proposed project is to continue monitoring and characterization of the Shagawa Lake system in terms of **contaminants of interest**; the list of analytes is expected to change as additional potentially problematic materials and compounds are released into receiving waters of Minnesota. This is a unique proposal; all public data obtained during this project will contribute to a growing database of contaminants of interest; and involved students will have opportunities to present their ‘findings’ at VCC in classroom settings when appropriate. Future ENRTF support would be required to maintain this project; therefore, future LCCMR ENRTF funding applications will be submitted, but will be based on the priorities of the LCCMR program at that time, which may include additional sampling locations or systems, or re-evaluation of the contaminants of interest.

C. Timeline Requirements

Sampling is expected to begin as soon as July 2016; as soon as the equipment may be ordered, tested, and the necessary AIS permit is obtained from MNDNR. Sampling water from each location will continue monthly for a three year duration. Winter sampling will be completed whenever possible; however, site access may be hindered during ‘high snow’ or ‘extreme cold’ conditions.

2016 Detailed Project Budget

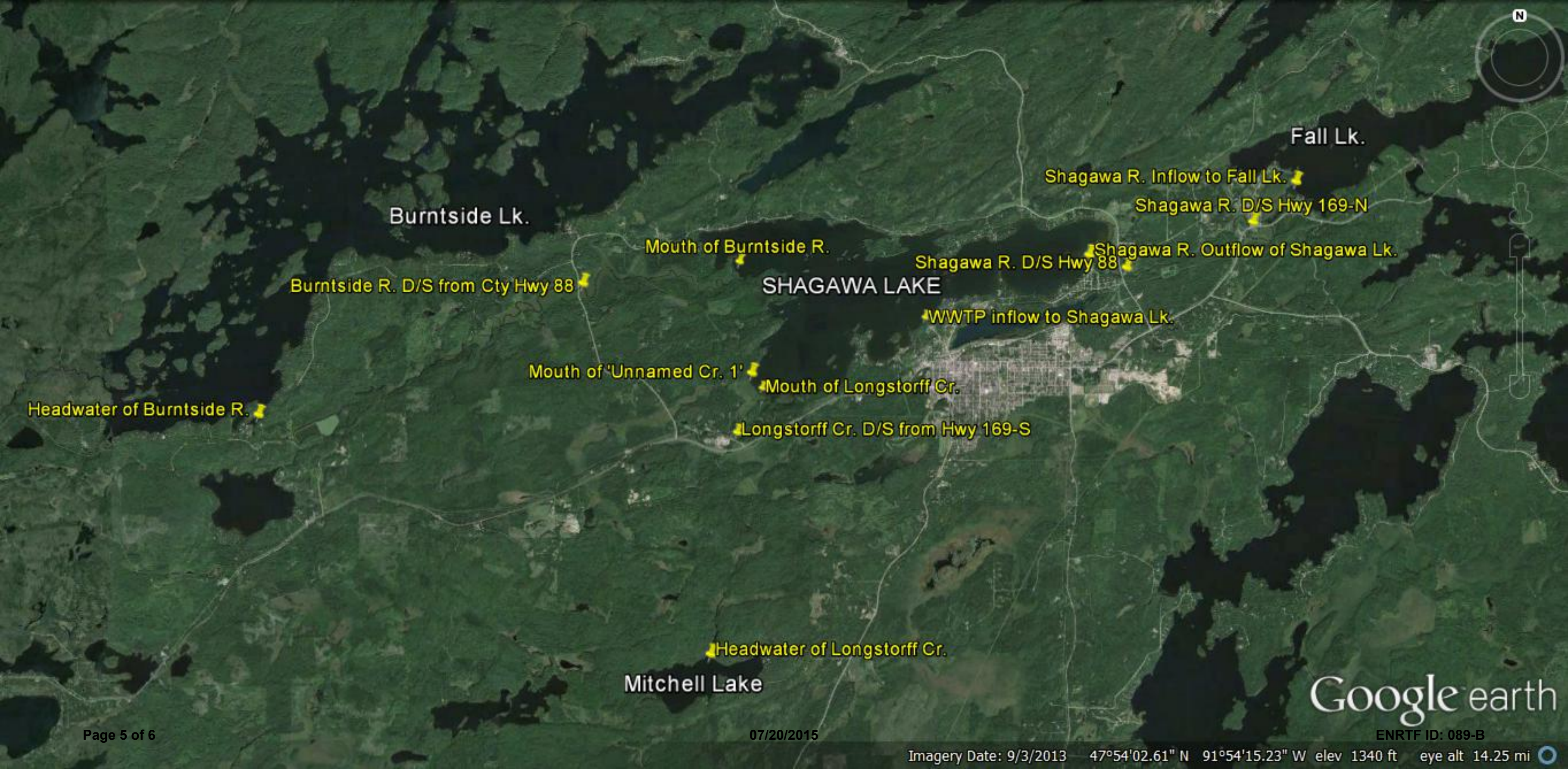
Project Title: *Shagawa Lake Contaminants of Interest: Source, Fate, Movement*

IV. TOTAL ENRTF REQUEST BUDGET \$171,635.00

BUDGET ITEM	AMOUNT
Personnel: <i>O'Niell Tedrow, MS, Project Manager (approx. 65% salary, 35% benefits); 20% FTE for all three years of the proposed project.</i>	\$ 32,464
Personnel: <i>Rita Koch, MS, Co-Project manager (approx. 65% salary, 35% benefits; 25% FTE for last two years of the proposed project.</i>	\$ 30,766
Personnel: <i>Wade klingsporn, Co-Project manager (non-paid position; already full-time State employed).</i>	
Personnel: <i>Student assistant_1; anticipated sampler, field assistant (approx. 65% salary; 35% 'benefits').</i>	\$ 12,960
Personnel: <i>Student assistant_2; anticipated sampler, field assistant (approx. 65% salary; 35% 'benefits').</i>	\$ 12,960
Personnel: <i>Student assistant_3; anticipated mapping, GPS assistance; some field work (approx. 65% salary; 35% 'benefits').</i>	\$ 1,620
Personnel: <i>Clerical needs in terms of budget tracking and management of Grant paperwork (non-paid position; already full-time State employed).</i>	
Equipment/Tools/Supplies:	
Field Meters: YSI Pro Plus with Quad Cable (x2; one specifically for AIS waters) - Approx. \$2000.00 each.	\$ 4,500
YSI Pro Plus Calibration Standards - pH 4.0, 7.0, 10.0, and conductivity standards needed for daily calibration of field meters.	\$ 1,200
Two Kevlar canoes for field work - approx. \$1600.00 each.	\$ 3,500
Personal floatation devices - at least four, one for each potential sampler	\$ 500
Class 3 high vis vests - typically required for MPCA grant projects.	\$ 250
Canoe outriggers (for stability during sampling) - allow for more stability and safety during sampling events.	\$ 750
Canoe paddles - dedicatef to this project	\$ 400
Lab analytical fees (estimated; awaiting cost estimate from lab) - currently awaiting official quote.	\$ 50,000
Shipping / handling charges for ordered equipment - YSIs, cal. standards, future instrument maintenance needs.	\$ 1,500
Acquisition (Fee Title or Permanent Easements):	NA
Travel: Mileage at \$0.57 / mile.	\$ 8,265
Additional Budget Items: <i>We anticipate using these funds for instrument and boat / equipment repair and calibration need (new sensors, batteries, cleaning supplies, cable if damaged).</i>	\$ 10,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 171,635

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ To Be Applied To Project During Project Period: <i>No other non-State funds are anticipated to be applied to this project, in support of this project.</i>	NA	<i>Indicate: Secured or Pending</i>
Other State \$ To Be Applied To Project During Project Period: <i>No other State funds are anticipated to be applied to this project, in support of this project.</i>	NA	<i>Indicate: Secured or Pending</i>
In-kind Services To Be Applied To Project During Project Period: <i>As of the writing of this application, no in-kind funds or services have been obtained in support of this project.</i>	NA	<i>Indicate: Secured or Pending</i>
Funding History: <i>Although this project is intended to supplement and enhance a previous study, no other ENRTF funds have been obtained in support of any ENRTF project.</i>	NA	
Remaining \$ From Current ENRTF Appropriation: <i>This is a unique project, and will not be partially funded by pre-existing ENRTF funds. No other ENRTF funds are available to supplement this current proposal.</i>	NA	<i>Indicate: Unspent? Legally Obligated? Other?</i>



Burntside Lk.

Fall Lk.

Shagawa R. Inflow to Fall Lk.

Shagawa R. D/S Hwy 169-N

Mouth of Burntside R.

Shagawa R. Outflow of Shagawa Lk.

Burntside R. D/S from Cty Hwy 88

SHAGAWA LAKE

Shagawa R. D/S Hwy 88

WWTP inflow to Shagawa Lk.

Mouth of 'Unnamed Cr. 1'

Mouth of Longstorff Cr.

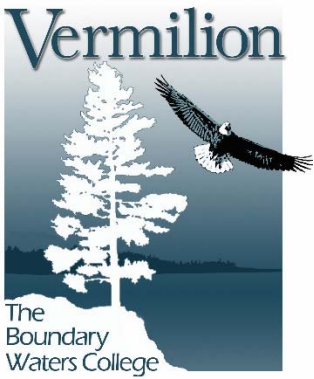
Headwater of Burntside R.

Longstorff Cr. D/S from Hwy 169-S

Headwater of Longstorff Cr.

Mitchell Lake

Google earth



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VCC Mission

'Vermilion Community College educates people from all walks of life to become well-rounded, ethical citizens prepared to work, live, and learn in a changing world especially the natural world that surrounds us.'

RE: 2016 LCCMR Project Manager Qualifications and Organization Description

Project Title: Shagawa Lake Contaminants of Interest: Source, Fate, Movement

Dear Project Proposal Selection Committee;

The Vision and Mission, concurrent with academic Programs, of Vermilion Community College (VCC) directly align with Environment and Natural Resources Trust Fund (ENRTF) goals and funding priorities. VCC prides itself on providing several Degree and Certification programs focused on **Water Resources** and **Natural Resource Technology / Management**, specifically those resources vital to Minnesota. VCC provides critical **Water Resource** education in the form of **Water / Wastewater Management Degrees**, and prepares students to obtain post-degree employment in wastewater management, or continue their studies of **Water / Natural Resource** management at advanced-degree granting Universities. As a Community College in such a critical industrial area, VCC has an obligation to provide current and relevant academic experiences to students. This proposed research project will enhance and supplement these **Water / Natural Resource** programs.

The Project Manager (O'Niell Tedrow) has approximately 14 years of academic, government, and private industry experience with research project design, management, completion, and reporting. O'Niell initiated his research at St. Cloud State University measuring responses of algal taxa to exposures of ibuprofen, acetaminophen, estradiol, and alkylphenols. He continued his toxicology studies at Clemson University, managing large-scale industry funded toxicology studies measuring responses of algae to algaecide exposures; and responses of amphibian taxa to pesticide exposures. During two years as a research assistant at the Athens, GA, USEPA NERL facility, he studied photo-transformation of carbon nanoparticles; followed by approximately four years as a water resources scientist working with NTS, a consulting firm in Virginia, MN. As a VCC Biology Instructor he currently manages one MPCA SWAG and one WPLMN Grant (both student-experience focused); shares knowledge of critical water resource management with students in several academic programs; and maintains a close association with NTS / local industry as a source of student internship / employment opportunities. He is an author on multiple peer-reviewed publications and contributions on his research foci; and is currently pursuing his Ph. D. in Biotechnology through Lakehead University.

Completion of the proposed **Shagawa Lake Contaminants of Interest: Source, Fate, Movement** project at VCC will enhance and advance students' knowledge, use, and understanding of the scientific process, and supplement critical existing datasets and **Water Resource / Natural Resource Management** focused academic curricula. This proposed project will involve multiple students and faculty, within multiple academic programs, over multiple years, resulting in project and research experiences at the Community College level more typical of advanced-degree granting Universities.

Please contact O'Niell Tedrow with any comments or questions.

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