

**Environment and Natural Resources Trust Fund
2015 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 058-B

Developing and Implementing Watershed-level Protection Strategies for Lakes

Category: B. Water Resources

Total Project Budget: \$ 192,863

Proposed Project Time Period for the Funding Requested: 1.5 years, July 2015 - December 2016

Summary:

This proposal seeks to enable faculty and students at Central Lakes College to identify watershed-lake relationships using remote imagery and flow sampling and develop watershed-level strategies for protection and restoration.

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Sponsoring Organization: Central Lakes College

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Location

Region: Central

County Name: Cass, Crow Wing

City / Township: Several townships

Alternate Text for Visual:

The shaded area represents the location of the ten watersheds/lakes which will be selected for analysis, sampling and development of protection strategies as part of this project. This service area will be expanded at the completion of the LCCMR project period.

_____ 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)

2015 Main Proposal

Project Title: Developing and Implementing Watershed-level Protection Strategies for Minnesota Lakes

PROJECT TITLE: Developing and Implementing Watershed-level Protection Strategies for Minnesota Lakes

I. PROJECT STATEMENT

Lake-based tourism in Minnesota generates \$4.7 billion annually in direct and indirect expenditures (MN DNR, 2010). To protect this environmental, social, and economic resource, we will develop a process to create watershed-level protection strategies for lakes in Minnesota. Currently 819 lakes in Minnesota are listed as impaired by the Minnesota Pollution Control Agency (Section 303d). Many of these impairments result from the delivery of sediments and dissolved materials to the lake through overland flow from the watershed.

This proposal seeks to augment existing resources at Central Lakes College (CLC) to enable faculty and students to collaborate with natural resources management agencies, lake associations, businesses, and private individuals to identify watershed-lake relationships and develop watershed-level strategies for protection and restoration. Specifically, this project will develop remote-sensing techniques to discriminate between portions of watersheds which recharge ground water and those that contribute to overland flow. Other data, such as land use, zoning, and parcel data, will be incorporated with delineated watersheds to create water quality protection strategies for ten watersheds in central Minnesota. These strategies will identify opportunities for protecting overland flow to the lake with low sediment and dissolved materials (e.g., phosphorus), and restoration opportunities where overland flows include high sediments and/or dissolved materials. Proposed mitigation activities (e.g., filter strips along agricultural lands) will include monitoring to evaluate the effectiveness of the strategies and their overall impact upon lake water quality. Mitigation activities will incorporate current best practices developed by natural resources management agencies such as Soil and Water Conservation Districts (SWCD) and the Natural Resources Conservation Service (NRCS). When available, mitigation plans will also leverage technical assistance and/or cost share from these agencies.

An additional intent of this project is to build sustainability for watershed-level protection. With the creation of techniques to develop effective protection strategies and purchase of sample processing equipment, this project will continue to operate past the funding period of this grant. Research, monitoring, and evaluation activities will be incorporated into existing curriculum and student-based research at Central Lakes College.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Delineate and assess overland and ground water flow in five watersheds Budget: \$12,476

ArcView Geographic Information System (GIS) software will be used to analyze watershed topography and identify water flow patterns in five selected watersheds. Areas of ground water recharge will be discriminated from areas that contribute to overland flow. Land cover/land use data will be included to target overland flows that may contain relatively high amounts of sediments and/or dissolved materials. A watershed-level map will result targeting streams for water sample collection to confirm their sediment and/or dissolved material loads.

Outcome	Completion Date
1. Subwatershed flow compartments delineated in five selected watersheds, land use/land cover data analyzed, sediment and dissolved material discharges estimated and sites selected for water flow analysis in each watershed.	August 2015

Activity 2: On-ground confirmation of overland flow contribution Budget: \$86,286

Water samples will be collected from locations based on results from activity 1. Water samples will be analyzed for total phosphorus total, suspended solids, chloride, and e. coli concentrations at CLC using project equipment. A cost/benefit analysis will be performed to identify lowest cost mitigation opportunities which yield the greatest reductions of sediment and/or dissolved materials.

Outcome	Completion Date
1. Collect water samples from at least five selected points within each of the five watersheds during at least two high rainfall events, analyze water samples for total	October 2015



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phosphorus, total suspended solids, chloride, and <u>e. coli</u> concentrations	
2. Confirm or modify remote sensing results, conduct analysis of mitigation costs versus impacts (e.g., reduction of phosphorus), identify first/best mitigation strategies to undertake, and create a report summarizing results for each watershed	February 2016

Activity 3: Delineate, ground truth, and develop strategies for five additional watersheds **Budget: \$68,945**

Activities 1 and 2 will be repeated in the five previous watersheds and five additional watersheds to document robustness of analysis techniques. Water samples will be collected over a complete ice-free season to capture a greater variety of discharges and sediment/dissolved materials loads in overland flows. Mitigations activities will be monitored and evaluated.

Outcome	Completion Date
1. Subwatershed flow compartments delineated in five new watersheds, data analyzed, and sites selected for water flow analysis in each watershed.	May 2016
2. Collect water samples from least five selected points within each of the ten (five new and five old) watersheds during at least five high rainfall events and analyze water samples	September 2016
3. Confirm or modify results, conduct costs/benefit analyses, identify first/best mitigation strategies to undertake, and create a water quality protection strategy document for each watershed	December 2016

III. PROJECT STRATEGY

A. Project Team/Partners

The project team includes Kent Montgomery, Natural Resources Instructor at CLC, Darren Mayers, Crow Wing Soil and Water Conservation District Technician, and CLC Natural Resources students. Mr. Montgomery will provide overall project management, including training, supervision, logistics, equipment management/maintenance, protection strategy writing/editing, dissemination, and project reporting. Mr. Montgomery will receive LCCMR funding for these roles in the form of release credits for classes associated with these activities, reducing/eliminating the cost for students.

Natural Resource students from CLC will provide watershed analysis, water sample collection and analysis, data management and quality assurance, protection and strategy writing. During their involvement in the program they will be enrolled in CLC courses for which they will receive credit. Students will be paid for their work with LCCMR funds given the stipulation that they are full-time students over the academic year.

Mr. Mayers will provide technical assistance in matching mitigation techniques with sediment and/or dissolved materials reduction opportunities and in identifying financial resources or incentives for implementing mitigation activities.

B. Project Impact and Long-Term Strategy

This LCCMR proposal represents a one-time funding request. Funding for this project will be used to support CLC student work and faculty support to develop water quality protection strategies. Water analysis equipment purchased with LCCMR funds will be used in conjunction with equipment currently in place at CLC (e.g., GIS software) after the conclusion of the project period to develop water quality protection strategies for additional watersheds. Other required supplies for this work will be provided through department budgets.

C. Timeline Requirements

This project will span an 18 month period, beginning July 2015. One full field season in 2016 (ice-free conditions) will be required to capture a more complete range of hydrologic conditions in the watersheds, including spring snow melt. The project and all reporting will be concluded by December 31, 2016.

2015 Detailed Project Budget

Project Title: Developing and Implementing Watershed-level Protection Strategies ofr Minnesota Lakes

IV. TOTAL ENRTF REQUEST BUDGET 1.5 years

BUDGET ITEM <i>(See "Guidance on Allowable Expenses", p. 13)</i>	AMOUNT
Personnel:	\$ -
Kent Montgomery, Project Manager (80% salary, 20% benefits); 33% FTE for 1.5 years	\$37,007
4 Student Workers, data collection and analysis (90% salary, 10% benefits) ; 100% FTE for 5 mo.	\$52,100
2 Student Workers, analysis and protection strategy writing (90% salary, 10% benefits); 50 % FTE for 12 mo.	\$26,050
Equipment/Tools/Supplies:	\$ -
Ion chromatography (this piece of equipment allows sample analysis for total phosphorus, total suspended solids, chloride, and other dissolved materials. This also ensures project sustainability in the future with all analysis done in-house - more economical and incorporated into curriculum.)	\$30,000
Stream flow meter	\$2,000
Stream water level recorders (2 @ \$500 ea.)	\$1,000
Quanti-tray sealer and pack (this equipment allows sample analysis for e. coli - purchase again assures sustainability of this project.)	\$4,600
Assorted lab glassware (cuvets, graduated cyclinders, flasks, ets.)	\$5,000
Chemicals for water sample processing (acetone, etc.)	\$5,000
Travel:	\$ -
Mileage (approx. 900 mi. travel to and from watersheds for sample collection)	\$4,950
Additional Budget Items:	
Institutional Cost Recovery (15%)	\$25,156
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 192,863

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ To Be Applied To Project During Project Period:	NA	
Other State \$ To Be Applied To Project During Project Period: <i>MNSCU allocation for Natural Resource Department Budget (travel, lab supplies, and chemicals)</i>	\$1,500	pending
In-kind Services To Be Applied To Project During Project Period:	NA	
Funding History: MNSCU Natural Resources Budget Allocation FY 2011-12 (3 stream depth recorders) and FY 2013-14 (ArcView License).	\$4,500	secured
Remaining \$ From Current ENRTF Appropriation:	NA	

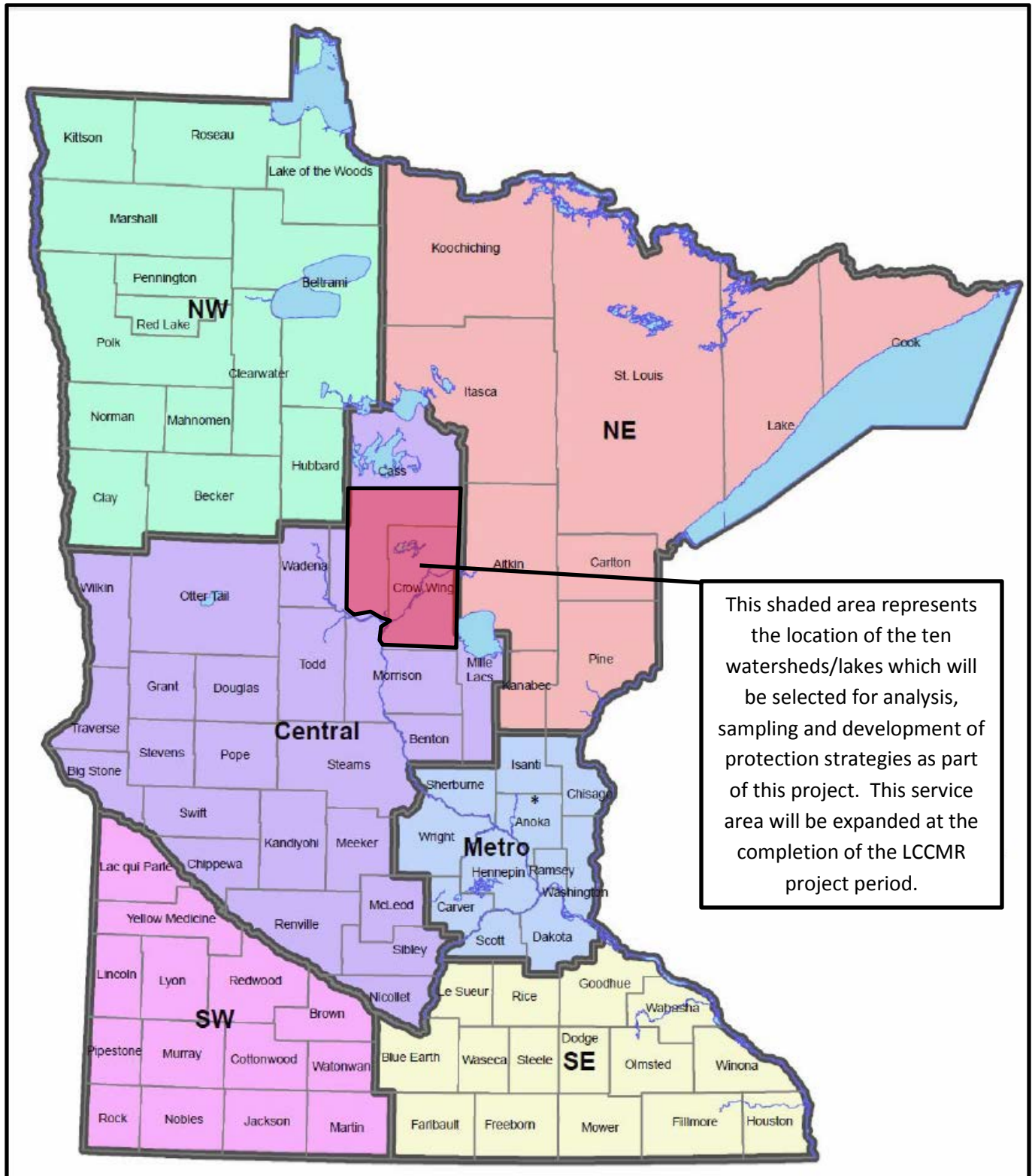


Environment and Natural Resources Trust Fund (ENRTF)

2015 Project Map

Project Title: Developing and Implementing Watershed-level Protection Strategies for Minnesota Lakes

Location of watersheds that will be analyzed, sampled, and will have protection strategies developed and implemented.





Environment and Natural Resources Trust Fund (ENRTF)
2015 Project Manager Qualifications and Organization Description
Project Title: Developing and Implementing Watershed-level Protection Strategies for Minnesota Lakes

Project Manager Qualifications

Kent Montgomery, Natural Resources Instructor at Central Lakes College (CLC), will serve as the project manager. Mr. Montgomery has managed several smaller Department of Defense grants while at CLC, including supervision of student workers, budget allocation and tracking, and grant reporting. Previously Mr. Montgomery has also administered numerous private, state, and Federal grants while at the University of Minnesota Extension Service and the Natural Resources Research Institute at the University of Minnesota Duluth.

Mr. Montgomery has over thirty years of experience in ecological monitoring and research, laboratory analysis, and remote sensing applied in wildlife management, forest management, and water resources contexts. He holds a B.A. in Education and Zoology from the University of Montana and an M. S. in Biology from the University of Minnesota, Duluth, as well as minors in Geology and Statistics. Mr. Montgomery currently teaches a variety of courses in the natural resources curriculum, including Limnology, Watershed Management, Ichthyology, Aquatic Invertebrate Ecology, Fisheries Management, and Field Methods in Freshwater Studies at CLC.

Organization Description

Central Lakes College is a regional facility, with campuses at Brainerd and Staples, is a member of the Minnesota State College and University System (MNSCU). During the 2011-12 academic year 6,252 students enrolled at Central Lakes College, including both the liberal arts and career/technical areas of study. Among the programs of study offered is a Natural Resources Technology A.A.S. degree, with approximately 40 students enrolled in the program annually. The majority of these students continue their natural resources training at a four-year institution. The Natural Resource program currently has transfer agreements with the Bemidji State University, the University of Minnesota, Crookston, and the University of Wisconsin, Stevens Point. Approximately 65% of students attending Central Lakes College receive some form of financial aid.