

**Environment and Natural Resources Trust Fund
2014 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 057-B

Protecting Water Quality in Northeast Minnesota Mining Areas

Category: B. Water Resources

Total Project Budget: \$ 406,000

Proposed Project Time Period for the Funding Requested: 3 Years, July 2014 - June 2017

Summary:

Prevent resource degradation by defining the threshold at which mining-related watershed changes will alter fisheries and recreational economies. Results will inform effective approaches to mining and resource protection.

Name: Ann Lewandowski

Sponsoring Organization: U of MN

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Location

Region: Northeast

County Name: Statewide

City / Township:

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



Environment and Natural Resources Trust Fund (ENRTF)

2014 Main Proposal

Project Title: Protecting Water Quality in Northeast Minnesota Mining Areas

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I. PROJECT STATEMENT

Mining activity in northeastern MN could accelerate over the next decade. The impact of this substantial land-use change could affect the habitat, water-quality, human health, and the recreation economy of the area.

Generally when a major land use change occurs, the surrounding environment can buffer adverse effects; but with passing time, a threshold may be crossed where the natural buffering capacity is overwhelmed and degradation is irreversible. Indicators – like a canary in a coal mine – need to be identified and monitored, and regional thresholds need to be defined to allow us to act in a timely way to prevent irreversible degradation.

A framework is needed to identify the indicators of environmental thresholds in Minnesota watersheds and to monitor for these indicators to protect at-risk waters. The Watershed Restoration and Protection Strategy (WRAPS) is a legislatively mandated framework for planning and implementing watershed interventions in Minnesota. The strategy for “restoration” is defined by the impaired waters process of the federal Clean Water Act. However, the “protection” portion of WRAPS has no clear strategy. To make effective protection decisions, watershed planners across the state need guidance for learning what indicators signal environmental thresholds in a particular watershed.

Project goals:

- Provide a clear understanding of the impact of planned mining activity in time to be able to adjust management strategies if needed to protect resources.
- Provide a general protection protocol that other watershed leaders can use to analyze the impacts of land use changes and to prevent resource degradation.

Approach:

1. **Measure watershed changes** in three watersheds in northeastern Minnesota where proposed mining or mineral exploration is occurring. Potential environmental-threshold indicators include:
 - animal (fish, macroinvertebrate, amphibians and wildlife),
 - plant (upland, riparian and wetland species), and
 - landscape features (channel geomorphic and biohydromorphic type and pathway).
 - Water quality and geochemical characteristics (soils, streambed-sediment, and bedrock).The last item, water quality and geochemical data, will not be funded by this project because it is being collected for the same three watersheds as part of the 2013 ENRTF-funded project titled “Assessment of Natural Copper-Nickel Bedrocks on Water Quality”. **Thus, this project will build on the value of the previous ENRTF project. That project will measure water quality, while this project will determine the impact and significance of the water quality changes.**
2. **Define the thresholds** at which these watershed changes have economically and ecologically significant impacts on habitat, fisheries, and recreational uses.
3. **Work with regional partners** throughout the project period to ensure the science is designed to inform and support mining and protection activities.
4. With PCA, use this project as a pilot to **develop a protocol to guide and define the “protection” strategy** component of WRAPS in other Minnesota watersheds.



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II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Collect data to understand watershed dynamics

Budget: \$203,000

Design and implement the study by developing an overarching plan including the installation of appropriate monitoring devices and assessment techniques at co-located sites.

Outcome	Completion Date
1. Define monitoring protocol (sites, parameters, methods, data quality)	Dec 2014
2. At defined sites, install equipment and set up baseline measures	Dec 2014
3. Collect monitoring data	Jun 2017

Activity 2: Analyze interactions; determine thresholds.

Budget: \$135,000

Determine interactions between measured indicators and impacts on water quality.

Outcome	Completion Date
1. Develop a data base, conduct statistical analysis, and report results annually	Jan '16, Jan '17
2. Hold annual data synthesis meeting of all collaborators to guide and adjust data collection	Nov '15, Nov '16

Activity 3: Finalize protection strategy and begin implementation

Budget: \$68,000

Collaborate with regional partners to incorporate results into a protection strategy. Collaborate with PCA to publish a statewide protection protocol for mandated WRAPS.

Outcome	Completion
1. Present results to state and local officials, and at a minimum of two public meetings.	Jun 2017
2. Publish results in peer reviewed journals, & present to colleagues at professional conferences.	Jun 2017
3. Provide a preliminary protection plan for the watershed.	Feb 2017
4. Prepare a final document for the protection portion of WRAPS that has statewide application.	Jun 2017

III. PROJECT STRATEGY

A. Project Team/Partners

Partial salary from ENRTF: (Magner, Hanson, and Lewandowski do not receive FT permanent U of M salary. Ferrington is on a 9 mo appointment.)

- Joe Magner (UMN), lead geomorphology assessment and implementation.
- Leonard Ferrington (UMN), Aquatic biologist, lead biological assessment and implementation.
- Chris Hanson (UMN Water Resources Center), editing services.
- Graduate student, collect and assess data
- Ann Lewandowski (UMN Water Resources Center), project management and communications coordination.
- Perry M. Jones (U.S. Geological Survey) Hydrologist, coordinate the water-quality, wetland and hydrological modeling with other USGS staff.

Time contributed:

- Bruce Wilson (Univ. of Minn.), Watershed statistician will lead statistical design and data analysis.
- Faye Sleeper (UMN Water Resources Center) will oversee and administer the grant

B. Timeline Requirements

3 years are required for this project: 2 ½ years of data collection after establishing the assessment system.

C. Long-Term Strategy and Future Funding Needs

While 3 years of monitoring will provide useful baseline data, we anticipate pursuing funding for another 3 years to account for lag time and climatic variability. We will work with PCA to incorporate the protection protocol into WRAPS guidelines. Development and implementation of future WRAPS across Minnesota will rely on Clean Water Land and Legacy funds.

2014 Detailed Project Budget

Project Title: Protecting Water Quality in Northeast Minnesota Mining Areas

IV. TOTAL ENRTF REQUEST BUDGET 3 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel:	\$ 290,420
Joe Magner, University of Minnesota (lead geomorphology assessment and implementation); .25 FTE 3 yrs, 93.6% salary, 6.4% fringe [\$89,333]	
Len Ferrington, University of Minnesota (lead biological assessment and implementation); 1 month for 3 yrs, 74.9% salary, 25.1% fringe [\$33,635]	
Ann Lewandowski, project manager .25 FTE for 3 yrs, 80.4% salary, 19.6% fringe [\$49,303]	
Editor .05 FTE 3 yrs, 79.0% salary, 21.0% fringe [\$5,561]	
Graduate student (data collection and analysis); academic year .5 FTE for 3 yrs, 54.4% salary, 45.6% fringe [\$112,588]	
Contracts:	\$ 81,000
USGS (Lead hydrology and hydrologic modeling) \$25,000/yr for 3 years; [\$75,000]	
local technical expert (check equipment, take readings between visits by students) \$2,000/year for 3 yrs [\$6,000]	
Other Direct Costs:	\$ 2,000
local partner to engage stakeholders and arrange 4 public meetings, [\$2,000]	
Equipment/Tools/Supplies: Equipment will be used at these sites for at least six years	\$ 11,500
Backpack shocker for monitoring fish population [\$3,500]	
field laser level to analyze stream morphology [\$2,000]	
3 camera set ups for monitoring storm dynamics - time lapse @ 2,000 each [\$6,000]	
Travel: Based on University of Minnesota travel policy	\$ 21,080
Year 1 (establish monitoring sites): 8 trips to 3 sites in northeast minnesota to collect biological and geomorphology data, and engage with local partners.	
Year 2 (maintain monitoring sites): 8 trips to 3 sites in northeast minnesota to collect biological and geomorphology data, and engage with local partners.	
Year 3 (maintain monitoring sites; presentations to public and agencies): :8 trips to 3 sites in northeast minnesota to collect biological and geomorphology data, and engage with local partners.	
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 406,000

V. OTHER FUNDS

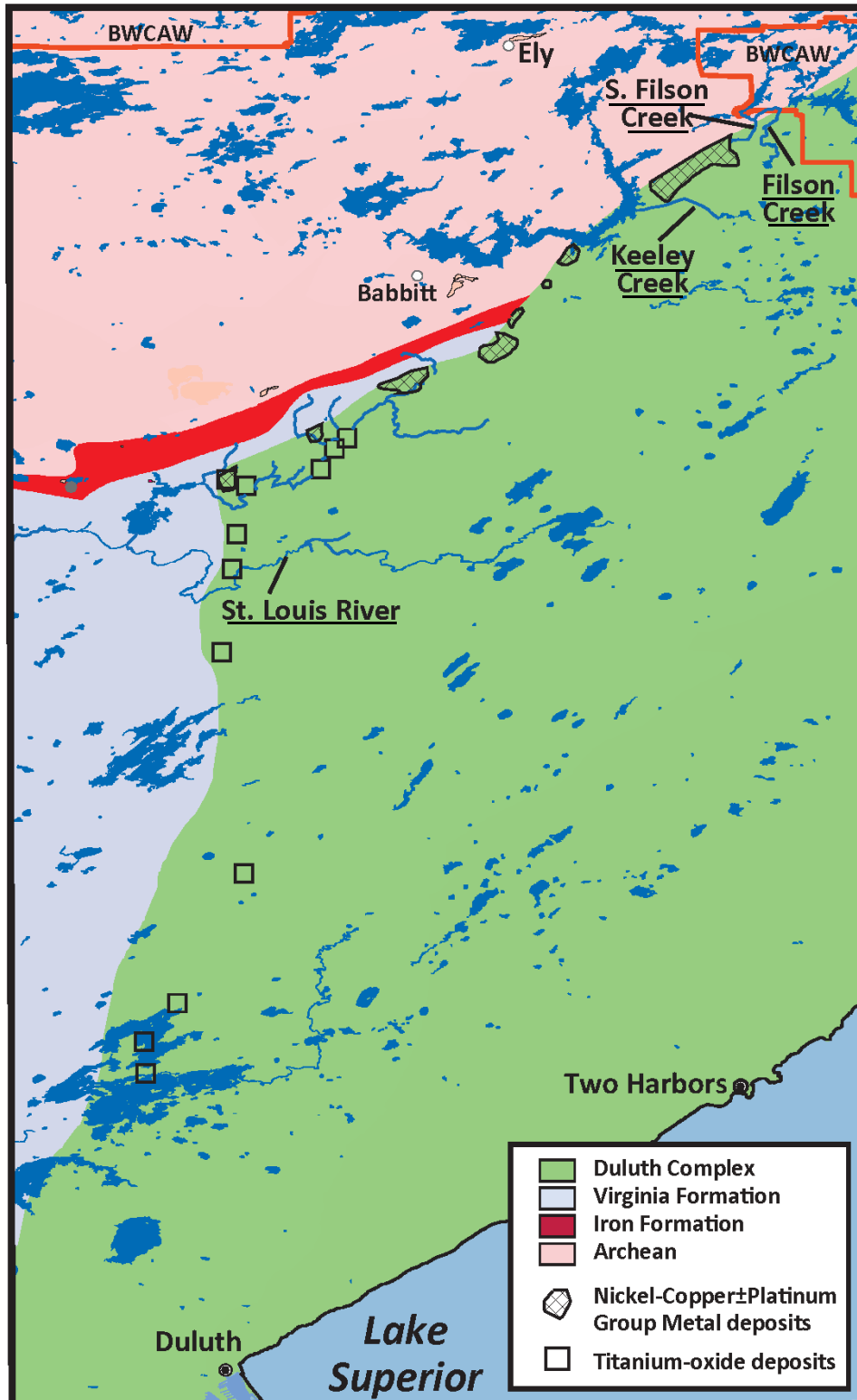
<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
In-kind Services During Project Period:	\$ 4,505	secured
Faye Sleeper 1% each year not funded by grant = 3,372 salary + 1133 fringe		
Funding History: A related but not duplicative project:	\$ 585,000	secured
2013 ENRTF-funded project ID# 05b: "How do natural copper-nickel concentrations in bedrock influence water quality?"		

ENRTF 2014

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The labeled creeks drain watersheds that could be affected by future mining and will be assessed as part of this project.



ENRTF 2014

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PROJECT MANAGER QUALIFICATIONS & ORGANIZATION DESCRIPTION

Ann Lewandowski will coordinate project activities and communications with partners. Ann is a Research Fellow for the University of Minnesota's Water Resources Center. For the past 10 years, she has coordinated research and outreach projects related to water and soil quality in both agricultural and forested regions of the state. These projects have given Ann extensive experience coordinating diverse interests including landowners, local government staff, private business, non-profits, state agencies, and academic researchers. Prior to working for the University, Ann worked for the USDA Natural Resources Conservation Service developing communication materials related to soil management. She has training in group facilitation, experience in communication and project management, and a Master's Degree in Geography from the University of Minnesota with an emphasis in soils and natural resource science.

Joe Magner received degrees from the University of Wisconsin and Minnesota and has served as an environmental water resource scientist and educator in varying roles for over 34 years; advising federal, state and local governments, including officials in China, India, Azerbaijan and South Africa. Dr. Magner was the chief architect of the MPCA's Watershed Restoration and Protection Strategy (WRAPS). Dr. Magner is a research professor in the Department of Bioproducts & and Biosystems Engineering at the University of Minnesota. He teaches classes in water quality, hydrology and watershed management and advises graduate students seeking to learn more about watershed systems. Joe has over 70 publications and is a co-author of the 4th edition of *Hydrology and the Management of Watersheds* published by Wiley-Blackwell (2012)

Faye Sleeper is co-director of the University of Minnesota's Water Resources Center and will be overall project manager for this proposal. She works on issues related to impaired waters/total maximum daily load, water policy, citizen engagement and bringing together practitioners with researchers to solve water quality and quantity issues. Faye has facilitated numerous projects and meetings throughout her career and more recently projects on environmental education, water quality protection and restoration, climate change adaptation, clean water funds measurement and TMDL training for agricultural producers. Prior to this current position Faye worked at the Minnesota Pollution Control Agency (MPCA) for 17 years, managing the Watershed Section for the last 8 years. Faye is Water Quality Coordinator for the Great Lakes Region Water NIFA team and represents University of Minnesota Extension on the Board of Water and Soil Resources. Faye has managed numerous grant projects that included technical expertise, including US/Russia Wastewater Project, USDA CSREES water quality grant, USDA NIFA Conservation Reserve Program Grant and USDA-EPA Road Salt Education Grant.

Organization Description

The University of Minnesota is one of the largest, most comprehensive, and most prestigious public universities in the United States (http://www1.umn.edu/twincities/01_about.php). The facilities at the University contain all the facilities needed for the proposed research.