

**Environment and Natural Resources Trust Fund
2010 Request for Proposals (RFP)**

LCCMR ID: 106-C

Project Title:

Evaluating Wetland Restoration Effectiveness to Improve Future Efforts

LCCMR 2010 Funding Priority:

C. Habitat Restoration, Enhancement, and Acquisition

Total Project Budget: \$ \$395,000

Proposed Project Time Period for the Funding Requested: 3 years, 2010 - 2013

Other Non-State Funds: \$ \$0

Summary:

Better understand the effectiveness of wetland restorations with regard to water quality improvement and other benefits across Minnesotas prairie pothole region through rigorous monitoring and develop wetland restoration guidance.

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Sponsoring Organization: Board of Water and Soil Resources

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Location:

Region: NW, Central, SW, SE

County Name: Martin

City / Township:

_____ Knowledge Base	_____ Broad App.	_____ Innovation
_____ Leverage	_____ Outcomes	
_____ Partnerships	_____ Urgency	_____ TOTAL

MAIN PROPOSAL

PROJECT TITLE: Evaluating Wetland Restoration Effectiveness to Improve Future Efforts

I. PROJECT STATEMENT

Wetlands are an integral part of Minnesota's landscape, providing water quality benefits by filtering pollutants (sediment, nutrients, pesticides) and providing water quantity benefits by attenuating peak flows and increasing groundwater recharge. Wetlands also host a tremendous diversity of flora and fauna.

The Minnesota Board of Water and Soil Resources (BWSR) implements numerous wetland restorations through the RIM program and wetland banking program. The Legislature has a long-standing commitment to restoring MN wetlands. This commitment, combined with an increasing emphasis on outcomes and TMDL implementation (of which wetland restoration is a component) makes it essential that the water quality, water quantity, and habitat benefits of these efforts are well understood. The purpose of this project is twofold: 1) build upon the wetland monitoring being conducted in Martin Co. since 2004 by Dr. Ken Brooks, in support of the LCMR-funded third crop project, and evaluate a wider range of critical factors in wetland function (drainage area, soils, etc.) to increase our understanding of function and benefit; and 2) to use these data to enhance future wetland restoration efforts for multiple benefits (habitat restoration, water quality improvement, flood reduction, etc.).

Monitoring of restored wetlands in two subwatersheds of Elm Creek in Martin County will cease in the summer of 2009 without additional investment. It is critical to continue monitoring the Elm Creek sites as a benchmark and to monitor and evaluate additional sites with different characteristics. Sites will be selected to represent a broad range of characteristics important to wetland function. The monitored wetlands in Elm Creek have significantly reduced stormflow peaks and volumes, as well as reduced nitrate levels (Lenhart 2008). However, there is considerable variability in phosphorus and suspended sediment export from the restored wetlands that may be due to their physical characteristics and to residual phosphorus in the soils underlying the restored wetlands; further study of these relationships are needed. With the rich data sets collected, the two Elm Creek wetland sites serve as valuable benchmarks for new wetland restorations. The expanded monitoring of three new sites can provide insight into how to better locate and design wetland restorations to achieve the maximum multiple benefits of hydrology, water quality and habitat. Long-term data sets are invaluable for evaluating key wetland characteristics and prioritizing sites for wetland restoration across different Minnesota landscapes. The three new sites will be selected to represent a broader range of soils and watershed characteristics – at wetland scales that can influence wetland functions. The project will sample and characterize pre-restoration conditions, including soil phosphorus and other nutrient data, on sediment, nutrient, and pesticide export from the drainage area selected for wetland restoration. Invasive and native vegetation site characteristics and restoration outcomes will also be evaluated.

II. DESCRIPTION OF PROJECT RESULTS

Result 1: Correlate Water Quality to Soil and Watershed Conditions

Budget: \$ 60,000

Additional monitoring and evaluation will be performed to explain the phosphorus and sediment export from the wetlands being studied in Martin County with the objective of explaining cause and effect relationships and opportunities.

Deliverable

1. *Wetland Monitoring Report for the Two Elm Creek Wetlands*

Completion Date

May, 2013

Result 2: Wetland Effectiveness in Relation to Key Characteristics **Budget: \$ 320,000**

A monitoring plan similar to that at the Elm Creek site will be established at three new wetland restoration sites. The objective of this effort is to confirm and/or build upon the relationships between wetland effectiveness and soil and watershed characteristics that are being developed for the Elm Creek wetlands. Soil phosphorus and nitrogen levels will be determined at wetland restoration sites before restoration projects are implemented. Baseline hydrology and sediment, nutrient and pesticide export from the site's drainage area will be determined to provide a baseline for evaluating wetland effectiveness. Monitoring data will be used to calibrate/validate state-of-the-art software models that can be used to estimate the effectiveness of un-monitored sites. A better understanding of wetland function and process across Minnesota's landscape will inform future prioritization and restoration efforts and provide valuable reference data for completed restorations.

Deliverable

1. *Technical Report Summarizing all Monitoring Efforts and Analyses*

Completion Date

May 2013

Result 3: Develop Technical Guidance for Wetland Restoration **Budget: \$ 15,000**

A guidance document will be developed to aid in future restorations. The guidance document will be targeted towards wetland restoration practitioners. The focus will be on how different watershed characteristics impact wetland restoration and strategies to account for and manage these characteristics in the planning and design phases. Recommendations on pre-project monitoring and data collection will be included.

Deliverable

1. *Wetland Restoration for Multiple Benefits Guidance Document*

Completion Date

May, 2013

III. PROJECT STRATEGY

A. Project Team/Partners

BWSR – Joel Peterson, Al Kean and other BWSR staff will provide overall project management, coordinate selection of project sites through new RIM-WRP signups, help with pre-project data collection when BWSR staff or SWCD staff perform site visits, and will perform vegetation monitoring at the sites.

University of Minnesota – Dr. Ken Brooks, Dean Current and colleagues in the Center for Integrated Natural Resources and Agricultural Management (CINRAM). Dr. Brooks will serve as overall technical manager and will oversee data collection, analysis, and modeling activities. Other collaborators with the existing monitoring along Elm Creek include the Martin County SWCD and Linda Meschke, Rural Advantage.

B. Timeline Requirements

This project will require 3 years. It is anticipated that funding will not be available until July 1, 2010. Further monitoring of the Elm Creek site will begin immediately. Pre-project baseline data will be collected in 2010 at new sites. This requires targeting project sites that will be constructed in 2010 so we can collect monitoring data at these sites in 2011 and 2012.

C. Long-Term Strategy

This project will build upon LCMR funded work already being conducted. While short-term monitoring is useful (2-3 years), long-term monitoring at wetland sites is important to a better understanding of process and effectiveness. We will seek opportunities to continue monitoring these sites, to the extent warranted by costs and benefits.

Project Budget

IV. TOTAL PROJECT REQUEST BUDGET (3 years)

BUDGET ITEM	AMOUNT
Contracts:	\$ -
University of Minnesota, Department of Forestry, includes for (1) Water quality and soil analysis, (2) travel expenses to design, install, and maintain monitoring equipment, (3) graduate student to assist with field data collection and data analysis, (4) graduate student to perform model work and develop technical manual	\$ 245,000
Equipment/Tools/Supplies: Monitoring equipment for 3 sites	\$ 150,000
Travel:	\$ -
Additional Budget Items:	\$ -
TOTAL PROJECT BUDGET REQUEST TO LCCMR	\$ 395,000

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period:	\$ -	
Other State \$ Being Applied to Project During Project Period:	\$ -	
In-kind Services During Project Period:	\$ -	
University of Minnesota faculty time	\$ 15,000	
BWSR personnel time directly related to project (Joel Peterson 5% FTE, Al Kean 1% FTE, Tom Wenzel 1%FTE and miscellaneous technician time)	\$ 22,000	
RIM-WRP wetland restoration for 3 sites	\$ 22,000	
Remaining \$ from Current Trust Fund Appropriation (if applicable):		
Funding History: Minnesota Environment and Natural Resources Trust Fund, 2003-2006. Part of project "Native Plants and Alternative Crops for Water Quality" (Total Project Funding Indicated, not all directly related to this proposal)	\$ 622,000	
Minnesota Environment and Natural Resources Trust Fund, 2005-2008. Component of project "Third Crops for Water Quality - Phase 2" (Total Project Funding Indicated, not all directly related to this proposal)	\$ 500,000	
Minnesota Pollution Control Agency. 2006-2009. EPA 319 Grant. "Assessing potential of watershed and stream channel modifications on suspended sediment, turbidity, and nutrients in the Blue Earth River Basin". (Total Project Funding Indicated, not all directly related to this proposal)	\$ 295,000	
Xcel Energy. 2008-2013. Data from Elm Creek Monitoring being used in this project entitled: "Lowering the cost of bioenergy feedstock while providing environmental services".		

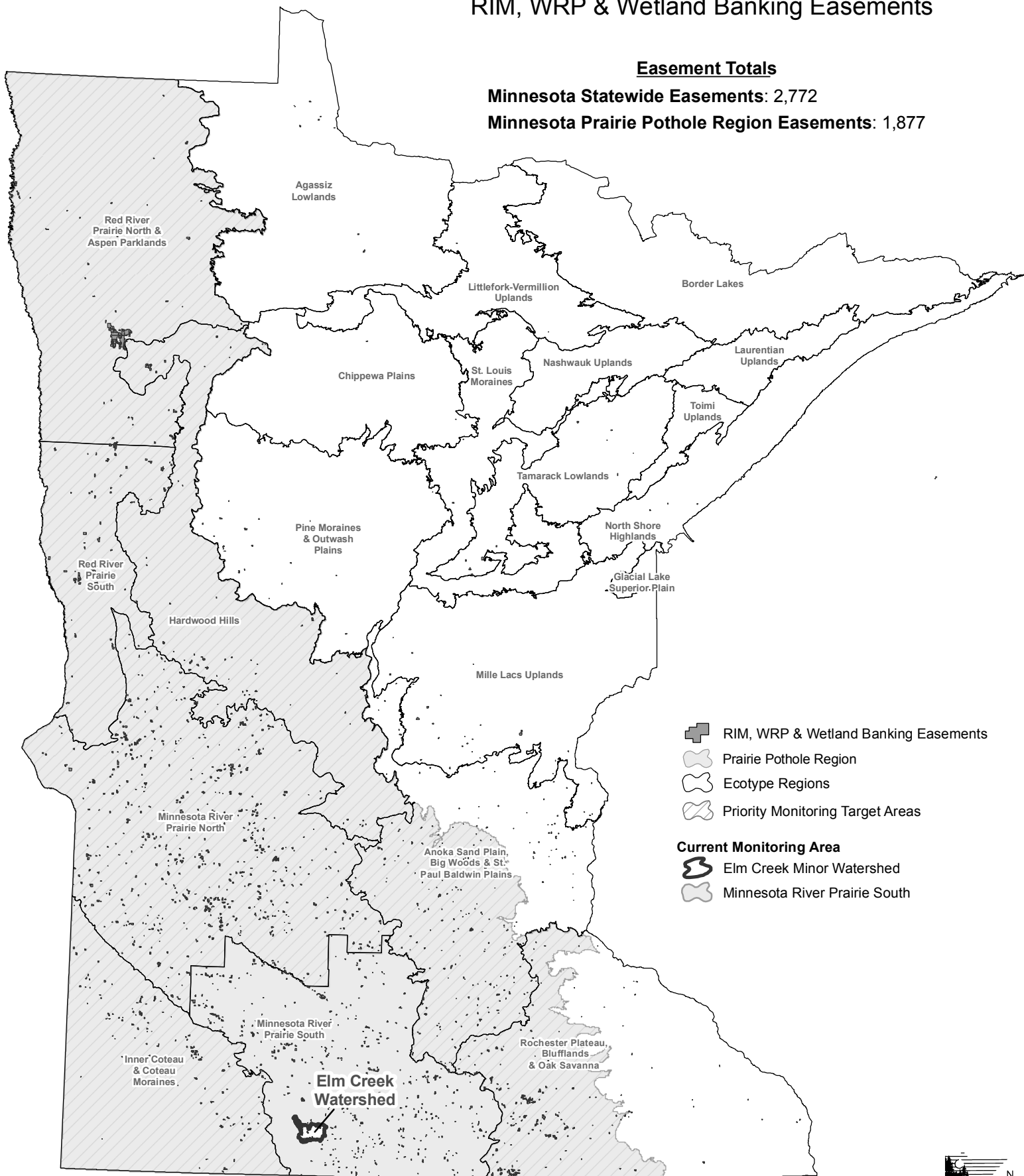
BWSR Wetland Restoration Projects

RIM, WRP & Wetland Banking Easements

Easement Totals

Minnesota Statewide Easements: 2,772

Minnesota Prairie Pothole Region Easements: 1,877



MANAGER QUALIFICATIONS AND ORGANIZATION

Manager Qualifications:

Dr. Joel Peterson is a registered professional engineer in the State of Minnesota and has worked in academia, private consulting and in the public sector for over 10 years. At the BWSR he is the lead technical and administrative engineer in the drainage area. His areas of responsibility include leading the interagency Drainage Management Team, providing technical assistance to drainage authorities, leading the writing of the update of the Minnesota Public Drainage Manual. Dr. Peterson is also an Adjunct Assistant Professor at the University of Minnesota in the Department of Biosystems and Bioproducts Engineering.

As a consulting engineer, Dr. Peterson served as a project engineer and project manager on water resources projects. These projects included rain garden design, regional infiltration basin design, stream restoration design, channel embankment protection, and modeling studies. Construction costs of these projects ranged from \$10,000 to multi-million dollar projects. Dr. Peterson also worked for the US Army Corps of Engineers on ecosystem restoration projects and served as Water and Sanitation project manager for the Corps in Baghdad, Iraq from August through December 2003.

During graduate school and as a Visiting Assistant Professor focused on hydrologic modeling and erosion mechanics and taught junior level water resources engineering.

Dr. Peterson received his BS, MS, and PhD degrees from the University of Minnesota, The Pennsylvania State University, and Purdue University, respectively, in Agricultural Engineering with emphasis in Water Resources Engineering.

Organization Description:

The mission of the Board of Water and Soil Resources is to assist local governments to manage and conserve their irreplaceable water and soil resources.

Minnesota Statutes 103B.101 directs the BWSR to facilitate communication and coordination among state agencies and between state and local units of government to make the expertise and resources of the state agencies involved in water and soil resources management available to local units of government. This includes engineering assistance for conservation on private lands.

The BWSR facilitates the stakeholder Drainage Work Group and interagency Drainage Management Team and thus is acutely aware of drainage policy and research in Minnesota. The BWSR is leading the update of the Minnesota Public Drainage Manual, which will include chapters on engineering and Best Management Practices (BMPs).