

**Environment and Natural Resources Trust Fund
2011-2012 Request for Proposals (RFP)**

LCCMR ID: 046-B

Project Title: Crop Residue Status and Soil Loss Outcomes Model

Category: B. Water Resources

Total Project Budget: \$ \$628,966

Proposed Project Time Period for the Funding Requested: 3 yrs, July 2011 - June 2014

Other Non-State Funds: \$ 0

Summary:

The Soil Loss Outcomes Model Project will work with 67 Soil and Water Conservation Districts to complete Crop Residue Management Surveys for three years and calculate soil loss using RUSLE2.

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Location

Region: NW, Central, Metro, SW, SE

Ecological Section: Western Superior Uplands (212K), No. Minnesota Drift and Lake Plains (212N), Paleozoic Plateau (222L), Minnesota and NE Iowa Morainal (222M), Lake Agassiz, Aspen Parklands (223N), Red River Valley (251A), North Central Glaciated Plains (251B)

County Name: d, Traverse, Wabasha, Wadena, Waseca, Watonwan, Wilkin, Winona, Wright, Yellow Medicine

City / Township:

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

PROJECT TITLE: Crop Residue Status and Soil Loss Outcomes Model

I. PROJECT STATEMENT

Keeping productive soil on the land and out of the water is one of Minnesota's primary conservation goals. The counties, state and federal government administer a variety of programs that work together to help landowners reduce soil erosion to tolerable ("T") levels or below. Many TMDL implementation plans also call for practices that reduce sediment transport; however, opportunities to evaluate outcomes and measure success are rare. Since the 1980s, landowners have made strides toward conserving productive soil on the land through the use of numerous soil conservation techniques. The transect survey is a statistical method for estimating cropland soil erosion based on a visual examination of field conditions. It is currently one of the few practices that can readily be assessed for soil loss reductions; however, the right evaluation tools and data collection protocols must be in place. The 2007 Tillage Transect Survey (TTS), also referred to as Crop Residue Management Surveys, represents the first electronically available resource for residue data in Minnesota and has facilitated the evaluation of residue data not only by county, but by watershed as well.

The Tillage Transect Survey Project will work with 67 Soil and Water Conservation Districts (SWCD) and/or Watersheds to complete Tillage Transect Surveys of their counties for three consecutive years. Via modification of a Wisconsin-based model, the Water Resources Center is ready to finish program development (modification of Wisconsin Tillage Transect Program), work with SWCD's and other local partners to obtain three consecutive years of data, and deliver credible outcomes that relate land use practices to water quality.

The overall goal of this project is improve on previous tillage transect surveys and provide a better mechanism to conduct the survey as well as report the results of the survey quickly. The overall goal will be strengthened by the following project goals.

1. Track the crop residue management practices throughout Minnesota and determine if improved tillage practices have an effect on soil loss.
2. Collect Tillage Transect data for three consecutive seasons based on new parameters tied to the RUSLE2 program and be able to calculate soil loss for the 32,000 points.
3. Create repository for Transect Data that will allow for one central location to analyze the data over three years and for any future surveys completed after the project.
4. Assess and report on data to determine soil loss in Minnesota by county, watershed, basin and statewide as well as any other geographic region.

The project will achieve these goals through the implementation of the new Minnesota WinTransect Program that will be used as a tool for collection of Tillage Transect data in the field. WinTransect is a program that utilizes soil data and climate zone data along with the transect information collected to calculate a soil loss component for each of the 32,000 stops. WinTransect allows for data collection in the field that is readily available. The point data is stored in one compact database and can be used yearly. Analysis and Reports are available immediately compared to many months to a year in previous tillage transect surveys.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: WinTransect Development and Route Adjustment Budget: **\$36,313.00**

Develop WinTransect Program and data collection protocols for new Tillage Transect Surveys and conduct GIS analysis/adjustment of transect routes to provide better survey coverage.

Outcome	Completion Date
1. Modify Wisconsin Program/GIS Route Analysis and Adjustment	January 2012

Activity 2: Quality Control and Protocol Training Budget: **\$59,220.00**

Develop and implement training sessions for viewers to provide quality control and overview protocols for consistent and standardized data across Minnesota-

Outcome	Completion Date
1. Coordinate and Implement Training Sessions for SWCD/Watersheds	April 2012
Activity 3: Tillage Transect Survey Data Collection Budget: \$448,595.00	
Coordinate SWCD/Watershed Data Collection and manage data, including quality control and quality assurance checks over the three consecutive years.	
Outcome	Completion Date
1. Completion of Tillage Transect Survey and Prepare Annual Report	July 2012
2. Completion of Tillage Transect Survey and Prepare Annual Report	July 2013
3. Completion of Tillage Transect Survey and Prepare Annual Report	July 2014
Activity 4: Assessment of Soil Loss Data Results Budget: \$46,467.00	
Finalize Data and Assess Soil Loss Data Results on Several Scales, including an Assessment on Nutrient Relationships- Tillage Practices will be reported yearly following the survey.	
Outcome	Completion Date
1. Assess Soil Loss Data Results and Analyze Data for Trends	September 2014
Activity 5: Soil Loss Data Results and Report Budget: \$38,371.00	
Present Results to Interested Stakeholders and Government Staff, including Collection of Feedback from Participants as well as a Final Report-	
Outcome	Completion Date
1. Prepare Report of Soil Loss from Data and Creation of Final Report.	September 2014

III. PROJECT STRATEGY

A. Project Team/Partners

Water Resources Center Staff (Project Team): *Shannon Fisher, Director* – project manager, develop protocol, deliver training sessions. Personnel - (\$43,996 – 0.15 FTE for 3 years) *Rick Moore, GIS Specialist* – development of WinTransect Program, Route analysis and route adjustment, Collect data from supporting Soil and Water Conservation District's (SWCD)/ Watersheds, analyze data. Personnel – (\$131,526 – 0.5 FTE for three years) *Office Support Staff* – Other State \$ being applied to Project (\$3,000) – Secured from MSU - Mankato

SWCD/Watershed Staff (Project Team) (67 counties with >30% cropland) – Attend preliminary and follow up Training Sessions – In-kind Services (67 people for 1 day each @\$25/hr = \$13,400), Viewer prep time in the office – In-kind Services (67 people for 1/2 day @ \$25/hr per year = \$20,100), Conduct Tillage Transect Surveys each May/June – Contract Work - (67 SWCD - \$2,100/year for 3 years = \$422,100).

Paul Kaarakka – University of Wisconsin Soils Science Software Programmer (Project Team) – WinTransect Program Development and Corresponding Soil and Climate Data Development. Contract Work – (2 months @ \$7,500/month = \$15,000)

Minnesota River Board (Partner) – Pending Grant Application for Projects – (\$3,000) – In-Kind Services – MN River Board Director Admin contributions (5 days/year at \$527/day = \$7,905)

B. Timeline Requirements

The data for the first two years would just show the tillage practices and crops. In the third year of the program, actual soil loss calculations would be able to be run. To calculate soil loss, RUSLE2 calculations are run for a single year with 2 years “lead-in” to avoid the effects of RUSLE2 starting it’s modeling from bare soil. Therefore, because of this requirement for RUSLE2, soil loss calculations would not be reported until year three. Transects will be completed in May/June of 2012, 2013, and 2014. Analysis of data would be ongoing and occur immediately after the last transect in 2014 with time needed to analyze and produce reports.

C. Long-Term Strategy and Future Funding Needs

The long term application of this project is evident as we try to assess our success in reducing sediment transport to our rivers, lakes and streams. If funded, this project would be an ongoing project to collect tillage transect data and report on tillage practices within the state.

2011-2012 Detailed Project Budget

PROJECT TITLE: Crop Residue Status and Soil Loss Outcomes Model

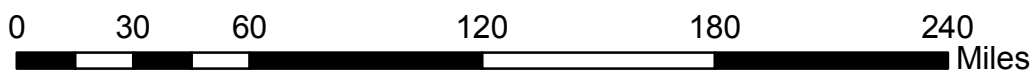
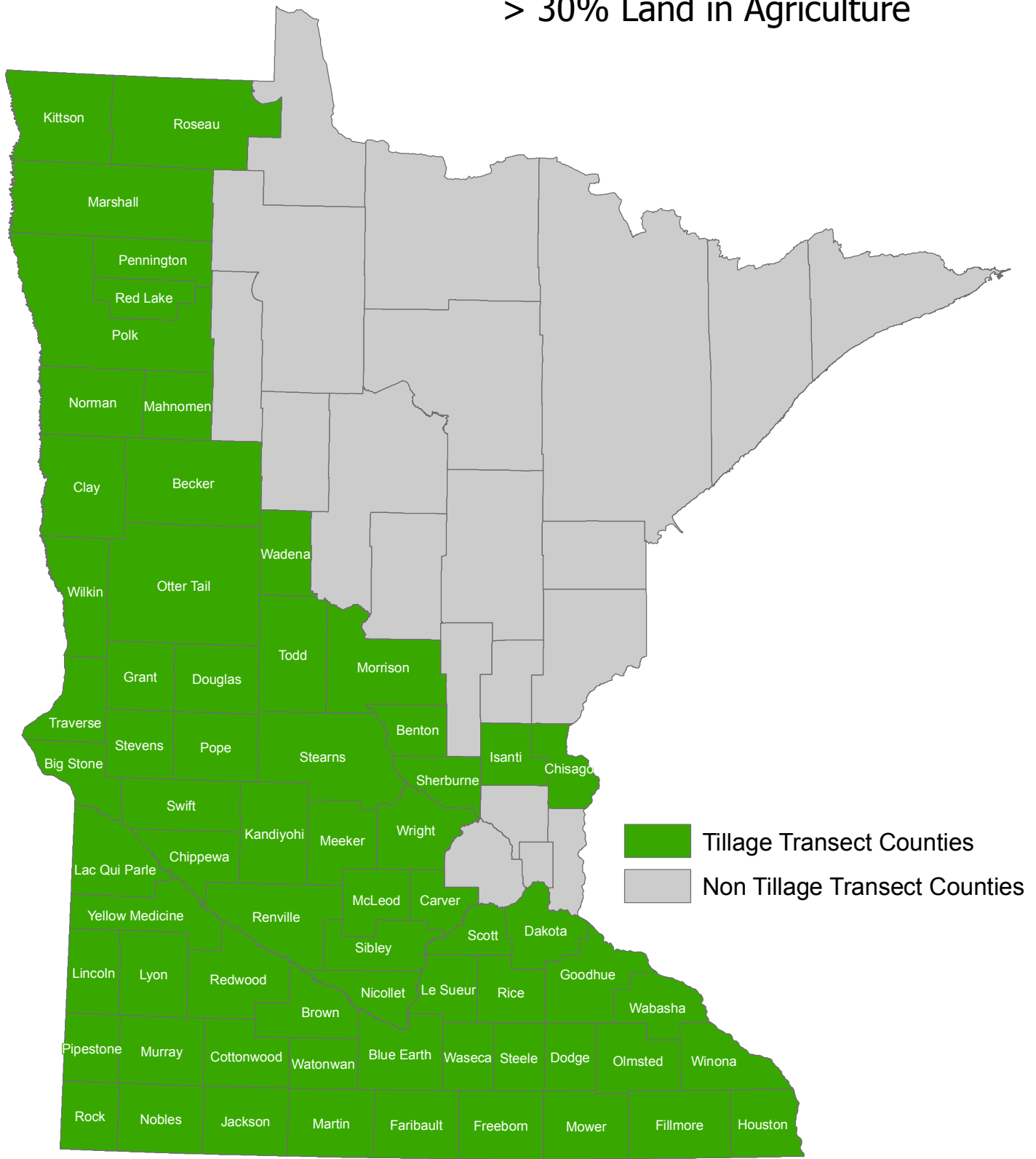
IV. TOTAL TRUST FUND REQUEST BUDGET - 3 years

BUDGET ITEM (See list of Eligible & Non-Eligible Costs, p. 13)	AMOUNT
Personnel: 1) WRC Director. Project Coordination, Training Delivery, Contract Development, Report Completion. \$43,996 (71% salary, 29% fringe) for a 0.15 FTE for 3 years. 2) Research Analysts, Int. Training Development and delivery, program/GIS assessment and model development, technical services to contractors. \$131,526 (71% wages, 29% fringe) for a 0.5 FTE for three years.	\$ 175,522
Contracts: 1) WinTransect Program Modification from WI to MN version. UW Soil Science software programmer. 2 months @\$7,500/month. 2) Tillage Transect Viewer Contracts with 67 entities (SWCDs, Counties, WDs, etc...) for three years. Each contract will be valued at approximately \$2,100/year for 3 years for 67 service areas.	\$ 437,100
Equipment/Tools/Supplies: 1) GPS units to borrow out to various disciplines. 2) data drives for provision of data and programs to participants. 3) Office supplies pertaining to project	\$ 3,200
Acquisition (Fee Title or Permanent Easements): Does not apply to this project.	\$ -
Travel: All travel for this project will be within the counties of Minnesota. Travel will include trips to various locations within the ag-portions of Minnesota to conduct project training, spot check reviewers, meet with engaged citizens.	\$ 8,244
Additional Budget Items: Printing of training manuals, training event venue fees	\$ 4,900
TOTAL ENVIRONMENT & NATURAL RESOURCES TRUST FUND \$ REQUEST	\$ 628,966

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period: Indicate any additional non-state cash \$ to be spent on the project during the funding period. For each individual sum, list out the source of the funds, the amount, and indicate whether the funds are secured or pending approval.	\$ 3,000	Pending application from MN River Board
Other State \$ Being Applied to Project During Project Period: Indicate any additional state cash \$ (e.g. bonding, other grants) to be spent on the project during the funding period. For each individual sum, list out the source of the funds, the amount, and indicate whether the funds are secured or pending approval.	\$ 3,000	Secured from MSU Mankato
In-kind Services During Project Period: Viewer attendance at mandatory training sessions (67 people for 1 day each @\$25/hour = \$13,400). Viewer prep time in the office (67 people for 1/2 day @\$25/hr per year = \$20,100). MN River Board Director Admin contributions (5 days/year at \$527/day = \$7,905).	\$ 41,405	Required as part of contracts.
Remaining \$ from Current ENRTF Appropriation (if applicable): None	\$ -	NA
Funding History: The MN Board of Water and Soil Resources has provided funding for the completion of tillage transect/residual cover surveys. In addition, they provide research and development funds for the WI model that will be the basis for this effort. This project would take it to the next step by allowing us to model soil loss better and demonstrate soil and nutrient loss reductions in association with the many impaired waters studies that are currently ongoing while still allowing productive ag lands to remain in production.	\$168,497	BWSR

2011 Tillage Transect Counties > 30% Land in Agriculture



PROJECT TITLE: CROP RESIDUE STATUS AND SOIL LOSS OUTCOMES MODEL

SHANNON J. FISHER

WRC DIRECTOR; MN RIVER BOARD EXECUTIVE DIRECTOR, ASSOCIATE PROFESSOR OF BIOLOGY

Dr. Fisher received his B.S. (1994) from Northland College and his M.S. (1996) and Ph.D. (1999) from South Dakota State University. He was an Environmental Review Ecologist and Fisheries Biologist for the MN DNR for 5 years before starting with the Water Resources Center in April 2005. In addition to his WRC duties, he serves as the Executive Director for the Minnesota River Board (MRB) and as an Associate Professor of Biology, teaching Lake Ecology, Fisheries Biology, Research Methods, and Fisheries Ecology.

In his collective capacity, Dr. Fisher provides administrative support to the WRC/MRB staff, leads a delegation of local officials working to improve water quality in the Minnesota River Basin, advises student researchers, maintains stakeholder relations, instructs courses, coordinates conferences, and lobbies policymakers. These activities focus on the WRC/MRB mission to collect and disseminate water quality, watershed, and aquatic ecology information – with an emphasis on engaging students and educating our regional community. Dr. Fisher’s research interests include water quality impacts on stream and lake biota, riverine and fisheries ecology, impaired waters restoration, agricultural drainage, and shallow lakes management. Dr. Fisher is pleased to be involved with undergraduate and graduate students to prepare them for future positions in watershed, fisheries, and water quality work – in collaboration with the Department s of Biology, Chemistry and Geology, Geography, and Civil Engineering.

The Water Resources Center (WRC) at Minnesota State Mankato was created in 1987 and serves as a regional center for water quality research and education. The WRC has led more than 100 research and educational projects. Shannon Fisher, WRC Director and Minnesota River Board (MRB) Executive Director, has supervised dozens of projects, including a current Conservation Innovation Grant valued at \$1 million on water quality credit trading. Director Fisher is also responsible for a 319 projects entitled “Evaluation of Nutrient and Bacterial Transport from Manure Applied Lands” and “Evaluation of Artificial Drainage Roles in Altering Hydrology.” The WRC team completed the 2007 Tillage Transect Survey and has been leading state efforts in residue management research and implementation. Our work has converted an archaic collection system into an electronic GIS layer that facilitated watershed residue assessment, trends analysis, and increased accuracy. Rick Moore (co PI) completed research on strategies to bring residue management into an “outcome” based process to measure soil loss (and indirectly phosphorous loss) and serve as an improved tracking mechanism for local governments to assess residue management impacts on TMDL implementation plans – with measurable outcomes!

WRC Mission and Overview: The Water Resources Center was created in 1987 and facilitates a mission to gather, interpret, and distribute data of environmental significance to help citizens enhance the quality of regional lakes, rivers, wetlands, and groundwater. This is accomplished through faculty and student applied research, educational programming, technical assistance, and water resource planning. As a center for environmental research and information exchange, the WRC distributes data and provides support to those interested in improving water resources in southern Minnesota. The Minnesota River Basin Data Center website contains a vast amount of data drawn from a variety of sources and organized in an easily accessible manner. The website includes descriptive and Geographic Information System (GIS) data by watershed, summaries of watershed project accomplishments, and links to pertinent watershed information.

Beyond data collection and dissemination, the WRC provides support to local and regional groups with a strong partnership with the Minnesota River Board. WRC staff assist with planning and coordination, technical problem solving, as well as providing outreach and educational services. The WRC also maintains a certified laboratory that provides expert analysis for numerous lake and watershed assessment projects across southern Minnesota. This work has been instrumental in helping local groups define strategies to protect water resources of interest.