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

Project Title: **ENRTF ID: 053-B**

Tile Outlet Treatment Trains to Improve Water Quality

Category: B. Water Resources

Total Project Budget: $ 514,394

Proposed Project Time Period for the Funding Requested: 3 years, July 2015 - June 2018

Summary:

Reduction of water quality and quantity impacts from agricultural drainage systems using an innovative treatment train approach that treats water traveling through the drainage system from farm field to shore.

Name: Linda Meschke

Sponsoring Organization: Rural Advantage

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Location

Region: SW, SE

County Name: Big Stone, Blue Earth, Brown, Carver, Chippewa, Cottonwood, Dakota, Douglas, Faribault, Fillmore, Freeborn, Goodhue, Grant, Jackson, Kandiyohi, Lac qui Parle, Le Sueur, Lincoln, Lyon, Martin, McLeod, Meeker, Mower, Murray, Nicollet, Nobles, Olmsted, Pipestone, Redwood, Renville, Rice, Rock, Scott, Sibley, Stearns, Steele, Stevens, Waseca, Watonman, Wright

City / Township:

Alternate Text for Visual:

MN map highlighting southern MN area.

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

PROJECT TITLE: Tile Outlet Treatment Trains to Improve Water Quality

I. PROJECT STATEMENT

The goal of this project is to demonstrate innovative conservation approaches on agricultural lands with a drainage system to protect and restore water quality by reducing soil erosion, increasing soil quality resulting in less nitrate leaching, reducing peak water flows and knowledge transfer of effective techniques resulting in improved nutrient management, post field treatment, reduced in-stream nutrient loads, and enhanced wildlife and other ecosystem services while maintaining agricultural productivity.

The primary focus will be on redesign of tile outlets using an innovative ***treatment train approach*** that addresses water traveling through drainage systems. A treatment train is simply a series of upland, riparian and in-stream practices that work together to cumulatively leverage pollution reductions from agricultural drainage systems. Current tile outlet discharge to a stream bypasses standard buffers or filter strip BMP's, thus failing to utilize the best available science.

This project will develop and demonstrate approaches to increase adoption of emerging management and pollutant load reduction practices associated with agricultural tile drainage systems and specifically tile outlets in southern Minnesota. Building from our efforts to develop three sites in Elm Creek Watershed [funded with an EPA 319 grant] we will expand our knowledge by identifying three new sites, across southern Minnesota, in landscapes where effectiveness can be demonstrated and farmers are willing to participate and share with their colleagues to reach a broader agricultural producer audience with these approaches.

Rural Advantage staff and University of Minnesota faculty and students in cooperation with local SWCD and NRCS staff have been working with landowners on a variety of research, education and conservation practice implementation activities over the past decade or so resulting in a strong trust relationship developed between partners. This proposal builds from previous efforts and was developed from observations and discussion with landowners and expressions of desire for conservation practices they have interest in adopting. A "treatment train" approach considers the water movement through the drainage system starting with upland treatment of the cropland where rainfall occurs, treatment at or near the tile outlet, and in-stream treatment just below the outlet. Because these practices would not be intrusive, but would complement and are expected to increase productivity in current agricultural production systems, we expect increased adoption.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: *Develop & Demonstrate Tile Outlet Treatment Trains* **Budget: $ 376 ,032**

Demonstrate the treatment train practices at three sites on private lands representing different drainage areas in southern Minnesota. Each site will be designed for its specific characteristics and include an 1] Upland Area – demonstrating soil biological health building practices, cover crops and/or extended crop rotation; 2] Tile Outlet [at or near] – demonstrating bioreactors, saturated buffers, constructed wetland and/or enhanced chemical [biochar, slag iron] treatment; and 3] In-stream – demonstrating placement of wood into the bed & bank for microbial and macroinvertebrate habitat, induced hyporheic flow with constructed riffles and/or addition of buried biochar and slag iron in constructed glides. Practices will be cost shared with the landowner at a 75% rate to encourage adoption of innovative practices. Site design will be led by university researchers and their students.

Outcome	Completion Date
1. Develop and install Tile Outlet Treatment Train Site #1	*November 1, 2016*
2. Develop and install Tile Outlet Treatment Train Site #2	*Dec. 31, 2016*

3. Develop and install Tile Outlet Treatment Train Site #3	*Dec. 31, 2017*

Activity 2: *Monitoring Tile Outlet Treatment Trains* **Budget: $ 63,017**

Along the treatment train, monitoring access points will be established to track nutrient concentration and loads. The use of isotopes and continuous data collection probes will be employed to define temporal and spatial change. Monitoring strategy will be developed by University of MN researchers with sample collection and maintenance assisted by University student researchers and Rural Advantage's technician.

Outcome	Completion Date
1. Design & Implement Monitoring Plan for Tile Outlet Treatment Train Site #1	*June 1, 2016*
2. Design & Implement Monitoring Plan for Tile Outlet Treatment Train Site #2	*Dec. 31, 2016*
3. Design & Implement Monitoring Plan for Tile Outlet Treatment Train Site #3	*Dec. 31, 2017*
4. Following site installation or early spring, begin monitoring each site	*Dec. 31, 2017*
5. Analysis of monitoring results	*June 30, 2018*

Activity 3: *Information Dissemination for Tile Outlet Treatment Trains* **Budget: $ 75,345**

Develop a Tile Outlet Treatment Train guidance document for landowners, annual field days at individual sites, one winter seminar presenting leading research information on innovative practices and methods and one watershed tour in the third year. Outreach events would be geared toward agricultural landowners and their conservation advisors. On-farm consultation with farmers to discuss innovative conservation BMP practices opportunities for their farms landscape. Development and dissemination of marketing materials for farmers regarding tile outlet treatment train practices.

Outcome	Completion Date
1. On farm consulting and marketing to identify, develop and implement sites with farmers	*June 30, 2017*
2. Annual Field Day at each site [1 in Y1; 2 in Y2; 3 in Y3 = 6 total]	*June 30, 2017*
3. Winter Seminar	*March 2016*
4. Tile Outlet Treatment Train Guidance document	*Dec. 31, 2015*
5. Watershed Tour	*May 31, 2017*

III. PROJECT STRATEGY

A. Project Team/Partners

Linda Meschke, President, Rural Advantage – Project Coordination, Outreach and Education
Dustin Benes, Ag Specialist, Rural Advantage – Technical and Monitoring Assistance, Outreach & Education
Dean Current, Director – Center for Natural Resources and Agricultural Management, University of Minnesota – outreach & education, BMP Adoption/Barrier UMN Student Researcher oversight
Joe Magner, Research Professor, Bio-products and Bio-systems Engineering, University of Minnesota – Lead site design and monitoring coordination, outreach & education, student oversight

B. Project Impact and Long-Term Strategy

The impact of this project will reduce water *quality* and *quantity* impacts from agricultural production systems that are intensely farmed [corn/soybeans] and contain extensive drainage systems. The proposal builds on research, education and implementation activities during the past decade that local resource managers and University of MN researchers have been working on in collaboration with land owners/ operators in Elm Creek Watershed. The goal is to improve the water quality in agricultural landscapes so they can be delisted from the 303d list. In anticipation of being able to meet delisting criteria, future work would be directed to other watersheds.

C. Timeline Requirements

Three years: July 1, 2015 through June 30, 2018 to encompass two full growing seasons for project activities.

2015 Detailed Project Budget

Project Title: Tile Outlet Treatment Trains to Improve Water Quality

IV. TOTAL ENRTF REQUEST BUDGET Three years

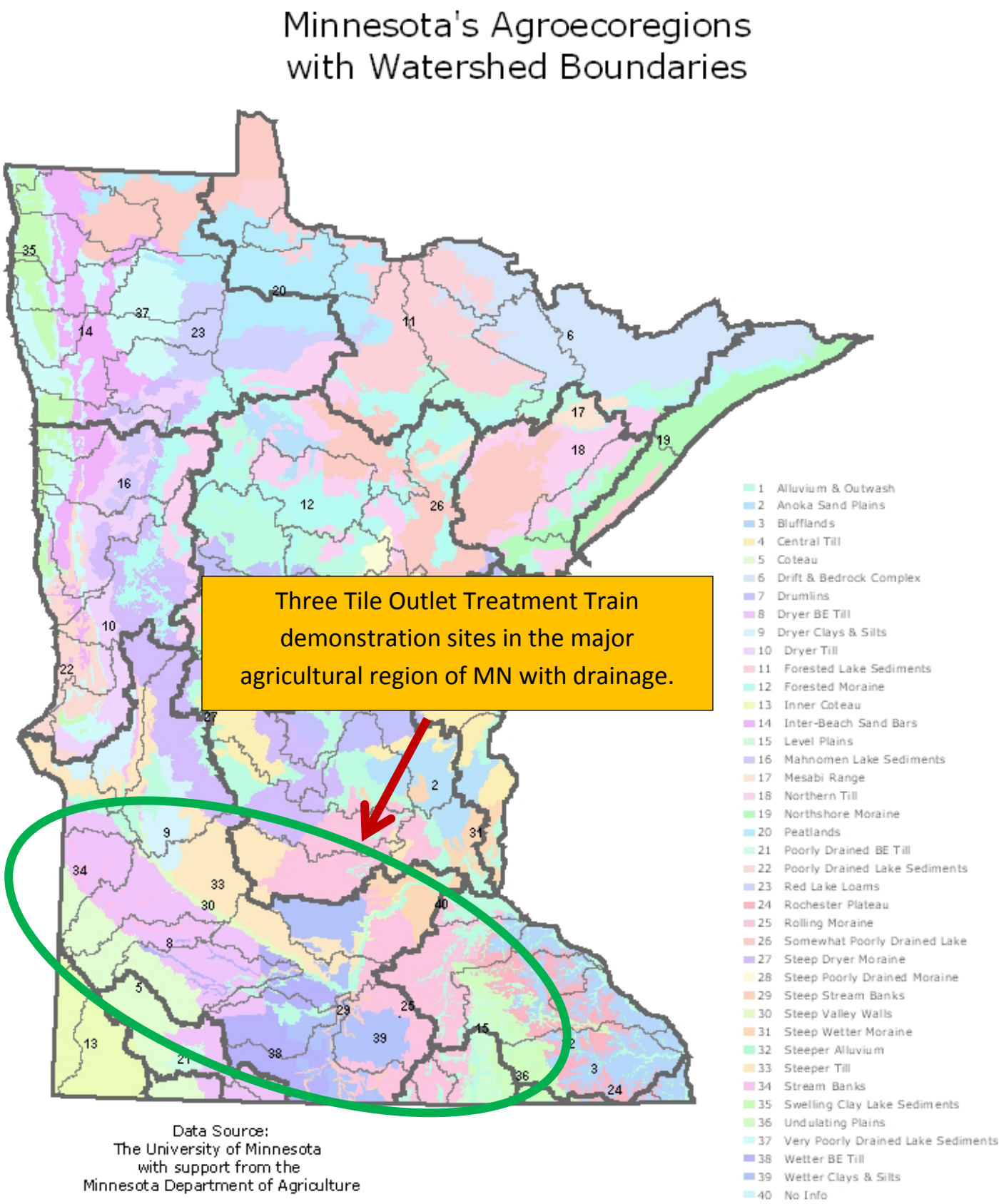
BUDGET ITEM *(See "Guidance on Allowable Expenses", p. 13)*	**AMOUNT**
Personnel: Rural Advantage: Meschke- Cordination and Admin - 20% FTE Salary $40.64/hr, Benefits $5.13/hr - 3yr. ; Technician - Benes - 30 % FTE Salary $18.00/hr, Benefits $2.16/hr - 3 yr	$ 99,054
Contracts: University of MN - Dr. Joe Magner - Site designs and UMN student leadership, monitoring equipment, supplies and analysis - $68,875 plus one student researcher @ $50,000 ; Dr. Dean Current- CINRAM/ UMN- Student leadership on Farmer barriers/adoption of practices $5,000/yr [$15,000] plus 1 student researcher @ $50,000. Assist with outreach, guidance document and demonstrations.	$ 183,875
Landowner Cost Share: Up to 75% cost share for practices installed as part of the Treatment Train $75,000 each Treament Train Site x 3 sites	$ 225,000
Education/ Outreach: Field Days- 6 x $100.00 = $600.00; 1 Winter Seminar- room- $250, speaker mileage- 6 @ $150 = $900, 3 ads @ $100 = $300, postage - 500 brochures @ $.45= $225. Printing 200 Guidance Documents for winter Seminar @ $4.00 =$800	$ 3,075
Travel: Mileage by Rural Advantage within the watershed and planning cordination with the University. 2,000 miles x 3yr @ $0.565/ mi = $3,390	$ 3,390
Additional Budget Items: none	$ -
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 514,394

V. OTHER FUNDS

SOURCE OF FUNDS	**AMOUNT**	**Status**
Other Non-State $ Being applied to Project During Project Period: USDA EQIP funds: about $225,000; Magner- grant from MN Corn Growers Association for drainage research about $68,000; EPA 319 - grant to Rural Advantage for Tile Outlet Treatment Trains in Elm Creek $265,000	$ 558,000	*Secured*
Other State $ To Be Applied To Project During Project Period: BWSR Cost Share Funds - $30,000	$ 30,000	*Pending*
In-kind Services To Be Applied To Project During Project Period: Each landowner will match 25% toward the project. $25,000 x 3 projects	$ 75,000	*N/A*
Funding History: Some of the 319 EPA funding will be encumbered prior to 7/1/15 - approximately $150,000; MN Corn Growers Grant - $68,000	$ 218,000	N/A
Remaining $ From Current ENRTF Appropriation: *No current projects.*	$ -	*N/A*

2015 Environment and Natural Resources Trust Fund - - Project Map

Project Title: Tile Outlet Treatment Trains for Improved Water Quality



Project Managers Qualifications and Organization Description

Linda Meschke, President, Rural Advantage

Ms. Meschke has over 36 years of experience in working on water resource issues in south central Minnesota. Her work has been focused on the implementation of innovative conservation practices to address agricultural non point source pollution. She currently is working on landscape diversification that includes targeting of perennials or 3rd Crops throughout the intense corn and soybean region of southern Minnesota.

For this proposal her role will be to coordinate the project between various partners, farmers and local resource managers. She will assist with identification of willing landowners and potential sites. Ms. Meschke will also be responsible for project administration and reporting.

Ms. Meschke has extensive experience in working with producers/ landowners; local governments; non profits; University of Minnesota researchers and educators and private industry to bring them together and work toward common goals. In collaboration with multiple partners she has developed and successfully lead over $10 million dollars in projects in the Greater Blue Earth River watershed area that have resulted in an estimated reduction of at least 9 percent of the pollution loading going to the Minnesota River from the Blue Earth River system.

She is currently an elected SWCD Supervisor for Martin County and was recently awarded the Distinguished Service in Sustainable Agriculture Award from the Minnesota Sustainable Farming Association. Ms Meschke serves on the Boards of the University of Minnesota Southwest Regional Sustainable Development Partnership, Green Lands, Blue Waters and the South Central Sustainable Farming Association. She has additional experience working as the Water Planner, Wetland Administrator and Agricultural Inspector for Martin County, Minnesota; farm partner; doing loan servicing for Farmers Home Administration during the farm crisis of the mid 1980's; and as a Vocational Agricultural Instructor and FFA Advisor.

Rural Advantage

Linda Meschke, with other partners, established on November 13, 2003 a 501[c][3] non profit called Rural Advantage under MN Statutes Chapter 317A to provide a vehicle to continue to advance the 3rd crop work in Minnesota and the Midwest. Linda Meschke is President of Rural Advantage. Rural Advantage's mission is to promote the connections between agriculture, the environment and rural communities in order to improve ecological health, economic viability and rural vitality. Objectives include:

- Advance landscape diversification to improve ecological health, rural vitality and farm profitability.
- Cultivate a more sustainable approach to agriculture that is diverse, resilient and responsible; and supports natural and agricultural 'systems' thinking.
- Foster rural economic development that supports rural families and local communities.
- Promote increased stewardship through education, demonstration and implementation.