

**Environment and Natural Resources Trust Fund
2012-2013 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 154-I

Integrated Drainage Water Management Evaluation

Topic Area: I. Water Resources

Total Project Budget: \$ 261,720

Proposed Project Time Period for the Funding Requested: 4 yrs. July 2013 - June 2017

Other Non-State Funds: \$ 15,000

Summary:

Evaluation of newly constructed drainage water management practices to provide sound science that shows the necessary environmental and economic benefits to transfer to working lands state wide.

Name: Bev Nordby

Sponsoring Organization: Mower Soil & Water Conservation District

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Austin MN 55912

Telephone Number: (507) 434-2603

Email: bev.nordby@mowerswcd.org

Web Address: Mowerswcd.org

Location

Region: Statewide

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 _____% |



PROJECT TITLE: Integrated Drainage Water Management Evaluation

I. PROJECT STATEMENT

Why this project needs to be done:

1) Overall Goals:

- Conduct comprehensive field scale monitoring necessary to evaluate 3 unique and innovative drainage water management practices that include a 2 stage ditch, constructed wetlands and bioreactors.
- Work with existing networks and cooperators on demonstrations and incorporate field days to outline benefits to utilizing drainage water management practices on working lands.
- Use results and participant feedback to inform drainage groups, watershed programs and policy, including cost-share programs and drainage administration.

2) How the project will achieve those goals:

- All three conservation drainage sites will be monitored for turbidity, flow, dissolved oxygen, PH, temperature and conductivity, nitrogen, phosphorus, and ortho phosphorus. On the two stage ditch nitrates and flow will be measured at the inlet and outlet of the ditch, all tile outlets, side inlet pipes, a mile north of the ditch and 2 miles north of the ditch. A stream in close proximity will also be monitored also for comparison. The constructed wetland and bioreactor will have similar monitoring done at the bioreactor structure inlet, outlet, and at the wetland outlet to a County Ditch. Evaluation of these drainage water management practices will inform the agriculture community, state agencies, researchers and local conservation practitioners on a suite of practices that have no negative impact on agricultural production, while potentially improving water quality.

3) Background

- The nearly 27,000 miles of drainage ditches and the drainage tiles that pour into them have a profound impact on hydrology and water quality throughout much of Minnesota and the Mississippi River Basin. Much of the public and private drainage system will be repaired or replaced in the next 10-20 years, providing a unique opportunity to incorporate innovative environmentally responsible drainage water management designs and practices into the existing drainage infrastructure. This project will be evaluating newly constructed two stage ditch in 2009 and constructed wetland with a bioreactor in 2011. A new constructed wetland funded through the federal government will be built in 2013. Environmental and economic evaluation of this suite of drainage water management practices is necessary to inform programs and policies related to drainage management in this state. The impact of the existing drainage infrastructure is understood. Multiple stakeholders will require confidence in alternative infrastructure designs before they are widely accepted and adopted, resulting in water quality improvement

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: To establish a comprehensive monitoring program to evaluate 3 unique and innovative drainage practices that include a two stage ditch, constructed wetlands and bioreactors to achieve sound science at the local field scale. **Budget: \$204,220.00**

| Outcome | Completion Date |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 1. Evaluation of 2 stage ditch that mimics a natural stream built in 2009 The inlet, outlet and all tile outlets and a stream in close proximity for comparison will be evaluated. | June 30, 2016 |
| 2. Evaluation of a constructed Wetland and woodchip bioreactor that was built in 2011. Part of the Root River Watershed that is impaired for turbidity. | June 30, 2016 |
| 3. Farmable Wetland (CP-39) Pilot Site Construction (2013) and monitoring | June 30, 2016 |
| Etc .All practices will be monitored for turbidity (TSS), flow, PH, temp, nitrogen, phosphorus, ortho phosphorus, conductivity and dissolved oxygen | |
| | |

Activity 2: Document conservation drainage on 3 innovative conservation drainage practices.

Budget: \$20,000.00

| Outcome | Completion Date |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1. 3 years of monitoring data on the two stage will be evaluated for changes in nitrogen, phosphorous and flow. Data will be compared to the natural stream and conventional ditch data. | June 30, 2017 |
| 2. 3 years of monitoring data on constructed wetlands and bioreactors that will evaluate agricultural drainage water to reduce sediment, nitrates and phosphorus before it enters Deer Creek. | June 30, 2017 |
| 3. Create additional technical guidance for landowners and professionals by generating outreach material for broader audiences. | June 30, 2017 |
| 4. A graduate student will be hired to bring together all data to review, analyze and summarize data collected from all sites. A final summary that describes the monitoring activities, analysis of the data for each site and the impact of each evaluated practices on water quality and crop productivity. These practices will be evaluated on a cost per lb of N and P removed compared to locally accepted conventional conservation practices | June 30, 2017 |

Activity 3: Public outreach and promotion will be done by working with existing networks and cooperators on demonstrations and incorporate field days to outline benefits to utilizing conservation drainage practices on working lands.

Budget: \$37,500.00

| Outcome | Completion Date |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1. A five member committee of producers will be formed to receive their input and insight on challenges and improvements throughout the project timeline. 4 meetings during project timeline | June 30, 2017 |
| 2. Have 3 field days to promote practices demonstrating to producers the financial and conservation benefits of utilizing conservation drainage practices on working lands. | June 30, 2017 |
| 3. Develop information to circulate to multiple audiences including producer groups, contractors, federal, state and local technical staff that includes several web sites as well as paper. | January 1, 2017 |

III. PROJECT STRATEGY

A. Project Team/Partners

Bev Nordby, District Manager, Mower SWCD – Administrator of Grant

Matt Taylor, Watershed Technician, Mower SWCD – Monitoring

Cody Fox, District Technician, Mower SWCD – Lead Construction of practices

Rich Biske-Nature Conservancy – Technical and Administrating Assistance

Joe Magner, MPCA & U of MN – Supervision of Graduate Student

Kyle Skov, Drainage Engineer, BWSR – Technical Assistance

Lisa Buckner, NRCS, Technical Asst

Greg Kruse – DNR Flow Monitoring

Adam Birr – Dept of Ag, Monitoring Asst

Mark Dittrich – Dept of Ag, Technical Asst

Al Kean – Technical Asst

Aaron Peter- Area Engineer

B. Timeline Requirements – 5 years is needed due to 3 years of solid monitoring, 1 year of data analysis and 1 year to promote the practices. Producers want “sound science” before they will adopt the new era of drainage practices.

| Objectives | 2013 | 2014 | 2015 | 2016 | 2017 |
|-----------------------------|------|------|------|------|------|
| Monitoring | X | X | X | X | |
| Data Analysis and Summary | | X | X | X | X |
| Involvement of Farmer Panel | X | X | X | X | X |
| Field Days | | X | | X | X |

C. Long-Term Strategy and Future Funding Needs

On farm demonstrations are critical to increase knowledge and understanding of the drainage practices, potential for cost sharing and generating acceptance of the practices by the mainstream agricultural community. The experiences and results from this project would ideally lead to scaling up the use of these practices where they are suitable. To achieve this they must be understood and accepted by multiple stakeholders. The conservation delivery framework must endorse these practices and support them with program guidance and cost-share. The agricultural community and drainage authorities will require confidence in the practices to support them at a large scale. Future funding will likely be required to conduct an analysis of drainage systems across the agricultural region of Minnesota to find specific locations where 2-stage ditches -and constructed wetlands could be placed to maximize environmental performance.

2012-2013 Detailed Project Budget

INSTRUCTIONS AND TEMPLATE (1 PAGE LIMIT)

Attach budget, in MS-EXCEL format, to your "2012-2013 LCCMR Proposal Submit Form".

(1-page limit, single-sided, 10 pt. font minimum. Retain bold text and DELETE all instructions typed in italics. ADD OR DELETE ROWS AS NECESSARY. If a category is not applicable write "N/A", leave it blank, or delete the row.)

IV. TOTAL ENRTF REQUEST BUDGET 5 years

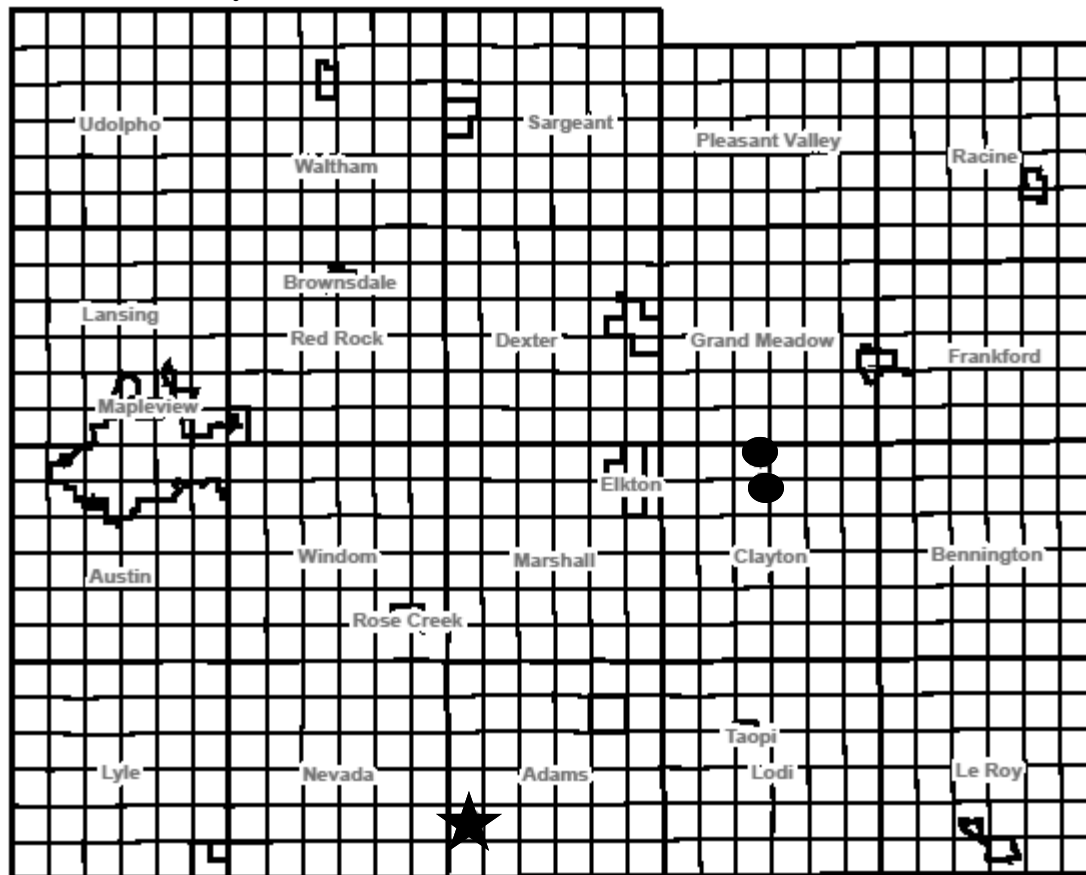
| BUDGET ITEM <i>(See list of Eligible and Non-Eligible Costs, p. 11)</i> | AMOUNT |
|---------------------------------------------------------------------------------------------------------|-------------------|
| Personnel: Administration, 10% FTE, 63% salary, 37% benefits, 5 years, 1 person | \$29,500.00 |
| Lead Technician, 13% FTE, 57% salary, 43% benefits, 5 years, 1 person | \$33,220.00 |
| Technician, 8% FTE, 56% salary, 44% benefits, 5 years, 1 person | \$20,400.00 |
| Contracts: MN DNR - Flow rating data collection and curve development | \$38,400.00 |
| University of Minnesota Graduate Student - Data analysis and project evaluation | \$20,000.00 |
| Tech Sales: Private Company assisting in the installation and maintenance of equipment | \$7,600.00 |
| MN Valley Testing Lab: lab costs for analyzing grab samples | \$49,000.00 |
| Equipment/Tools/Supplies: Monitoring Equipment: bubblers, data loggers, rain gages, solar panels | \$47,000.00 |
| YSI Standards and Equipment: Equipment necessary to maintain the YSI probe | \$4,000.00 |
| Station installs: Poles, cement pads, and misc supplies for monitoring stations | \$1,000.00 |
| Field Days: Promotion, transportation, etc. for field days | \$6,200.00 |
| Staff Gages - Permanent stream gage to measure depth | \$400.00 |
| Acquisition (Fee Title or Permanent Easements): | NA |
| Travel: | \$5,000.00 |
| Additional Budget Items: | NA |
| TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST = | \$ 261,720 |

V. OTHER FUNDS

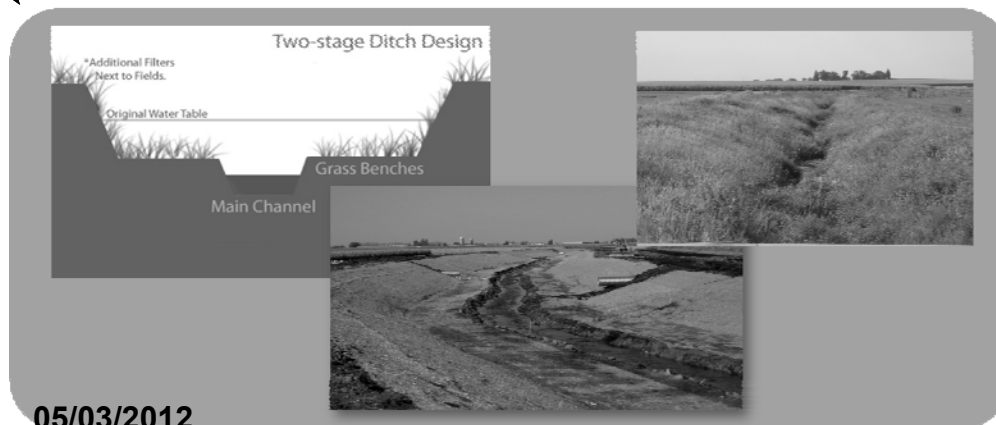
| SOURCE OF FUNDS | AMOUNT | Status |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|
| Other Non-State \$ Being Applied to Project During Project Period: Federal Funds will be captured from the Conservation Reserve program for the Constructed Wetland. | \$ 15,000 | Secured |
| Other State \$ Being Applied to Project During Project Period: | \$ - | |
| In-kind Services During Project Period: | \$ 12,500 | Secured |
| Joe Magner, University of Minnesota and MPCA, advisor to the graduate student | | |
| Advisory Committee, advise in planning and technical guidance | \$ 2,000 | Secured |
| Remaining \$ from Current ENRTF Appropriation (if applicable): | \$ - | |
| Funding History: Benefits from this project are that two of the three practices are already built. 250,000.00 was funded through the NRCS and Nature Conservancy for the 2 stage ditch and the bioreactor and constructed wetland were funded through Clean Water Fund at \$71,000.00. Our third constructed wetland will be constructed with federal dollars through the Conservation Reserve Program \$15,000.00. | \$ 336,000 | Secured |

Integrated Drainage Water management Evaluation

Mower County

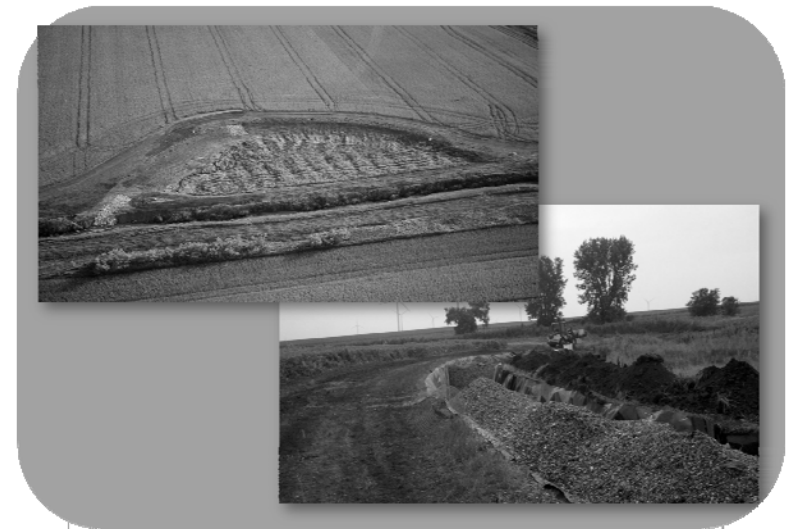


★ Two Stage Ditch



05/03/2012

● Constructed Wetland & Woodchip Bioreactor



Objective

Sound Science at the Local Scale

- **Constructed Wetland & Woodchip Bioreactor:** Edge of field practices for water retention and sediment trapping.
- **Two Stage Ditch:** Reduce maintenance, filter nutrients, and mimic natural streams.

Team Qualifications

Titled: Integrated Drainage Water Management Evaluation

Submitted by the Mower Soil and Water Conservation District

Funding Recipients

1. **Mower Soil and Water Conservation District**

The Mower Soil and Water Conservation District (SWCD) is located in Austin, MN. They have an active 5 member Board of Supervisors that are proactive and willing to participate in innovative programs and projects. There are 5 fulltime staff in the office with 2 administrative and 3 technical positions.

In 1996 the Mower SWCD received the SWCD of the Year Award in Minnesota for “Outstanding Leadership In Conserving Minnesota’s Resources” by the Minnesota Association of Soil and Water Conservation District.

The Mower SWCD office stepped out of the box 4 years ago and teamed up with the newly established Cedar River Watershed District to provide technical and administrative services. This partnership has provided an efficient and effective local government structure.

Bev Nordby, District Manager, Mower SWCD

Bev has been District Manager for the Mower SWCD over the last 25 years.

- Instrumental in organizing a group of natural resource managers in SE Minnesota and became the first chair of the Basin Alliance for the Lower Mississippi River.
- Lead the effort to launch the Conservation Reserve Enhancement Program (CREP) in SE Minnesota.
- Received the 2003 Outstanding SWCD Employee of the Year in Minnesota.
- Received the Sigurd F. Olson Conservation Award from the Izaak Walton League.
- Coordinates the Flood Reduction Efforts for the Cedar River.
- Administrator of the Cedar River Watershed District for the last 5 years.
- Coordinates the TMDL for Turbidity for the Cedar River Basin.
- Successful Clean Water Fund Applications and many other grant applications.

Matt Taylor, Watershed Technician, Mower SWCD

Matt has been with the Mower SWCD for the last 6 years.

- 2002 graduate of Bethel College.
- Monitored for the Clean Water Legacy Stream Water Assessment Grant on the Cedar River in 2008 and 2009.
- Leads the Cedar River Watershed District surface water monitoring program.
- Monitored the two-stage ditch, control drainage, surge ponds, and bio reactors.
- Attends yearly monitoring training from MPCA.
- Works with MDA on field to stream project.

Cody Fox, District Technician, Mower SWCD

Cody has been with the Mower SWCD for the last year and a half.

- 2008 Graduate of University of Minnesota.
- Local lead on Construction for Constructed Wetland & Bioreactor Project.
- Monitored two-stage ditch.
- Works with MDA & TNC on new era drainage projects.
- Mower county drainage inspector.
- Survey and design conservation practices.