

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

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**Project Title:**

**ENRTF ID: 150-F**

Restoring Aquatic Habitat by Reducing Sediment from Streambanks

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**Category:** F. Methods to Protect, Restore, and Enhance Land, Water, and Habitat

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**Total Project Budget:** \$ 276,000

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

**Summary:**

Restore aquatic habitat by reducing the 65-70% of river sediment now delivered from streambanks, bluffs, and ravines by developing tools and training for siting and implementing stream flow reduction practices.

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**Sponsoring Organization:** U of MN - Water Resources Center

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**Location**

**Region:** Statewide

**County Name:** Statewide

**City / Township:**

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<input type="checkbox"/> Funding Priorities	<input type="checkbox"/> Multiple Benefits	<input type="checkbox"/> Outcomes	<input type="checkbox"/> Knowledge Base
<input type="checkbox"/> Extent of Impact	<input type="checkbox"/> Innovation	<input type="checkbox"/> Scientific/Tech Basis	<input type="checkbox"/> Urgency
<input type="checkbox"/> Capacity Readiness	<input type="checkbox"/> Leverage	<input type="checkbox"/> Employment	<input type="checkbox"/> TOTAL <input type="checkbox"/> %



**Environment and Natural Resources Trust Fund (ENRTF)**

**2014 Main Proposal**

**Project Title: Restoring Aquatic Habitat by Reducing Sediment from Streambanks**

**PROJECT TITLE: Restoring Aquatic Habitat by Reducing Sediment from Streambanks.**

**I. PROJECT STATEMENT**

**Why:** Excess river sediment is severely reducing the quality of habitat for fish and other aquatic life, and is rapidly filling Lake Pepin. Water quality standards for turbidity and sediment are not being met in many river reaches across Minnesota, now listed as impaired. Sediment fingerprinting has established that the sources of 65-70% of Minnesota River and Lake Pepin sediment are streambanks, bluffs, and ravines, and are associated with larger stream and river flows. Sediment from these sources can be significantly reduced only with effective water management at the individual land parcel, public drainage system, and small watershed scales. The dominance of stream flow-related sediment impairments has only recently been documented. Local conservation staff and drainage authorities need tools for optimal siting of water storage, and materials and methods for use with landowners/operators on water management practices that reduce high flows and enable agricultural production in periods of both excess and deficit precipitation.

**Goal and Outcomes:** The **goal** is to reduce flow-driven sediment from streambanks, bluffs, and ravines through effective selection and targeting of water management practices in agricultural areas of the state.

**Outcomes** expected are:

- Local conservation and drainage authority staff equipped to engage landowners in selection and targeting of water management practices using GIS/LiDAR-based tools, a rural stream handbook, examples of successful water management projects, and successful approaches for working with landowners in small watersheds.
- Water managed effectively for both excess and deficit water periods, decreasing downstream flooding and near-channel erosion, and enabling agricultural production.
- Improved aquatic habitat in rivers and lakes currently impaired by excess sediment, and reduced sediment filling of lakes and reservoirs, including Lake Pepin.

**Methods:**

1. Organize GIS/LiDAR tools and methods to systematically identify and target water management practices.
2. Develop a printed and web-accessible handbook and presentations showing stream response to changes in flows, and land management practices that can reduce flow-related impacts for use with landowners. (Upland water management practices are not widely addressed in existing stream restoration handbooks.)
3. Document and present examples of successful water management projects, and approaches for use with landowners and small watershed groups in siting and implementing targeted water management.
4. Deliver methods and materials to conservation and drainage staff as web-based modules, webinars, on-line resources, and in-person workshops.

**II. DESCRIPTION OF PROJECT ACTIVITIES**

**Activity 1: Develop tools and methods to systematically target water management practices.**

**Budget: \$60,674**

Organize methods and GIS/LiDAR tools to prioritize target water management practices at the small watershed scale. Practices include buffers and cover crops for increased spring transpiration and soil water holding capacity, controlled drainage, constructed and restored wetlands, two-stage ditches, downsized culverts, and ponds/impoundments.

Outcome	Completion Date
GIS/LiDAR based tools and methods to systematically identify, prioritize, and target water management opportunities/practices for local conservation and drainage authority staff.	January 2016

**Activity 2: Prepare a rural stream and water management handbook.**

**Budget: \$ 76,323**

Prepare a printed (5,000 copies) and web-based handbook and related presentations for local conservation staff to use with landowners and land managers showing the connection between land and water management practices and stream responses. The handbook will describe water management practices that reduce



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hydrologic impacts and increase resistance to erosion. The emphasis will be on examples, illustrations, and photos from Minnesota. SWCD staff requested materials to use with landowners.

Outcome	Completion Date
A printed and web-accessible illustrated rural stream handbook and presentations.	January 2016

**Activity 3: Develop approaches for working with landowners on water management and prepare examples of successful water management projects.**

**Budget: \$ 78,619**

Working with local conservation staff and drainage authorities, develop and document successful approaches for them to use with landowners, land managers, and small watershed groups in siting and implementing targeted water management practices. Collect and prepare examples of water management projects that are successful both for hydrologic design and landowner adoption. The emphasis will be on Minnesota examples prepared by the original design and implementation groups.

Outcome	Completion Date
Documented successful approaches used in Minnesota and elsewhere for engaging landowners, land managers, and small watershed groups in siting and implementing targeted water management practices.	January 2016
Documented examples of successful water management projects, primarily in Minnesota	January 2016

**Activity 4: Program delivery to conservation staff and drainage authorities.**

**Budget: \$ 60,384**

Deliver the program to conservation and drainage authority staff as web-based modules and webinars, on-line resources, and in-person workshops. Conduct surveys with local conservation staff who have used this project’s education resources or participated in project events, to evaluate the utility and extent of use of the resources and methods with landowners and managers.

Outcome	Completion Date
Program delivered to conservation and drainage staff as webinars, web-based modules, on-line resources, and a minimum of six in-person training events.	March 2017
Evaluation of utility and use of the project materials and methods with landowners.	March 2017

**III. PROJECT STRATEGY**

**A. Project Team/Partners**

**Time Contributed:** David Mulla, UM Dept. Soil, Water, & Climate (SWC), Activities 1, 2; Karen Terry, UM Extension, Activities 2, 3, 4; Les Everett, UM Water Resources Center (WRC) Project Manager; Brenda Asmus, MPCA, Activity 2; SWCD staff Brad Becker (Dakota), Beau Kennedy (Goodhue), Dave Bucklin (Cottonwood), Jerad Brach (Blue Earth), Activity 1, 2, & 3 Consultants and Product Reviewers; Craig Austinson, Blue Earth County Drainage Authority staff, Activity 3.

**Partial funding from ENRTF:** Jacob Galzki and Joel Nelson, UM SWC, Activity 1; Chris Lenhart, UM Dept. Bioproducts & Biosystems Engineering, Activities 2, 3, 4; Rick Moore, MSU-Mankato, Activities 2, 3, 4; Ann Lewandowski, UM WRC, Activities 2, 3, 4, and project coordination; I&S Engineering, Activities 2, 3; Christine Hansen: UM WRC, Activities 2, 3, 4 (editor).

**B. Timeline Requirements**

Three years are required to carry out this project. Activities 1, 2, 3: 18 months. Activity 4: 18 months

**C. Long-Term Strategy and Future Funding Needs**

In the long term, materials and methods developed in this project will need to be periodically revised to incorporate new research results and training methods. UM Extension and state agencies will be encouraged to adopt this as an ongoing program, and the training materials will be available on the web for long-term access.

## 2014 Detailed Project Budget

Project Title: Restoring Aquatic Habitat by Reducing Sediment from Streambanks.

### IV. TOTAL ENRTF REQUEST BUDGET Three years

BUDGET ITEM:	AMOUNT
<b>Personnel:</b> (All positions listed below are grant supported without permanent funding.)	\$ 212,478
Chris Lenhart, UM, Technical lead Activity 3, assist Activities 2 & 4; 12% time yr 1, 6% yr 2, 2% yr 3; 74.8% salary, 25.2% fringe [\$20,182]	
Ann Lewandowski, UM Water Resources Center (WRC), Coordinator for program development and delivery; 70% time for 2 yrs, 60% for 9 mo.; 74.8% salary, 25.2% fringe [\$128,885]	
Jacob Galzki, UM, Technical analysis (Activity 1) 50% time 12 months, 44% time 6 months. 74.8% salary, 25.2% fringe [\$36,898]	
Joel Nelson, UM, GIS Tech (Activity 1) 16% time 18 months. 73.1% salary, 26.9% fringe. [\$19,776]	
Christine Hansen, UM WRC, Editor for training materials and web. 5% time for 2 yrs, 4% for 1 yr. 73.1% salary, 26.9% fringe [\$5,687]	
Student Assistants, survey processing. 100 hours @ \$10.50/hr. [\$1,050]	
<b>Services/Contracts:</b>	
Stream booklet (5,000 copies), design and printing.	\$ 14,173
Web and document design for example projects and landowner approaches.	\$ 5,000
Local hosts costs for 10 pilot and final workshops	\$ 8,000
I&S Engineering, prepare examples of water management practices & projects. I&S is implementing water management practices with landowners in the Minnesota River Basin, a target area of this proposal.	\$ 12,700
Richard Moore, MSU-Mankato, partial preparation of handbook and watershed group methods, and workshop delivery. 300 hours @\$39/hr	\$ 11,700
GIS Lab fees for Activity 1	\$ 4,000
Shipping of handbooks	\$ 400
<b>Supplies:</b>	
Supplies for meeting handouts	\$ 400
<b>Travel:</b> (All in-state)	
Activity 2. Meetings to develop handbook and presentations. 6 trips, 300 mi. each @\$0.565/mi., 3 partial day per diems non-TwinCities, 3 full day per diems with hotel Twin Cities.	\$ 1,697
Activity 3. Meetings to develop and pilot test project examples and approaches to landowners for water management. 10 trips, 300 mi. & 15 trips at 100 mi. @\$0.565/mi., 6 partial day perdiems outstate, 3 full day perdiems plus hotel non-Twin Cities.	\$ 3,466
Activity 4. Trips to deliver 6 workshops. 8 trips (2 or more people from 2 locations), 300 mi. each @\$0.565/mi., 4 per diems with hotel non-TC, 4 partial per diems non-TC	\$ 1,986
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	<b>\$ 276,000</b>

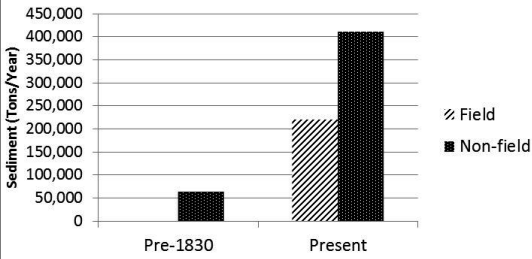
### V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
<b>Other Non-State \$ Being Applied to Project During Project Period:</b>	0	
<b>Other State \$ Being Applied to Project During Project Period:</b>	0	
<b>In-kind Services During Project Period:</b>		
Les Everett, UM WRC, Project Manager, Salary and fringe, 1% time, 2.75 years	2,427	Secure
Karen Terry, UM Extension, Training Lead, Salary and fringe, 1% time, 2.75 years	2,236	Secure
David Mulla, UM Soil, Water & Climate, Activity 1 Lead, Salary and fringe 1% time, 1 year	2,130	Secure
<b>Remaining \$ from Current ENRTF Appropriation (if applicable):</b>	0	
<b>Funding History: Related but not duplicative</b> ENTR grant "Strengthening Natural Resource Management with LiDAR Training" July 2011-June 2013.	\$ 180,000	Secure
<b>Related but not duplicative</b> ENTR grant "Strategic Planning for Minnesota's Natural and Artificial Watersheds" July 2010-June 2012.	\$ 327,000	Secure

# PROJECT TITLE: Restoring Aquatic Habitat by Reducing Sediment from Streambanks.

**Increases in sediment loads and stream flow threaten habitat and recreation.**

Annual Sediment Delivery to Lake Pepin by Source and Era

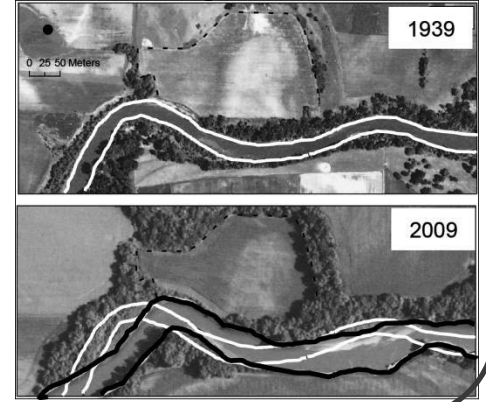


Data: Science Museum of Minnesota, St. Croix Research Station

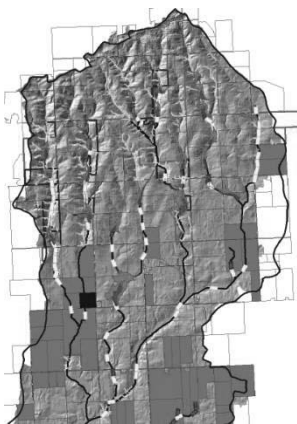
Streambank erosion  
LeSueur River Watershed



Channel widening on the Blue Earth River



**Careful siting of a suite of practices can store water and reduce stream flow while maintaining agricultural production.**



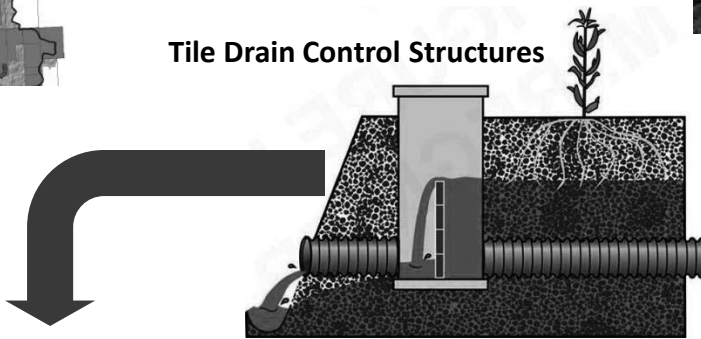
Systematically identify opportunities in the watershed for . . .



Filter Strips and Cover Crops for spring transpiration



Tile Drain Control Structures



Wetlands and Ponds/Impoundments



07/25/2013



Improved Ditch Designs

## **Project Title: Restoring Aquatic Habitat by Reducing Sediment from Streambanks**

### **Project Manager Qualifications and Organization Description**

#### **Project Manager and Administrative Lead:**

Les Everett, Agronomist, University of Minnesota (UM) Water Resources Center.

- Since 1995 has prepared and delivered 11 major grant funded projects from PCA (319), MDA, NRCS, LCCMR-ENRTF, and McKnight Foundation that, in partnership with UM Extension and state and federal agencies, provided on-farm nutrient and tillage research and outreach for farmers and agricultural professionals, and training for conservation staff on use of LiDAR for conservation.
- Serves on both the Stakeholder Advisory Board and Science Advisory Panel for the Lake Pepin and Minnesota River TMDLs.

#### **Project Technical Leads:**

David Mulla, Professor, UM Dept. Soil, Water, & Climate.

Research emphasis, with over 100 scientific journal articles on:

- Measurement, modeling, and management of uncertainty and risk for non-point source pollution of surface and groundwater.
- Characterization and estimation of field-scale variability for precision farming.
- Evaluation of alternative farm management strategies for improved soil quality and sustainability.

Extensive use of GIS and LiDAR for targeting soil and water management practices.

Chris Lenhart, Hydrologist, Research Professor, UM Dept. of Bioproducts & Biosystems Engineering

- Currently leading research projects in hydrology, geomorphology and watershed management.
- Author & co-author of numerous publications on hydrology, restoration and stream geomorphology.

#### **Project Training Lead:**

Karen Terry, UM Extension Educator, Water Resources:

- Water resources educator with UM Extension since 2006.
- Stream ecologist in MN DNR for 15 years.
- Lead educator on the Extension-funded pilot project titled Streamside Ecology, designed to teach stream system functions to local government leaders.

#### **Organization Description:**

The **University of Minnesota Water Resources Center** (WRC) facilitates interdisciplinary research, education, and outreach on water resources. It hosts the Water Resources Science graduate program with faculty affiliates across many UM Departments. In collaboration with UM Extension as well as state and federal agency partners, it develops and delivers outreach and professional education programs on storm-water management, on-site sewage treatment, agricultural practices and other topics. The WRC hosted and chaired the Lake Pepin and Minnesota River TMDL Science Advisory Panels.