

**Environment and Natural Resources Trust Fund  
2016 Request for Proposals (RFP)**

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**Project Title:**

**ENRTF ID: 156-F**

Riparian Management Practice Guidelines for Minnesota's Waterways

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

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**Total Project Budget:** \$ 103,594

**Proposed Project Time Period for the Funding Requested:** 2 years, July 2016 to December 2017

**Summary:**

Riparian areas provide filtration, stream bank stability and habitat benefits. Guidance will be developed to maximize their benefits through a variety of management practices focusing on four study watersheds.

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**Sponsoring Organization:** U of MN

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**Location**

**Region:** Statewide

**County Name:** Statewide

**City / Township:**

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**Alternate Text for Visual:**

Buffers play a key role in stabilizing streambanks, providing water filtration and wildlife habitat. An approach that considers these different factors is needed. The ACPF tool developed in Iowa by Mark Tomer will be used in 4 Minnesota Watersheds as case studies. Concise guidance by ecoregion will then be developed based on that analysis.

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



**I. PROJECT STATEMENT**

The introduction of Governor Mark Dayton’s 50-foot buffer proposal highlighted a state-wide concern with cleaning up Minnesota’s waters. This project addresses questions about the state-wide need for a 50 foot buffer and looks more carefully at the ideal placement of water quality and stream bank stability best management practices (BMPs) within agricultural landscapes.

There is growing awareness among Minnesota’s state agencies and the engaged public that more work is needed to meet state water quality goals. Buffers have well documented benefits and have long been used in the region. What is missing from a stand-alone 50-foot buffer rule—or any approach that attempts a one-size-fits-all solution to the complexities of agricultural drainage and runoff issues—is an understanding of where other treatment options are more appropriate than buffers. There are places in agricultural landscapes where a buffer, by itself, would accomplish very little in terms of nutrient or erosion reduction. A more nuanced approach that takes into account subsurface tile lines that bypass buffers and the role of vegetation in stream bank stability at different scales is needed to address agricultural water quality problems.

This project proposes to implement a holistic study and analysis of water quality and stream bank stability best management practices (BMPs) on agricultural land. This project will consider agricultural land uses in placing BMPs, targeting appropriate BMP locations, and designing BMPs in the riparian corridor. While there is no one solution for determining where BMP alternatives—from buffers to saturated buffers to treatment wetlands—are most effective, the tool will provide state legislators and the public with a strategic decision making tool to best protect Minnesota’s water resources.

This project is needed to establish clear criteria that everyone—from the public to legislators to specialists working in the field of water issues—can access to determine where riparian BMPs should be implemented. The project will help in local improvement of water quality, as well as set the stage for state-wide water quality improvements through more strategic placement and less use of farmland that is not critical for water quality benefits.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1:** Use of GIS to identify the best location for different riparian BMPs.

**Budget: \$40,000**

First, the lessons learned from past riparian buffers and studies would be summarized for Minnesota. Next four small watersheds in Minnesota would be selected to conduct the Lidar-based Agricultural Conservation Planning Framework (ACPF) analysis which identifies the best location for different riparian BMPs such as grass buffers, multi-species forest buffers, treatment wetlands, saturated buffers and bioreactors.

Outcomes	Completion Date
1a. Summary of lessons learned from past riparian research and relevance to Minnesota	12/2016
1b. GIS and ACPF analysis completed in four watersheds within agricultural parts of MN	5/2017

**Activity 2:** Field check riparian zones using watershed approach

**Budget: \$35,000**

Using a watershed approach, a graduate student and other UM staff would field inspect the four watersheds that were analyzed with the ACPF tool above. Refinements to the BMPs suggested by the ACPF would be adjusted and written up for each watershed.

Outcomes	Completion Date
2a. Assessment of the ACPF analysis in the field. Fine-tuning of the appropriate placement of riparian-zone BMPs	8/2017
2b. Refined recommendations for riparian BMPs in different ecoregions	10/2017



**Activity 3: Develop clear policy guidelines by ecoregion**

**Budget: \$18,594**

Guidance for placement of riparian BMPs would be developed for four of the agro-ecoregions (e.g. Red River and Driftless areas). The priority and feasibility of different BMPs by different ecoregion would be refined in a way that would be easily accessible to local government, decision-makers and knowledgeable landowners.

Outcome	Completion Date
3a. Concise guidance on riparian BMPs for four major agroecoregions of Minnesota	12/2017
3b. Refined selection of riparian BMPs most appropriate in different settings	12/2017

**Activity 4: Conduct public workshop and post guidance on line**

**Budget: \$10,000**

Public workshops would be conducted in two watersheds with UMN-Extension. Findings would be summarized. Information on the tools and concise guidelines would be posted on a university website. Fact sheets would be developed on riparian BMPs.

Outcome	Completion Date
4a. Public workshop conducted in two of the four study watersheds	11/2017
4b. A summary of findings from the public workshops will be provided	12/2017
4c. Information on the project findings and guidance will be posted on a U of M website	12/2017

**III. PROJECT STRATEGY**

**A. Project Team/Partners**

The project team has extensive experience in the implementation of riparian zone BMPs, extension activities and research on their effectiveness in different regions of Minnesota. The project team is comprised of the following University of Minnesota team (U of M) staff:

*Funded staff:*

- Dr. Joe Magner and Dr. Chris Lenhart, BBE Research Professors would serve as co-project leaders at 5% FTE, \$11,608 and 25% FTE, \$40,395 respectively
- A graduate student in Water Resources Center and Law School would conduct GIS analysis and do field checks of buffer sites, 50% FTE plus tuition and fringe, \$43,591

*Unfunded project staff*

- Gary Wyatt of UM Extension, would support outreach efforts including leading public meetings and assisting with outreach materials (such as fact sheets). He has extensive experience with riparian buffer plantings, 1% FTE (in-kind assistance)

**B. Project Impact and Long-Term Strategy**

The project will provide better guidance for the placement of riparian management practices in Minnesota. By targeting resources where they are most needed, there will be greater water quality benefits and less overall farmland taken out of use. While initially four watersheds will be assessed, the process for defining the optimal suite of BMP practices in a given agro-ecoregion will be established and could be transferred state-wide. The concise guidance will serve as an overview of the practices most likely to be successful for managers and policy makers. In watersheds of interest the more detailed ACPF analysis could be done by local partners. Public workshops and online materials will provide training for local government staff, consultants and landowners who are interested in implementing the guidance. Findings will be incorporated into the Agricultural BMP Handbook as well.

**C. Timeline Requirements**

Funding would begin in July of 2016 and continue through December 2017. GIS work would be done in summer and fall 2016. Field examination of the four watersheds would occur in spring to summer 2017, followed by public meetings and outreach activities in fall 2017.

## 2016 Detailed Project Budget

**Project Title:** Riparian management practice guidelines for Minnesota's waterways

### IV. TOTAL ENRTF REQUEST BUDGET 1.5 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
<b>Personnel:</b> Chris Lenhart, Research leader 25 % FTE for 1.5 year = \$40,395 Elizabeth Henley, Graduate Research Assistant, (50% RA for 1 year, fringe) = \$43,591 Joe Magner, Research Professor, 5% FTE for 1.5 year, \$11,608 Gary Wyatt, Extension Professor 1% FTE (in-kind)	\$ 95,594
<b>Professional/Technical/Service Contracts:</b>	\$ -
<b>Equipment/Tools/Supplies:</b> printing of guidance documents, estimated at 100 copies x \$15= \$1500 + printing, room rental and supplies for public meetings, = \$1500, Total \$3,000	\$ 3,000
<b>Acquisition (Fee Title or Permanent Easements): 0</b>	\$ -
<b>Travel:</b> Travel to an from watershed sites, using University of Minnesota mileage expense guidelines \$4,000. Travel to public meetings (\$800) and meetings with BWSR staff (\$200)	\$ 5,000
<b>Additional Budget Items: N/A</b>	\$ -
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	<b>\$ 103,594</b>

### V. OTHER FUNDS *(This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)*

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
<b>Other Non-State \$ To Be Applied To Project During Project Period: N/A</b>	\$ -	
<b>Other State \$ To Be Applied To Project During Project Period: N/A</b>	\$ -	
<b>In-kind Services To Be Applied To Project During Project Period: Unrecovered F&amp;A</b>	\$ 44,683	<i>secured</i>
<b>Funding History:</b> Joe Magner, Minnesota Corn Growers association \$97,000; Chris Lenhart, MDA Priority Setting in Watershed Restoration, \$278,000	\$ 375,000	past studies
<b>Remaining \$ From Current ENRTF Appropriation: 0</b>	\$ -	

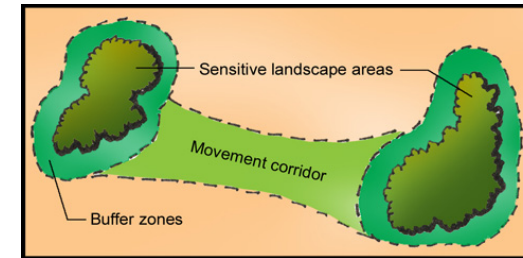
# Riparian management practice guidance for MN waterways

## 1. Buffers help stabilize stream banks

Particularly mid-size stream banks with erodible soils

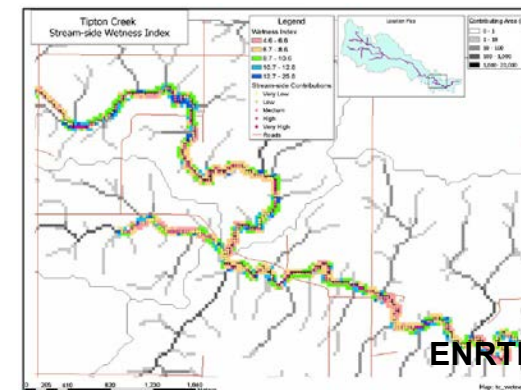


## 3. Habitat for wildlife



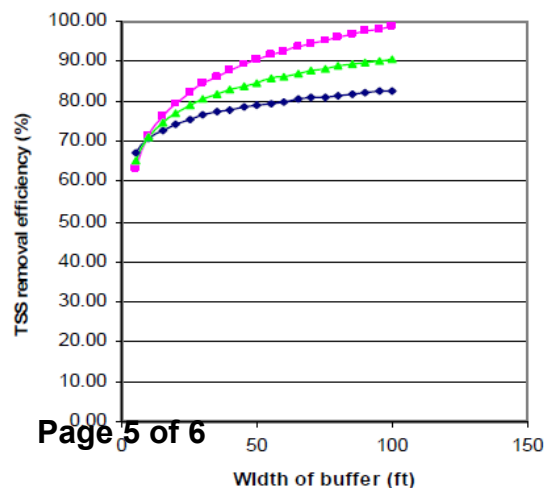
USDA National Agroforestry Center

Combining these 3 factors, a strategy for selecting the best riparian BMPs will be developed using the Iowa ACPF tool in four Minnesota watersheds



M. Tomer, riparian management practices prioritization

ENRTF ID: 156-F



2. Water filtration is a well-documented benefit of buffers (sediment removal by width is shown at left)

07/15/2015

**CHRISTIAN F. LENHART,**

Research Assistant Professor, Ecological Engineering Group,  
Department of BBE, University of Minnesota, St. Paul, MN

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**Education:** Ph.D., Water Resources Science, University of Minnesota, 2008; M.S. in Water Resources Management and MSLA in Landscape Architecture, University of Wisconsin-Madison, 2000; B.S. in Biology, University of Notre Dame, 1993

**Research and project management experience**

*Research Assistant Professor, 2010- present, University of Minnesota, BBE Department*  
Research project leadership: I have been the principal investigator or co P.I. on 9 research projects ranging from \$5,500 to \$312,000 since 2010. Some relevant projects include:

- Agricultural BMP Handbook update, a manual on the effectiveness of farmland management practices, Minnesota Dept. of Agriculture (MDA), 2015-16, \$65,000
- Treatment wetlands for water quality improvement in sub-surface tile drainage. Minnesota Department of Agriculture (MDA) (2013-2015), \$312,000.
- Developing approach for prioritizing stream restoration sites in the Minnesota River Basin for sediment reduction (2011-2013) (McKnight Foundation)(\$75,000)
- Researching tools for prioritizing channel restoration sites and investigating hydrologic drivers of channel erosion in different agro-ecoregions (2011-2015). MDA, \$280,000

Field hydrologic monitoring and wetland assessment experience from other work

- Led hydrologic monitoring and assessment to characterize the impact of EAB-on forest hydrology in LCCMR study, Forecasting the hydrologic impacts of emerald ash borer on northern Minnesota black ash forests (2010-2014).
- Developed an assessment tool for wetland buffers for the Minnesota Department of Transportation to benefit water quality and wildlife (2009)
- Managed hydrologic and water quality monitoring program of restored wetlands in Martin County Minnesota, 2004-2007. Assessed hydrologic and nutrient reduction in two restored wetlands for my PhD research
- At Coon Creek watershed 2002-2004 as a water resources specialist I coordinated hydrologic monitoring, wetland permit review and wetland mitigation monitoring.
- Coordinated wetland assessments in Illinois, Wisconsin, Minnesota and Montana

**Teaching and Training:** I have taught many courses at the University of MN and Mankato State including: Ecological Engineering Design, Case Studies in Ecological Restoration, Watershed management and sustainable development in Ecuador, wetland ecology, plant ecology and soil science. I have conducted training courses on methods for TMDLs and wetland delineation and presented at numerous conferences on wetlands for water quality.

**Recent Scientific Publications**

- Lenhart, CF, et al. 2015 Reduction of riparian corridor sediment from large agricultural watersheds: *Journal of Environmental Management. (In prep)*
- Lenhart, C.F. and Lenhart, P.C. 2014. Restoration of wetland and prairie on farmland in the former Great Black Swamp of Ohio. *Ecological Restoration* 32 (4): 441-449.

**Organization Description** – The BBE Department team strives for the sustainable use of renewable resources and enhancement of the environment. The Ecological Engineering group focuses on research and development of ecological management and restoration practices such as buffers, wetlands and drainage water management particularly in rural settings.