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

Project Title: **ENRTF ID: 078-B**

Riparian Buffer Optimization: Modeling Determinants of Buffer Adoption

Category: B. Water Resources

Total Project Budget: $ 390,093

Proposed Project Time Period for the Funding Requested: 2 years, July 2016 to June 2018

Summary:

This project will create a statewide riparian buffer optimization tool (RiBOT) to examine riparian lands that are ecologically, economically and socially suitable for buffers by modeling geospatial and survey data.

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Sponsoring Organization: U of MN

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St. Paul MN 55108

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Email mdaven@umn.edu

Web Address

Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Conceptual model of factors influencing agricultural practice adoption

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

PROJECT TITLE: Riparian buffer optimization: Modeling determinants of buffer adoption

I. PROJECT STATEMENT

Riparian buffers provide important ecological benefits including reduced stream bank erosion, improved water quality and enhanced wildlife habitat. State and local agencies are increasingly investing often scarce resources to promote buffer adoption among landowners and agricultural producers. Unfortunately, very little is known about landowner and producer motivations for and constraints to riparian buffer adoption. Decisions to adopt conservation practices such as riparian buffers are complex and likely have multiple economic, biophysical, and psycho-social (e.g., social pressures, land ethic, and perceived ability) drivers. For example, in a baseline study of riparian landowners in Sand Creek and Vermillion River watersheds (Davenport & Pradhananga, 2012), a majority of landowners reported being likely to adopt buffers if they had access to financial resources and if they could learn how to maintain buffers for water quality and soil conservation. Adopters believed that they had the ability to change the way they use their land to protect water resources and felt a greater sense of personal obligation to maintain streamside buffers. The proposed project takes an interdisciplinary approach to understanding the complexities of landowner motivations and constraints to riparian buffer adoption using econometrics, social science survey methods, and geospatial analysis. For policy makers, program designers and local implementers, knowing the drivers and constraints to conservation practice adoption will provide invaluable direction for future conservation program funding, planning and evaluation. Finally, this project will create a statewide riparian buffer optimization tool (RiBOT) to identify riparian lands that are ecologically, economically and socially suitable for conservation. The tool will be publicly available in a web-based user-friendly portal.

Project goal: Project goals are to determine the biophysical (e.g., land suitability, potential environmental benefits), behavioral (e.g., beliefs, norms and actions), and economic (e.g., payments, land values) factors that influence landowner adoption of riparian buffers. Project findings will be used to develop and pilot a statewide tool to more effectively target future lands for voluntary buffer adoption. The project will achieve these goals through four project activities: preliminary geospatial analysis of riparian buffers; a producer/landowner survey to assess beliefs, norms, behaviors, and perceived costs and benefits of buffer adoption; analysis and modeling of geospatial and survey data to examine the determinants of buffer adoption; and project evaluation, RiBOT development and piloting, and reporting of findings through focus groups, a workshop, and a technical report.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Geospatial analysis of riparian buffers **Budget: $100,000**

Geospatial assessment will be conducted in three agricultural watersheds (basins) to determine the extent of buffer use along streams and ditches. Geospatial analysis will also be conducted to determine landscape suitability for riparian buffers based on landscape features (e.g., erodibility, stream bank stability) and potential environmental benefits of buffer adoption.

Outcomes	Completion Date
1. Geospatial analysis of existing buffers along streams and ditches completed	February 2017
2. Analysis to determine landscape suitability for buffers completed	April 2017

Activity 2: Develop and administer landowner/producer survey **Budget: $131,602**

Riparian landowners/producers in three watersheds will be surveyed about their values, beliefs, behaviors and perceived costs and benefits associated with riparian buffers. A list of property owners in the study watersheds will be obtained from publicly available property tax records. A stratified random

sample of 1,000 landowners/producers from each watershed will be surveyed. Survey instruments will be developed based on extensive literature review and feedback from pilot test of the instrument.

Outcomes	Completion Date
1. Develop survey instruments including survey questionnaire	May 2017
2. Administer surveys to 3,000 producers/landowners in 3 watersheds	September 2017

Activity 3: Analysis and modeling **Budget: $45,264**

Descriptive statistical analysis and binary logit modeling will be used to assess the biophysical, economic and psycho-social determinants of buffer adoption. Data from the study watersheds will be used to calibrate the statewide RiBOT.

Outcome	Completion Date
1. Geospatial & survey data analyzed and modeled	December 2017

Activity 4: Evaluation, tool development/piloting, and reporting **Budget: $113,227**

Three focus groups will be conducted with resource professionals and local decision-makers to further examine and evaluate project findings. RiBOT and its web platform will be completed. A final report highlighting recommendations to promote adoption of riparian buffers will be prepared.

Outcomes	Completion Date
1. Focus groups completed	March 2018
2. Statewide riparian buffer optimization tool & web application development/piloting	May 2018
3. Project report completed	July 2018

III. PROJECT STRATEGY

A. Project Team/Partners

Professional services will be contracted for the geospatial analysis/web development in Activity 1, 3 and 4 (receives $115,000 subaward from the request). Project team members from the University of Minnesota who will contribute time and effort to the project Activities 2, 3, and 4 are Amit Pradhananga (receives $40,461) and Mae Davenport (receive $124,102 from the request) and Mike Kilgore (receives $110,530 from the request). Two graduate Research Assistants will assist Drs. Pradhananga, Davenport, and Kilgore in survey and focus group administration, RiBOT development and piloting, and reporting.

B. Project Impact and Long-term Strategy

Project findings will have broad relevance for policy makers, conservation program designers and local decision makers and implementers trying to promote voluntary adoption of riparian buffers. Findings and the optimization tool will be made publicly available for download on a UMN-hosted website. It is anticipated that the project will be completed within a two-year period beginning July 2016.

C. Timeline Requirements

Two years are needed to collect background information, develop and finalize study protocol, collect and analyze the data, develop and pilot the optimization tool, and prepare project report.

References: Davenport, M. A., & Pradhananga, A. (2012). *Perspectives on Minnesota Water Resources: A Survey of Sand Creek and Vermillion River Watershed Landowners*. Dept. of Forest Resources, University of Minnesota. Retrieved from http://z.umn.edu/sandvermsurvey**.**

2016 Detailed Project Budget

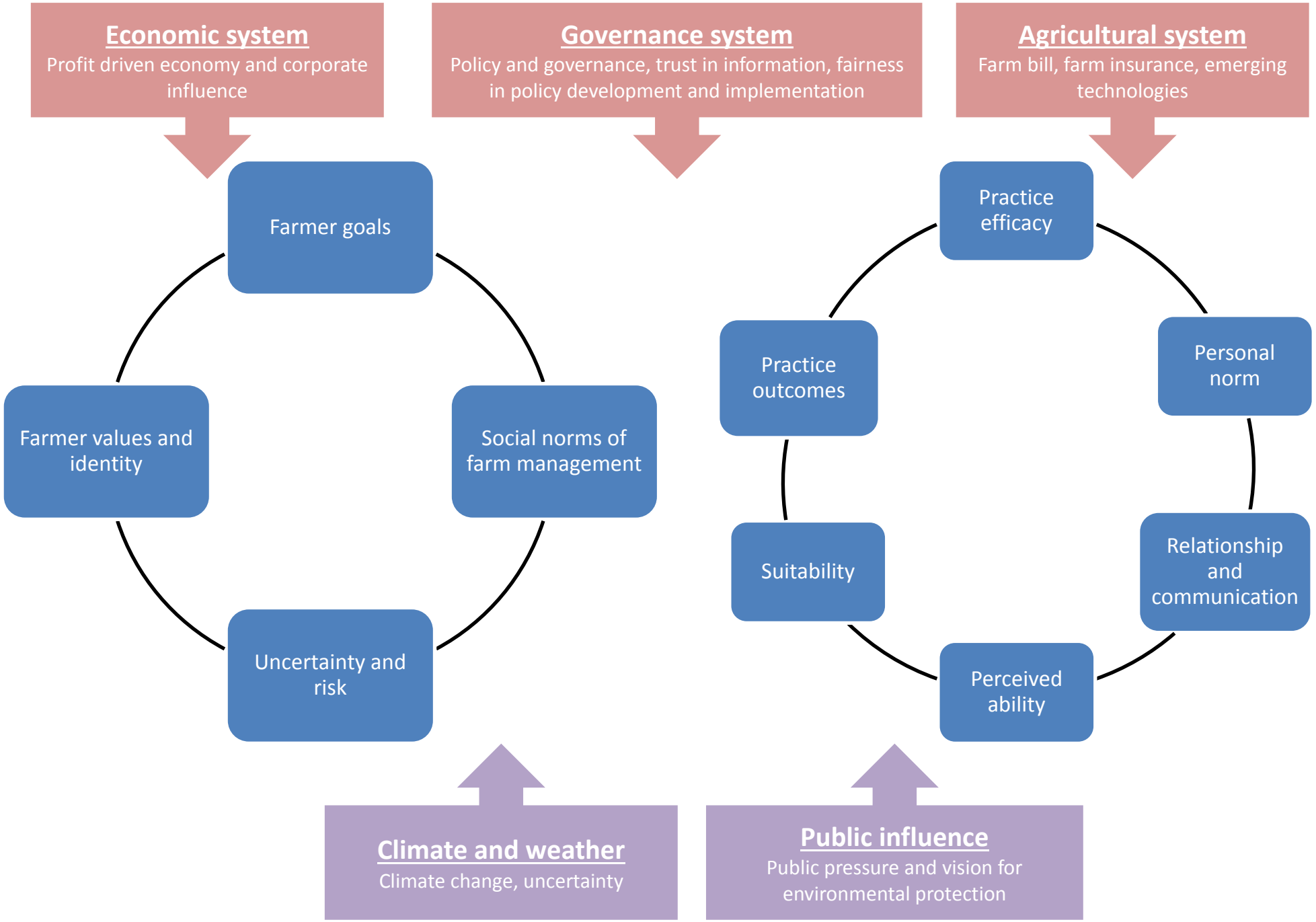
Project Title: ***Riparian buffer optimization: Modeling determinants of buffer adoption***

IV. TOTAL ENRTF REQUEST BUDGET: 2 years

BUDGET ITEM *(See "Guidance on Allowable Expenses", p. 13)*	**AMOUNT**	
Personnel		
Faculty: One month of faculty salary and fringe (36%) for Kilgore for two years (Co-PI; 0.1 FTE) and three weeks of faculty salary and fringe (36%) for Davenport for two years (Co-PI; 0.1 FTE)	$	49,928
Research Associate- Amit Pradhanaga- 6 months of Research Associate salary ($30/hr) and fringe (33.8%) over 2-year study period (12.5% of FTE)	$	40,461
Graduate Assistants - Salary and fringe for two University of Minnesota graduate students at 50% FTE for 2 years. Graduate fringe is budgeted at 83% of salary and includes tuition for the academic year, health care for the fiscal year and social security and Medicare for 6.5 pay periods (summer)	$	161,204
Professional/Technical/Service Contracts: Contract for geospatial analysis services (Activity 1, 3, & 4)	$	115,000
Equipment/Tools/Supplies: Survey printing and mailing (3000 surveys with cover letters and postage-paid return envelopes; 3 waves of mailing)	$	21,000
Travel: Travel within Minnesota. These funds will be used to pay mileage (75%) and per diem costs (25%) for researchers and graduate students.	$	2,500
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$	390,093

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

SOURCE OF FUNDS	**AMOUNT**	**Status**
Other Non-State $ To Be Applied To Project During Project Period: *Indicate any additional non-state cash dollars secured or applied for 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.*	N/A	N/A
Other State $ To Be Applied To Project During Project Period: *Indicate any additional state cash dollars (e.g., bonding, other grants) secured or applied for 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.*	N/A	N/A
In-kind Services To Be Applied To Project During Project Period: *Indicate any additional in-kind service(s) secured or applied for to be spent on the project during the funding period. For each type of service, list type of service(s), estimated value, and indicate whether it is secured or pending. In-kind services listed must be specific to the project.*	N/A	N/A
Funding History: *Indicate funding secured but to be expended prior to July 1, 2016, for activities directly relevant to this specific funding request, including past and current ENRTF funds. State specific source(s) of fund and dollar amount.*	N/A	N/A
Remaining $ From Current ENRTF Appropriation: *Specify dollar amount and year of appropriation from any current ENRTF appropriation for any directly related project of the project manager or organization that remains unspent or not yet legally obligated at the time of proposal submission. Be as specific as possible. Indicate the status of the funds.*	N/A	N/A



Conceptual model of factors influencing agricultural conservation practice adoption

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Professional preparation

BA Biology and English, Duluth, Minnesota, College of St. Scholastica. 1996
MS Forestry, Missoula, University of Montana. 2000
PhD Natural Resources Science and Management, St. Paul, University of Minnesota. 2003

Appointments

2015 – present Director, Center for Changing Landscapes, University of Minnesota (UMN)
2011 – present Associate Professor, Department of Forest Resources, UMN
2009 – 2011 Assistant Professor, Department of Forest Resources, UMN
2004 – 2009 Assistant Professor, Department of Forestry, Southern Illinois University Carbondale

Relevant peer-reviewed publications

Pradhananga, A. & Davenport, M.A. (Accepted). Landowner motivations for civic engagement in water resource protection. Submitted to Journal of the American Water Resources Association.

Floress, K., Akamani, K., Halvorsen, K.E., Kozich, A., & Davenport, M.A. (2015). The roles of social sciences in successfully implementing watershed management strategies. Journal of Contemporary Water Research and Education.

Davenport, M.A., & Seekamp, E. (2013). A multilevel model of community capacity for sustainable watershed management. *Society and Natural Resources: An International Journal*, *26*(9), 1101-1111.

Brinkman, E., Seekamp, E., Davenport, M.A., & Brehm, J.M. (2012). Community capacity for watershed conservation: A quantitative assessment of indicators and core dimensions. *Environmental Management*, 50(4), 736-749.

Floress, K., Mangun, J.C., Davenport, M.A., & Williard, K.W.J. (2009). Constraints to collaborative watershed planning: A case study of a citizen-based watershed planning process. Journal of the *American Water Resources Association*, 45(6), 1352-1360.

Additional significant products

Yost, M. Coulter, J. Russelle, M. & Davenport, M.A. (2013). Cash in on N credits when corn follows alfalfa. *Hay and Forage Grower*, January, 24-25.

Davenport, M.A. (2013). *Social measures monitoring system overview*. Report prepared for the Clean Water Fund Tracking Framework. St. Paul, MN: Dept., UMN. 31 pp.

Davenport, M.A. & Olson, B. (2012). *Nitrogen use and determinants of best management practices: A study of Rush River and Elm Creek watershed agricultural producers*. St. Paul, MN: Dept. of Forest Resources, UMN. 78 pp.

Davenport, M.A., & Pradhananga, A. (2012). *Perspectives on Minnesota water resources: A survey of Sand Creek and Vermillion River watershed landowners*. St. Paul, MN: Dept. of Forest Resources, UMN. 84 pp.

Professional activities

- Coordinating research as a member of the North Central Multi-State Committee (USDA): Catalysts for Water Resources Protection and Restoration: Applied Social Science Research.

Organization description: The College of Food, Agricultural and Natural Resource Sciences (CFANS) embodies the land-grant mission in its research, teaching and service. CFANS is committed to promoting the principles of equal opportunity, affirmative action and multiculturalism.