

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

Project Title:

ENRTF ID: 051-B

Conservation Reference Watersheds within the Minnesota River Basin

Category: B. Water Resources

Total Project Budget: \$ 699,820

Proposed Project Time Period for the Funding Requested: 4 years, July 2015 - September 2019

Summary:

This project comparing channelized vs. natural streams will provide valuable information and tools for the future management of agricultural watersheds and the protection of water quality in Central Minnesota.

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Sponsoring Organization: Renville County SWCD

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Olivia MN 56277

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Web Address _____

Location

Region: Central

County Name: Renville

City / Township:

Alternate Text for Visual:

Map showing the amount of conservation easements with restored wetlands in both watersheds

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



Environment and Natural Resources Trust Fund (ENRTF)

2015 Main Proposal

Project Title: Conservation Reference Watersheds within the Minnesota River Basin

PROJECT TITLE: Conservation Reference Watersheds within the Minnesota River Basin

I. PROJECT STATEMENT

Local pressure to channelize Limbo Creek in southwest Renville County has raised concerns for the stability and water quality of Minnesota River Basin streams. Limbo Creek is the only largely unaltered public watercourse remaining in Renville County in terms of channelization and remaining water storage. Other tributaries to the Minnesota River have watersheds characterized by intensive agricultural drainage, unstable ravines, and eroding bluffs. These bluffs can have an elevation drop of as much as 200 feet, and some tributary streams exhibit gullies, step-pools, and even waterfalls. State-funded wetland restorations within the Limbo Creek watershed have significantly increased the water storage potential of the drainage basin and provided many benefits to downstream ravines, bluffs, and receiving waters. We propose to quantify the benefits of the wetland restorations to determine if channelization would negate the multiple benefits these wetlands provide and to determine if the Limbo Creek watershed could be a reference for sustainable agricultural watersheds in this part of the state. A reference watershed represents a stable, potential future condition that may serve as a model for other restoration strategies within the Minnesota River Basin.

Two major activities are proposed to quantify (1) the impact of the wetlands and (2) natural stream channel. The wetland assessment on Limbo Creek and its restored wetlands will include habitat, quantification and identification of fish and benthic invertebrates and an assessment of fish health. For the second activity, a paired watershed approach will be used to compare and contrast the differences between Limbo Creek and Timms Creek, a highly-drained watershed that is typical of many tributaries to the Minnesota River. The stream channels of Limbo and Timms Creek will be assessed hydrologically, geomorphologically, and through water-quality sampling. Fluvial geomorphological assessments will determine bank stability and predict streambank erosion rates in terms of tons of sediment contributed from unstable ravines and streambanks. Both creeks will be assessed for nutrients, pesticides, and continuous water-quality to record nitrate, turbidity, and other parameters. Finally, a synoptic survey of 10 sites along each creek will document the changes in the naturally sinuous and the channelized portions of the creeks. The intensive nature of the biological and hydrological work is to ensure the impact of all of the management practices used in this reference watershed are being accounted for in terms of water quality and water quantity. This study will quantify the benefits of the significant water storage capacity of the Limbo Creek watershed in comparison to the Timms Creek watershed, which has low storage capacity, is unstable, and is prone to increased flooding unless regular extensive ditch maintenance is performed.

The potential detrimental effects from future channelization in Limbo Creek make it important to document the current stream quality, including invertebrate and fish communities. With its current water storage capacity and naturally sinuous channel, Limbo Creek will serve as a reference for the management of other agricultural watersheds in this part of the state. The results of this study will be a valuable tool to land managers and state agencies as it quantifies the impact of state-funded wetland restorations and may aid in the targeting of best management practices (BMPs) within other highly-drained, agricultural watersheds. In order to understand the influence of channelization on the Limbo Creek watershed, the Renville County Soil and Water Conservation District (SWCD), the U.S. Geological Survey (USGS), and the Minnesota Department of Natural Resources (DNR) propose this study to compare Limbo Creek watershed with Timms Creek watershed. With more than 70% of southern Minnesota's watercourses altered, this study will serve as a guide to quantifying the effects of channelization.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Quantify the effects of wetland restorations in Limbo Creek

Budget: \$115,000



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An assessment of the water-quality (particularly nitrogen) of the wetland restorations will be completed. Biological stream quality will be determined by (1) a physical habitat assessment, (2) identification and enumeration of fish and/or benthic invertebrates, and (3) biomarkers of fish health (for example gonadosomatic index) will be analyzed in approximately 10 fish from each site.

Outcome	Completion Date
1. Water-quality assessment on the effect of wetland restorations	Sept. 2017
2. Physical habitat assessment of Limbo Creeks	Sept. 2015
3. Fish and/or invertebrate analysis	Sept. 2015
4. Set up Environmental Effects of Agricultural Conservation website	Oct. 2015

Activity 2: Comparison of natural and channelized segments in Limbo and Timms Creeks Budget: \$584,820

Four streamgaging stations (one upstream and one downstream site in each creek) and chemical sampling will be used to quantify the water quality of Limbo Creek and the impact of maintaining a natural stream. The water-quality will be assessed with (1) routine collection of water-quality samples at the streamgages, (2) continuous water-quality monitoring at each streamgage, (3) a one-time synoptic profile survey of 10 sites along each creek to document changes in sinuous and channelized portions of the streams, (4) level II and III Rosgen fluvial geomorphological field studies on at least two sites in each creek, and (5) channel flow, runoff response, and discharge rates will be monitored and compared. The results of this study will be disseminated through a newly created website that will highlight studies and publications that quantify the effects of agricultural conservation.

Outcome	Completion Date
1. Measurement and comparison of hydrology and geomorphology	Oct. 2018
2. Water-quality sample collection and continuous nitrate and turbidity sensors	Oct. 2018
3. One time profile study of the length of each stream (nitrate, pesticides, etc.)	Aug. 2017
4. Prediction of erosion rates, sediment loading, and probable future conditions	Sept. 2018
5. Water budget and paired hydrograph analysis	Sept. 2018
6. Write, publish, and disseminate results	Sept. 2019

III. PROJECT STRATEGY

A. Project Team/Partners

The Renville SWCD (Ryan Clark) will serve as the project manager for this project, with in-kind field assistance. The USGS will contribute funds through their cooperative matching program (currently 30% of the total project cost or about \$300,000). Project Partners Receiving Funds: USGS (for streamgaging, biological and water-quality collection, website development, data analysis and report writing). Project Partners Not Receiving Funds: MN DNR (for the geomorphology comparison, assistance with hydrologic interpretation, and reporting), MPCA (report review and oversight), Renville County Ditch Authority (report review and oversight), Hawk Creek Watershed Project (report review and data sharing).

B. Project Impact and Long-Term Strategy

The long-term strategy is for this project to serve as an example to scientifically quantify the effects of land stewardship activities. The network and website will be maintained into the future, with additional research as it becomes available. The project will benefit from the larger USGS Environmental Effects of Agricultural Practices team and website, which serves the entire Midwest Region. No future funding for this project is anticipated from the ENRTF.

C. Timeline Requirements

The project will take approximately 3 field seasons (including spring runoff) in order to capture the hydrological variability of the system. Because ENRTF project funds aren't available until July of 2015, the field portion of the study will run through the 2018 field season. The final year (2019) will be used for data analysis and reporting.

2015 Detailed Project Budget

Project Title: Conservation Reference Watersheds within the Minnesota River Basin

IV. TOTAL ENRTF REQUEST BUDGET 4 years

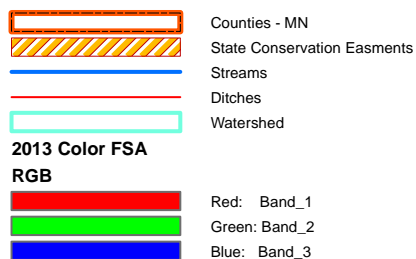
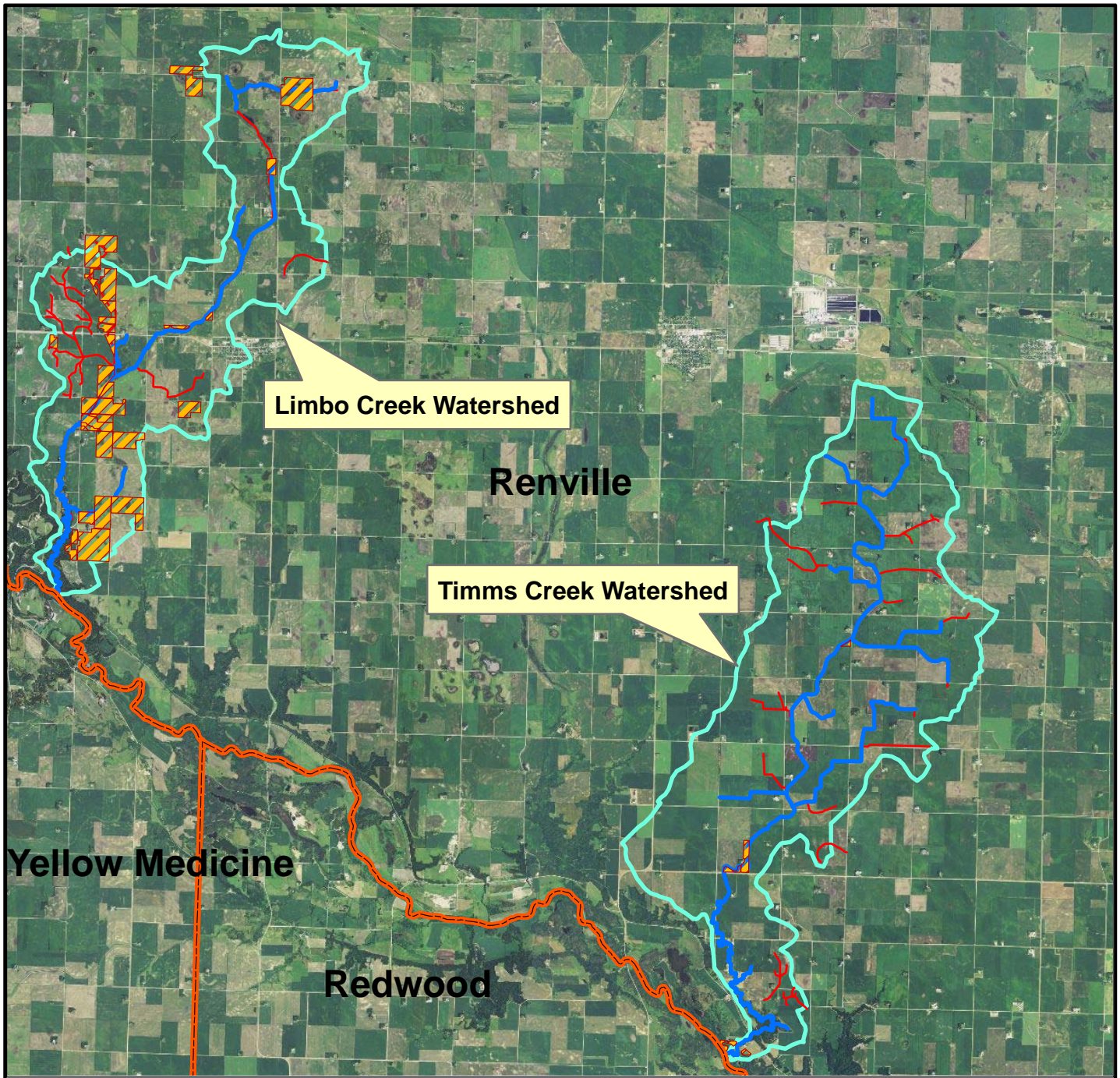
	<u>AMOUNT</u>
CONTRACT WITH U.S. GEOLOGICAL SERVICE	
Personnel	
Victoria Christensen, Principal Investigator (70%, 30%); 25 fte, 4 years	\$114,400
Graduate Student (80%, 20%); 25 fte, 4 years	\$83,200
Kathy E. Lee, Biologist (70%, 30%); 10% fte, 1 year	\$12,480
GS-9 field technicians (5 techs; 70%, 30%); 30% fte, 3 years	\$74,880
Chris Sanocki, GIS specialist (70%, 30%); 10% fte, 2 years	\$24,960
Water Quality Specialist (70%, 30%); 10% fte, 2 years	\$24,960
Administrative Assistant (70,30); 10% fte, 4 years	\$24,960
IT Specialist (70%, 30%); 10% fte, 1 year	\$12,480
Laboratories	
National Water Quality Laboratory & Sediment Laboratory	\$50,000
Biological Laboratory	\$6,000
Equipment/Tools/Supplies	
USGS Streamgages and Raingages	\$210,000
Rental of Water-quality monitors, nitrate probes, replacement probes, calibration standards	\$25,000
Field and laboratory supplies: Bottles, gloves, preservatives (chemicals), tubing, filters	\$10,000
Travel	
10 field trips per year: mileage, lodging, and per diem	\$15,000
Additional Budget Items:	
Publishing, printing, and editorial charges	\$7,500
Shipping & Communication costs (FedEx/Ice and other charges associated with sample shipment)	\$4,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$699,820

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

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ To Be Applied To Project During Project Period: <i>USGS Matching Funds</i>	\$ 300,000	<i>Pending</i>
Other State \$ To Be Applied To Project During Project Period:	\$ -	N/A
In-kind Services To Be Applied To Project During Project Period: <i>Ryan Clark, SWCD, approx. 100 hours per year</i>	\$ 10,000	<i>Secured</i>
<i>MN-DNR, Garry Bennett, in-kind salary for geomorph assessment</i>	\$20,000	<i>Pending</i>
Funding History:	\$ -	N/A
Remaining \$ From Current ENRTF Appropriation:	\$ -	N/A

Conservation Reference Watersheds within the Minnesota River Basin

Environment and Natural Resources Trust Fund 2015 Main Proposal



1:146,856
2013 NAIP Imagery



LCCMR Proposal 2015

Renville County Soil & Water Conservation District

Conservation Reference Watersheds within the Minnesota River Watershed

Project Manager: Ryan Clark, District Technician, Renville County Soil & Water Conservation District (SWCD), Olivia MN

Ryan Clark is a new technician at the Renville County SWCD. His experience includes past employment with the University of MN Natural Resources Research Institute (NRRI) and the Minnesota Department of Natural Resources (MN DNR). He has worked extensively in the natural resources management and research fields. Past projects he has been involved with include numerous stream, lake, and wetland habitat assessments.

Ryan has a good working relationship with the staff at state and federal agencies. He would be the lead staff person in administering the grant, and would oversee the budget.

Organization Description: Renville County Soil & Water Conservation District is a Local Unit of Government which employs two full-time District Technicians, two full-time Farm Bill Technicians and an administrative assistant. All of the employees have a solid understanding of natural resources management and research. The SWCD Staff & the five elected Supervisors are committed to conserving the natural resources of Renville County and are committed to working with local, state and federal agencies to preserve and enhance the natural resources of the State of Minnesota.