



# Environment and Natural Resources Trust Fund

M.L. 2021 Approved Work Plan

## General Information

**ID Number:** 2021-280

**Staff Lead:** Michael Varien

**Date this document submitted to LCCMR:** July 21, 2021

**Project Title:** Economic And Ecological Benefits Of Soil Health

**Project Budget:** \$288,000

## Project Manager Information

**Name:** Scott Wold

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## Project Reporting

**Date Work Plan Approved by LCCMR:** July 20, 2021

**Reporting Schedule:** December 1 / June 1 of each year.

**Project Completion:** June 30, 2025

**Final Report Due Date:** August 14, 2025

## Legal Information

**Legal Citation:** M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 08m

**Appropriation Language:** \$288,000 the first year is from the trust fund to the commissioner of natural resources for an agreement with Redwood County for the Redwood Soil and Water Conservation District to increase farmer adoption of conservation practices by demonstrating soil improvements and cost savings of cover crops and alternative tillage compared to conventional practices on working farms. This appropriation is available until June 30, 2025, by which time the project must be completed and final products delivered.

**Appropriation End Date:** June 30, 2025



## Narrative

**Project Summary:** To provide real world economic results of cover crops and alternative tillage implementation. Environmental benefits do not have to come at a cost of bottom line profitability.

**Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.**

We are looking to address and overcome the remaining barriers for cover crop and alternative tillage adoption on Minnesota farms. There has been a noticeable increase in cover crop and alternative tillage adoption in the past decade, however the percent of lands utilizing these practices remains low. Farms are complex operations, and any change to those operations must be done carefully. The main barrier to cover crop and alternative tillage adoption is overcoming the uncertainty in a new practice. Farmers need reliable information about how to implement these practices, what the effects will be on their fields, and what the effects will be on the farm economics.

While research on cover crops and alternative tillage has been done in Minnesota, that research has been done in highly controlled fields. How those results transfer over to “real” farms can be hard to sell to producers. Currently we don't have any large scale side by side comparisons of traditional management compared to cover crops and alternative tillage. In order to get large scale implementation, real world data from profitable farms is vital.

**What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.**

We are proposing to utilize active farming operations to illustrate side-by-side results of cover crop and alternative tillage techniques for the first three years of adoption compared to traditional management. The focus will be on tracking the changes in soil health from practice implementation as well as the economics of the farming operation. We will be tracking specific factors in order to provide a comprehensive overview of changes occurring in farming operations during that time.

To accomplish this we propose to implement cover crops and alternative tillage on 2,000 acres of private land over a period of 3 years. We will divide participating farms into two parts, one part will implement cover crops and alternative tillage, and the other part will retain traditional techniques. Through ongoing tracking of soil health metrics, crop yields, and economic inputs and outputs, we will provide real world comparisons of cover crops and alternative tillage. We will track these changes and classify our observations based on 4 soil classes. These outcomes will then be synthesized and distributed to individuals and groups throughout the state in order to encourage greater implementation.

**What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?**

We will demonstrate the benefits of cover crop and alternative tillage technique implementation in the first three years of adoption, and how soil health practices can be more profitable than traditional management. Our focus will be on the impact to farm economics in order to demonstrate that these methods can be successfully implemented on a profitable farm. By illustrating that these practices can be more profitable than traditional techniques, we will provide a compelling reason for individuals to adopt these practices. By tracking changes in soil health, we will be able to demonstrate the ecological benefits as well.

## Project Location

**What is the best scale for describing where your work will take place?**

Region(s): SW

**What is the best scale to describe the area impacted by your work?**

Statewide

**When will the work impact occur?**

In the Future

## Activities and Milestones

### Activity 1: Cover Crop and Alternative Tillage Data Collection including Soil, Harvest, Economic, and Analysis - activity 2

**Activity Budget:** \$75,000

**Activity Description:**

Sites will be selected within project watershed based on willingness, scale, and ability to split farming acres in half to complete demonstration.

We will be conducting initial assessments on all tracts of land in the project to establish the baseline conditions of the fields. Initial soil health testing will include grid sampling, infiltration, Visual Evaluation of Soil Structure (VESS), soil stability, residue percentage, penetration, soil temperature, bulk density, soil life, roots, the Haney soil test, and the Phospholipid fatty acid (PLFA) test. The tests will again be completed at the conclusion of the project to compare to our initial baseline information. Soils and the end results will be tracked based upon 4 different soil classes. This soil classification will allow us to provide examples for many different farms within our County, Region, and State.

Throughout the project, we will also be tracking a comprehensive set of economic data. These data includes the following costs: harvesting, grain, equipment, planting, planting cover crop, spraying, tillage, fuel, seed, cover crop seed, fertilizer, pesticides, cover crop termination, insurance, grain handling, grain hauling, grain drying, land, labor, overhead, personal, custom hire, and others. We will also closely be tracking the average yield on each field.

**Activity Milestones:**

Description	Completion Date
Baseline soil data collection	June 30, 2022
Soil samples processed and analyzed	August 31, 2022
Season 1 harvest and economic data collected and analyzed	February 28, 2023
Season 2 harvest and economic data collected and analyzed	February 28, 2024
End soil data collection	November 30, 2024
Soil samples processed and analyzed	December 31, 2024
Season 3 harvest and economic data collected and analyzed	February 28, 2025
Final data analysis	February 28, 2025

### Activity 2: Data Synthesis, Outreach, and Field Days - activity 3

**Activity Budget:** \$63,000

**Activity Description:**

At the onset of the project and then again at the end of the data collection phase of the project, we will be working closely with outside professionals in order to fully scope and then synthesize the data collected. We will be working with an economist to assist us in analyzing and processing the economic data. We will also be working with an environmental consultant to assist us with synthesizing and displaying the ecological data collected. These data will be prepared in a straight forward easy to understand visual format, outlining the results of our efforts.

We will share the results of our project through print, online, video forums, as well as by hosting several cover crop and alternative tillage demonstration days annually. Our publications will center on an online web portal which will contain all of the results of our project. During the project we will be utilizing video to capture various stages of the process. We will be utilizing a state wide distribution network to invite the public to the field days and to distribute the information

collected. Field days will provide ongoing project information and data, discuss with participating farmers on implementation including challenges and positives.

**Activity Milestones:**

Description	Completion Date
First Field Day	September 30, 2022
Outreach Material and Field Day Preparation	December 31, 2022
Preliminary Data Synthesis Year One and Two Data	March 31, 2023
Second Field Day	September 30, 2023
Third Field Day	September 30, 2024
Final Economic and Soil Synthesis Report	March 31, 2025
Final Outreach Materials and Publication Complete	June 30, 2025

**Activity 3: Establish Demonstration Sites and Implement Soil Health and Farming Management Practices - activity 1**

**Activity Budget:** \$150,000

**Activity Description:**

We are proposing to implement cover crops and alternative tillage on 2000 acres for a 3 year contract. These acres will be established directly next too similar acreage that will maintain the traditional management practices for a total of approximately 4000 acres in the demonstration. Individuals will be paid a cost share for the acres they are committing to implement cover crops and alternative tillage on for the next 3 years at a rate of \$25.00/acre/year. \$25.00/acre was set as the cost share rate by taking the normal cost share for soil health practices at \$20.00/acre and adding \$5.00 since individuals are committing for 3 years instead of 1. These individuals will be required to allow us access to their private property during the study in order to complete our research. We will find several individuals to allow us to post materials near their field creating an onsite demonstration plot of the project's activities. District staff currently has enough interest if we are funded that most of our acres are already able to be implemented.

**Activity Milestones:**

Description	Completion Date
Advertise demonstration project to identify potential demonstration locations	August 31, 2021
Select a minimum of 4 locations representing the 4 soil types totaling approximately 4000 acres	September 30, 2021
Secure contracts with farmers to implement practices totaling approximately 4000 acres	December 31, 2021
Soil health practices determined/assigned to fields	December 31, 2021
Producers prepared to implement soil health practices and track data	February 28, 2022
Season 1 soil health practices implemented and fields planted	December 31, 2022
Season 2 soil health practices implemented and fields planted	December 31, 2023
Season 3 soil health practices implemented and fields planted	December 31, 2024

## Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Meadowlands Farm Coop	Meadowlands Farm Coop	Meadowlands will be assisting us in helping to implement soil health practices on farms enrolled in the demonstration.	No
Michael Spencer	Minnesota State University Mankato	Consulting Economist	No
Tom Berry	WENCK Associates	Environmental Consultant.	Yes

## Dissemination

**Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.**

We will share results through print, online, video forums, as well as by hosting several cover crop and alternative tillage demonstration days in year 3. Our publications will center on an online web portal which will contain all of the results of the project. During the project we will be utilizing video to capture various stages of the process. During year 3, we will host up to 3 field days showcasing results for the general public. We will be utilizing a state wide distribution network (Minnesota Soil Health Coalition) to invite the public to the field days and to distribute the information we have collected. Further, we will be working closely with the local coop's and utilize their communication network to help disseminate results and to encourage customers to experiment with various soil health techniques. We will also be sharing our results via the many speaking engagements and presentations our staff gives throughout the year to landowners and other professionals in the natural resource field.

The Minnesota Environment and Natural Resources Trust Fund (ENRTF) will be acknowledged through use of the trust fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the ENRTF Acknowledgement Guidelines.

## Long-Term Implementation and Funding

**Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this be funded?**

The Redwood Soil and Water Conservation District will continue to market the results of this project. We hope that this effort overcomes the largest barriers we experience locally to implement these practices. By continuing to update our materials, we will not only be accomplishing our mission locally, but supporting the broader initiative across the state. We will be asking our participating landowners to continue conducting several of the tests we use to measure soil health progress and reporting those results to us. This work will be funded through the Redwood SWCD.

## Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
<b>Personnel</b>								
Administrative Staff		Grant Administration			20%	0.3		\$14,000
							<b>Sub Total</b>	<b>\$14,000</b>
<b>Contracts and Services</b>								
TBD	Professional or Technical Service Contract	Consultant will assist us in conducting data collection in the field.				0.6		\$41,000
TBD	Professional or Technical Service Contract	Consultant will assist in compiling all of our data and putting it into a professional report. This report will be heavy on visual representations and highlight success and economic implications.				0.25		\$30,000
TBD	Professional or Technical Service Contract	Creation and printing of promotional materials and mailings to share the results of our project.				-		\$6,000
TBD	Professional or Technical Service Contract	Creation of signs and educational materials to be included at our demonstration sites.				-		\$6,000
TBD	Professional or Technical Service Contract	Creation of a website portal to be included within the Redwood SWCD website to provide a single destination to see the results of our project.				-		\$3,000
TBD	Professional or Technical Service Contract	Creation of videos to demonstrate project progress to provide compelling visuals of what these practices look like in action.				-		\$6,000
Local Landowners	Professional or Technical Service Contract	Landowners will receive \$25.00 / acre to commit to the 3 year study. This rate is based of the the average cost share for implementing soil health practices plus a little extra since landowners are committing for 3 years.				-		\$150,000



							<b>Sub Total</b>	<b>\$242,000</b>
<b>Equipment, Tools, and Supplies</b>								
	Tools and Supplies	will be used for infield soil testing equipment, including, infiltration rings, maul, thermometers, shovels, penetrometer, soil sampling kits, tape measures, flags, tarps, slake jars, soil stability test kit, scale, and other miscellaneous supplies.	Supplies necessary to conduct infield soil testing					\$4,000
	Tools and Supplies	20 data infield data loggers	Provide real time in field soil information recording temperature and moisture content					\$23,000
							<b>Sub Total</b>	<b>\$27,000</b>
<b>Capital Expenditures</b>								
							<b>Sub Total</b>	-
<b>Acquisitions and Stewardship</b>								
							<b>Sub Total</b>	-
<b>Travel In Minnesota</b>								
							<b>Sub Total</b>	-
<b>Travel Outside Minnesota</b>								
							<b>Sub Total</b>	-
<b>Printing and Publication</b>								
							<b>Sub Total</b>	-
<b>Other Expenses</b>								
		Cover Crop Field Days publication and event setup	Conduct 3 field days in the 3rd year of the study to demonstrate results					\$5,000

							<b>Sub Total</b>	<b>\$5,000</b>
							<b>Grand Total</b>	<b>\$288,000</b>

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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## Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
<b>State</b>				
			<b>State Sub Total</b>	-
<b>Non-State</b>				
In-Kind	Local District Funds	Landowner outreach	Secured	\$20,000
In-Kind	Local District Funds	Field data collection, increased by \$14,000 from original application to supplement reduced LCCMR funding.	Secured	\$44,000
In-Kind	District funds provided by County	Supplement report compilation due to reduced LCCMR funding	Secured	\$30,000
			<b>Non State Sub Total</b>	<b>\$94,000</b>
			<b>Funds Total</b>	<b>\$94,000</b>

## Attachments

### Required Attachments

#### *Visual Component*

File: [db55f583-8cc.pdf](#)

#### *Alternate Text for Visual Component*

Corn growing with a cover crop between rows. Conventional corn rows would have bare ground. Picture shows what one soil health technique i.e. cover crops looks like in the field....

#### *Board Resolution or Letter*

Title	File
Board of Supervisors Letter of Support	<a href="#">83a80e18-0ab.pdf</a>

### Optional Attachments

#### *Support Letter or Other*

Title	File
Letter of Support - WENCK Associates	<a href="#">4a83eab2-499.pdf</a>
Letter of Support - Michael Spencer, Ph.D.	<a href="#">0e996bac-afb.pdf</a>
Letter of Support - Meadowland Farmers Coop	<a href="#">d1e5fdb1-402.pdf</a>
Background Check Certification	<a href="#">b2658963-205.pdf</a>

## Difference between Proposal and Work Plan

### *Describe changes from Proposal to Work Plan Stage*

Changes have been made as requested.

We reduced the budget in the following areas; report compiling (\$30,000), signage and education (\$2,000), website creation (\$2,000), field days (\$3,000), and field data collection (\$14,000). We will make up for the report compilation dollars and field data collection by increasing our in kind contribution to the project. The other areas will result in slightly skimmed down activities, but will be supplemented with District reserves as necessary in order to fully complete the project.

## Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

**Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?**

N/A

**Do you agree travel expenses must follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?**

N/A

**Does your project have potential for royalties, copyrights, patents, or sale of products and assets?**

No

**Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?**

N/A

**Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?**

N/A

**Does your project include original, hypothesis-driven research?**

No

**Does the organization have a fiscal agent for this project?**

Yes, Redwood County



