# Final Abstract

Final Report Approved on September 30, 2025

## M.L. 2021 Project Abstract

For the Period Ending June 30, 2025

**Project Title:** Demonstrating Real-World Economic and Soil Benefits of Cover Crops and Alternative Tillage

**Project Manager:** Nick Brozek

**Affiliation:** Redwood Soil & Water Conservation District

**Mailing Address:** 403 S Mill St. P.O. Box 130

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**Phone:** (507) 637-4023

**E-mail:** nick_b@co.redwood.mn.us

**Website:** https://www.redwoodswcd.org/

**Funding Source:**

**Fiscal Year:**

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

**Appropriation Amount:** $288,000

**Amount Spent:** $262,834

**Amount Remaining:** $25,166

**Sound bite of Project Outcomes and Results**

Soil tests showed increases in infiltration, structure, biology, moisture retention, and temperature moderation. Producers experienced consistent reductions in input costs, including reduced labor demands and machinery wear due to fewer tillage passes, and improved profitability for both corn and soybean rotations.

**Overall Project Outcome and Results**

The purpose of this project was to show that there are both environmental and economic benefits from using conservation farming methods. Specifically, the project looked at the use of cover crops and reduced tillage, or no till systems, as methods of reducing both soil erosion and work hours. One hurdle to convincing producers to change their farming practices and adopt a more conservation-friendly approach is the ability to show the economic benefit of doing so.

Redwood SWCD worked with 10 local producers to compare conservation practices side-by-side with conventional farming practices on 2000 acres in Redwood County, over three consecutive years. Soil moisture and temperature data was collected throughout the project in real-time using remote soil sensors. Before and after soil tests were performed

on site to record infiltration, structure, biology, and moisture. Economic data was collected from the producers, including what equipment was used, which tasks were performed, and what inputs used.

The data collected during this project shows average profit increase of $23.76 per acre for corn production and $38.35 per acre for soybean production. Producers noted reduced labor hours and equipment maintenance and wear due to fewer tillage passes.

Soil tests showed enhanced infiltration and moisture retention, reduced compaction, and increased biology in the soil. Infiltration increased nearly 32 inches per hour. worm counts nearly doubled. compaction was reduced by around around 50 psi. This is good for the environment and for the producers bottom line, since healthier soil produces better crops.

Soil sensor data showed fields using conservation practices experienced less temperature fluctuation, which aided planting in the spring and protected crops from extreme heat in the summer. Even during drought conditions persisting from summer 2022 into 2024, soil health fields maintained comparable for better spring moisture levels than conventional fields.

**Project Results Use and Dissemination**

Three public events were held to showcase the ongoing project and promote conservation. A pamphlet was created to share at these events showing preliminary results. Soil data was analyzed and graphed. A video was produced showcasing the conservation practices involved, centered on local producers. A final report was drafted summarizing the results. The raw data from the soil sensors will be available on the SWCD website, along with the graphs, video, and final report. The final report and video will be shared on social media and at future events.

# Environment and Natural Resources Trust Fund

M.L. 2021 Approved Final Report

## General Information

**Date:** November 12, 2025

**ID Number:** 2021-280

**Staff Lead:** Michael Varien

**Project Title:** Demonstrating Real-World Economic and Soil Benefits of Cover Crops and Alternative Tillage

**Project Budget:** $288,000

## Project Manager Information

**Name:** Nick Brozek

**Organization:** Redwood Soil & Water Conservation District

**Office Telephone:** (507) 637-4023

**Email:** nick_b@co.redwood.mn.us

**Web Address:** https://www.redwoodswcd.org/

## Project Reporting

**Final Report Approved:** September 30, 2025

**Reporting Status:** Project Completed

**Date of Last Action:** September 30, 2025

**Project Completion:** June 30, 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? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & 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 | Approximate 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 an 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 | Approximate 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 | Approximate 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 work 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 | $ Amount Spent | $ Amount Remaining |
|---|---|---|---|---|---|---|---|---|---|---|
| **Personnel** | | | | | | | | | | |
| 1 Administrative/Technical Staff | | Grant Administration and data collection | | | 20% | 0.3 | | $36,612 | - | - |
| | | | | | | | **Sub Total** | **$36,612** | **$35,698** | **$914** |
| **Contracts and Services** | | | | | | | | | | |
| Minnesota Soil Health Coalition | Professional or Technical Service Contract | Conduct soil testing in all control and soil health fields. Will match the testing that was done at the beginning of the grant. | | X | | 0.1 | | $19,947 | $16,000 | $3,947 |
| Eric Carter & Centrol Consulting | 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. | | X | | 0.25 | | $32,500 | $22,025 | $10,475 |
| BRYMA Designs | Professional or Technical Service Contract | Creation and printing of promotional materials and mailings to share the results of our project. | | X | | 0 | | $6,000 | $1,499 | $4,501 |
| BRYMA Designs | Professional or Technical Service Contract | Creation of signs and educational materials to be included at our demonstration sites. | | X | | 0 | | $1,128 | $1,128 | - |
| BRYMA Designs | 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. | | X | | 0 | | $3,000 | $452 | $2,548 |
| Foresee Studios | Professional or Technical Service Contract | Creation of videos to demonstrate project progress to provide compelling visuals of what these practices look like in action. | | X | | 0 | | $6,000 | $5,750 | $250 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 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. | | | | 0 | | $147,023 | $147,023 | - |
| | | | | | | | **Sub Total** | **$215,598** | **$193,877** | **$21,721** |
| **Equipment, Tools, and Supplies** | | | | | | | | | | |
| | 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 | | | | | $2,500 | $24 | $2,476 |
| | Tools and Supplies | 20 data infield data loggers | Provide real time in field soil information recording temperature and moisture content | | | | | $28,725 | $28,670 | $55 |
| | | | | | | | **Sub Total** | **$31,225** | **$28,694** | **$2,531** |
| **Capital Expenditures** | | | | | | | | | | |
| | | | | | | | **Sub Total** | **-** | **-** | **-** |
| **Acquisitions and Stewardship** | | | | | | | | | | |
| | | | | | | | **Sub Total** | **-** | **-** | **-** |
| **Travel In Minnesota** | | | | | | | | | | |
| | | | | | | | **Sub Total** | **-** | **-** | **-** |
| **Travel Outside Minnesota** | | | | | | | | | | |
| | | | | | | | **Sub Total** | **-** | **-** | **-** |
| **Printing and Publication** | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Sub Total** | **-** | **-** | **-** |
| **Other Expenses** | | | | | | | | | | |
| | | Cover Crop Field Days publication and event setup | Conduct 3 field days in the 3rd year of the study to demonstrate results | | | | | $4,565 | $4,565 | - |
| | | | | | | | **Sub Total** | **$4,565** | **$4,565** | **-** |
| | | | | | | | **Grand Total** | **$288,000** | **$262,834** | **$25,166** |

## Classified Staff or Generally Ineligible Expenses

| Category/Name | Subcategory or Type | Description | Justification Ineligible Expense or Classified Staff Request |
|---|---|---|---|
| **Contracts and Services** - Minnesota Soil Health Coalition | Professional or Technical Service Contract | Conduct soil testing in all control and soil health fields. Will match the testing that was done at the beginning of the grant. | Just trying to get this field to save |
| **Contracts and Services** - Eric Carter & Centrol Consulting | 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. | Should be eligible |
| **Contracts and Services** - BRYMA Designs | Professional or Technical Service Contract | Creation and printing of promotional materials and mailings to share the results of our project. | No ineligible costs |
| **Contracts and Services** - BRYMA Designs | Professional or Technical Service Contract | Creation of signs and educational materials to be included at our demonstration sites. | No ineligible costs |
| **Contracts and Services** - BRYMA Designs | 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. | No ineligible costs |
| **Contracts and Services** - Foresee Studios | Professional or Technical Service Contract | Creation of videos to demonstrate project progress to provide compelling visuals of what these practices look like in action. | No ineligible costs |

## Non ENRTF Funds

| Category | Specific Source | Use | Status | $ Amount | $ Amount Spent | $ Amount Remaining |
|---|---|---|---|---|---|---|
| **State** | | | | | | |
| | | | **State Sub Total** | **-** | **-** | **-** |
| **Non-State** | | | | | | |
| In-Kind | Local District Funds | Landowner outreach | Secured | $20,000 | $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 | $44,000 | - |
| In-Kind | District funds provided by County | Supplement report compilation due to reduced LCCMR funding | Secured | $30,000 | $30,000 | - |
| | | | **Non State Sub Total** | **$94,000** | **$94,000** | **-** |
| | | | **Funds Total** | **$94,000** | **$94,000** | **-** |

# 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....

### *Financial Capacity*

File: d580d434-bcd.pdf

### *Board Resolution or Letter*

| Title | File |
|---|---|
| Board of Supervisors Letter of Support | 83a80e18-0ab.pdf |

## Supplemental Attachments

### *Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other*

| Title | File |
|---|---|
| Letter of Support - WENCK Associates | 4a83eab2-499.pdf |
| Letter of Support - Michael Spencer, Ph.D. | 0e996bac-afb.pdf |
| Letter of Support - Meadowland Farmers Coop | d1e5fdb1-402.pdf |
| Background Check Certification | b2658963-205.pdf |
| Quote for replacement soil probe | c85bb676-593.pdf |
| 2023 soil probe graph_water | 204ecbce-5b2.png |
| 2023 soil probe graph_tempurature | 0a46471a-fc4.png |
| Quote for 6 soil probes | 94bb3809-dab.pdf |
| rack card | d758b8a0-7f5.pdf |
| Final Report - Digital | 10d18fb5-9a3.pdf |
| Final Report - Print | 111c7c82-993.pdf |
| Soil test spreadsheet | 2a5ae49c-7d4.xlsx |

### *Media Links*

| Title | Link |
|---|---|
| web portal | https://www.redwoodswcd.org/lccmr |
| Final Report-Online | https://lccmrprojectmgmt.leg.mn/media/attachments/10d18fb5-9a3.pdf |

# 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 understand that travel expenses are only approved if they 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, sale of products and assets, or revenue generation?**

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

# Work Plan Amendments

| Amendment ID | Request Type | Changes made on the following pages | Explanation & justification for Amendment Request (word limit 75) | Date Submitted | Approved | Date of LCCMR Action |
|---|---|---|---|---|---|---|
| 1 | Project Manager | Previous Manager: Scott Wold (Scott_w@co.redwood.mn.us)<br>New Manager: Nick Brozek (nick_b@co.redwood.mn.us) | New Staff, previous PM no longer with the organization | March 29, 2023 | Yes | March 29, 2023 |
| 2 | Amendment Request | • Project Collaborators - Project Manager Info<br>• Other<br>• Budget - Professional / Technical Contracts<br>• Budget - Capital, Equipment, Tools, and Supplies<br>• Attachments | One of our soil probes was destroyed by rodents in the field. We received a quote to purchase a replacement probe at a cost of $888.00. We are proposing to move funds from the data collection consultant line item, to the soil probe line item. A copy of the quote was added to the attachments section. | January 17, 2024 | Yes | February 1, 2024 |
| 3 | Amendment Request | • Budget<br>• Budget - Personnel<br>• Budget - Professional / Technical Contracts<br>• Budget - Capital, Equipment, Tools, and Supplies<br>• Budget - Other<br>• Attachments | We did not hire a consultant to assist with collection of the data. Our staff has been collecting the data. Therefore, we are respectfully requesting to move part of those funds to the data analysis consultant budget, part to the grant administration budget (to account for our staff time), and part to help pay for a carbon intensity and soil health conference the Redwood SWCD is organizing in cooperation with the Minnesota Soil Health Coalition. | June 27, 2024 | Yes | August 23, 2024 |
| 4 | Amendment Request | • Budget<br>• Budget - Professional / Technical Contracts<br>• Budget - Capital, Equipment, Tools, and Supplies<br>• Attachments | Six of our soil probes were broken this fall. Causes were being chewed by rodents and run over by farm machinery. We took precautions to prevent these problems – covering wires with foil, flagging, working with farmers to temporarily remove the probes. We want to purchase six new probes to be installed immediately to collect data this | December 18, 2024 | Yes | January 13, 2025 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | fall, winter, and spring. The data collected will be included in our final report for this grant. | | | |
| 5 | Amendment Request | • Budget<br>• Budget - Professional / Technical Contracts<br>• Budget - Capital, Equipment, Tools, and Supplies<br>• Budget - Other | Redwood SWCD had two staff members leave in the last couple of weeks. We will not be able to bring new staff on board and provide the proper training to complete the final round of soil testing listed in the grant outcomes. We got a quote from the Minnesota Soil Health Coalition to do the testing for $19,000. We would like to move some unused grant funds to pay for testing. | April 1, 2025 | Yes | May 5, 2025 |

# Status Update Reporting

## Final Status Update August 14, 2025

**Date Submitted:** July 16, 2025

**Date Approved:** August 1, 2025

**Overall Update**
We conducted a second round of soil tests, finished gathering economic data from the producers, and analyzed the moisture and temperature data from the soil probes. We produced a video showcasing the conservation practices. We produced a final report disseminating our data and analysis, in both digital and printable formats. Data analysis shows that soil health practices increase infiltration, structure, biology and moisture retention in the soil. They also demonstrate consistent reductions in input costs and time, which increases profitability in both corn and soybean rotations. Additionally, soils showed greater moisture retention and resilience during drought years.

**Activity 1**
Baseline soil health testing was completed in 2022. Follow-up testing was completed in June 2025, in the same locations as the 2022 tests, using GPS locations logged during baseline testing. Tests included infiltration, structure (VESS), compaction, residue cover, biological activity, and temperature.
Soil health indicators improved more noticeably in the fields that implemented conservation practices. Water infiltration increased nearly 32 inches per hour in soil health fields, compared to an increase of only 6 inches in the conventional fields. Worm counts increased by double the rate in soil health fields vs. conventional fields. Similarly, soil compaction was reduced by 45 psi in the top 6 inches and by 53 psi within 6”-12” in soil health fields. The conventional fields average compaction reduction was 26 psi and 4 psi, respectively.
Economic data shows median per-acre expense reduction in corn of $21.45, and average profit increase of $23.76 per acre in soil health fields. The difference in bean fields was even greater, being $34.70/acre and $38.35/acre, respectively.
Analysis of the soil probe moisture data found that soil health fields consistently retained more moisture during the spring and growing season compared to conventional fields.
*(This activity marked as complete as of this status update)*

**Activity 2**
We contracted for analysis of the raw data collected by our soil probes. This data (raw data and analysis) will be available on the web portal added to the Redwood SWCD website. The data and analysis was incorporated into the project report that we had professionally produced. This report will be shared on our website and Facebook page in digital form and can be printed and shared in paper form as well.
We conducted 3 field days, in partnership with other SWCD’s and soil health organizations. These were attended by around 150 people, cumulatively. Promotional materials summarizing our project and the preliminary results were produced, printed and distributed at these events.
Video of some of the farming practices, soil testing and producer testimonials was taken and an 8-minute video produced, along with a 90 second condensed version. These will be shared on the SWCD website, Facebook page, and YouTube channel.
*(This activity marked as complete as of this status update)*

**Activity 3**
From the beginning of the project, we worked with 11 different landowners within the Ramsey Creek watershed. Each designated at least one soil health field and one control field (conventional field). They provided a plan as to which practices they would be using on each field and spot checks were performed throughout the project to confirm that the planned practices were being carried out. Economic data was obtained from the producers, including tillage passes,

inputs, and yields. Soil probes were used to collect real-time temperature and moisture data, at three different depths, from the enrolled fields. Producers were compensated at a rate of $25 per acre per year. Spot checks showed most producers stuck to their plan. However, two times a non-conservation practice was used on a soil health field, or a conservation practice was used on a conventional field. Producer payments were reduced accordingly in those instances.
*(This activity marked as complete as of this status update)*

**Dissemination**
We produced a digital and printable report showcasing the analysis of the data collected during the project. We also produced two videos showing footage of conversation farming practices in action. The videos also include footage of the soil testing process and producer testimonials regarding cover crops and no-till practices. There is an 8 minute long video and a 90-second condensed version. https://www.redwoodswcd.org/lccmr

# Status Update Reporting

## Status Update June 1, 2025

**Date Submitted:** July 16, 2025

**Date Approved:** August 1, 2025

**Overall Update**
LCCMR staff waived the June 1, 2025, reporting status update because the appropriation ends June 30, 2025, and the reporting final status update is due August 14, 2025

**Activity 1**
LCCMR staff waived the June 1, 2025, reporting status update because the appropriation ends June 30, 2025, and the reporting final status update is due August 14, 2025
*(This activity marked as complete as of this status update)*

**Activity 2**
LCCMR staff waived the June 1, 2025, reporting status update because the appropriation ends June 30, 2025, and the reporting final status update is due August 14, 2025
*(This activity marked as complete as of this status update)*

**Activity 3**
LCCMR staff waived the June 1, 2025, reporting status update because the appropriation ends June 30, 2025, and the reporting final status update is due August 14, 2025
*(This activity marked as complete as of this status update)*

**Dissemination**
LCCMR staff waived the June 1, 2025, reporting status update because the appropriation ends June 30, 2025, and the reporting final status update is due August 14, 2025

# Status Update Reporting

## Status Update December 1, 2024

**Date Submitted:** December 18, 2024

**Date Approved:** January 13, 2025

**Overall Update**
We have contacted each participating producer to confirm the conservation practices they are contracted to implement, and to retrieve economic data regarding their participating fields. The soil probes have been continually monitored to make sure data is being collected regularly. Broken probes have been identified and replacements are being sought. We will be contracting with a firm or qualified individual to perform the final data analysis. We are working with the company that operates the SWCD website to produce the final report, videos, and website portal.

**Activity 1**
We are preparing to conduct end-of-project soil tests in the spring, making sure we have the correct equipment and lining up professional ag consultant help. We are continuing to gather economic data from participating landowners, contacting each by phone to request their farm and yield data and to remind them of the requirements of the project. Staff has performed site inspections to confirm that the contracted soil health practices are being implemented.

**Activity 2**
We are interviewing outside professionals - firms and qualified individuals - to line up final data analysis. We are continuing to perform preliminary analysis. Data is being collected and downloaded now from the summer and fall to be sent to our analyst. We are working on the web portal to disseminate our data and findings (see hyperlink). We visited participating landowners during field work to video and make drone footage of the conservation farming practices. We organized and held two events to showcase the project and view and discuss conservation farming practices, in cooperation with Renville County SWCD, the Minnesota Soil Health Coalition, and participating producers. We produced an information "rack card" (see attachments) to hand out at events.

**Activity 3**
We have contacted each participating landowner/producer to confirm the practices they are signed up for. We are continuing to make contract payments, with the last round of landowner payments scheduled for 2025. Staff has continued to monitor the soil probes, logging on to the system each day to check for any issues with the probes reporting data. Staff has worked with landowners to remove probes when needed before farming activity occurs, and to replace them immediately after completion of the field work. We have taken additional precautions to protect the probe equipment from damage, including flagging the equipment location, wrapping wires in foil, and removing and replacing the probes with extreme care.

**Dissemination**
We set up a website portal on which to share our data and findings. We produced a rack card to hand out at field days.

# Status Update Reporting

## Status Update June 1, 2024

**Date Submitted:** June 27, 2024

**Date Approved:** August 23, 2024

**Overall Update**

We continue to collect soil data via our soil probes and economic data from the participating farmers. Staff will meet individually with farmers after planting to review their economic data and practices in detail. We have sent the soil probe data to an analyst who has completed some preliminary review. We have lined up a consultant to analyze the soil data. We have reached out to an economist to analyze the economic data. We are working with a graphic designer, website designer/photographer to design and create promotional materials, educational materials, web portal, and final project report. We plan to hire a consultant and/or soil scientist to gather and analyze the final soil testing.

Preliminary soil data analysis shows water content results varied by depth, with soil health fields having higher water content throughout the summer at 0-15 cm. at 15-30 cm the control fields had higher water content until mid-august, after which point soil health fields had higher content. At 30-45 cm control fields had higher water content throughout the summer.

Temperatures were consistently lower for soil health fields across all depths except for early growing season (in which the temps were similar).

**Activity 1**

Sites have been selected and assessed. Initial soil health testing was conducted to set a baseline. Staff has received economic data from participating farmers over the course of the project. Staff will continue to meet with participating farmers to gather data about their expenses and income. Staff have arranged to sit down with participating farmers when they come in this year to recertify. During these meetings, staff will go over the farm practices in detail with each farmer.

Staff reviewed the use of cover crops and chemical spray with each participating farmer to avoid damage to cover crops in the study fields.

**Activity 2**

We have reached out to an economist to assist us in analyzing the economic data being collected in this study. We have also lined up an environmental consultant to assist us with making sense of the collected soil data. Additionally, we sent the soil data collected up through fall 2023 to a data analyst. Our analyst aggregated the data a provided preliminary graphs, plotting all stations together and individually.

We sent the analyst the data for January and February 2024, but have not received analysis back yet. We plan to send the March and April data soon.

Most of the probes were removed from the fields for the winter (in mid December). However, probes were left in two fields that had cover crops and their adjacent control fields (4 probes total). Those probes were only removed a couple weeks ago to allow the fields to be planted. All the probes will be replaced in May, after corn and soybean planting is complete.

We conducted one field day last spring. A second event is planned for June 18, in cooperation with the Minnesota Soil Health Coalition and Renville SWCD. A third event is being planned for August.

**Activity 3**

Staff continues to work with the participating farmers to ensure the study practices are implemented. Payments are made in a timely manner. We will work with the farmers to maintain access to their fields for soil testing and probe maintenance.

**Dissemination**

We are working with a graphic designer and photographer to make promotional materials for the two remaining events, to provide a portal on the SWCD website to disseminate our raw data, and our analysis and results when completed. We will work with them to design and print a final report detailing the projects findings, including photographs. We will also have project videos, including drone footage, available to be viewed on the website, and at subsequent soil health events, or other educational events. We plan to create brochures or similar materials describing the scope of the project and data gathered thus far, and do so again with our final data analysis and report.

# Status Update Reporting

## Status Update December 1, 2023

**Date Submitted:** December 15, 2023

**Date Approved:** January 4, 2024

**Overall Update**
We have gathered and downloaded the 2023 crop year soil probe data and are working with a consultant to analyze the data. We will bring in additional consultants and professionals as needed to analyze and disseminate the data. We are planning additional field days to reach out to the public. We are working with our website designer to add an online portal to easily and efficiently disseminate data, analysis and other project information to interested members of the agricultural industry and general public.

**Activity 1**
Initial assessments were completed last year, including soil testing and producer interviews and review of farming records. We have been meeting with the producers enrolled in the project to discuss and gather their economic data, regarding 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 yield.

**Activity 2**
We uploaded the raw data collected thus far and brought it to a consultant for initial review. We will bring in additional consultants and professionals as needed to analyze and disseminate the data. We are working with our website designer to add an online portal to easily and efficiently disseminate data, analysis and other project information to interested members of the agricultural industry and general public.
Staff communicated with the producers in order to remove the probes and related equipment from the fields immediately prior to harvest, in order to avoid damage to the probes and equipment. The probes and equipment will be replaced in the fields immediately after planting in the spring of 2024.
One of the probes was damaged by rodents. A replacement probe is being ordered this winter.

**Activity 3**
We are working with the producers enrolled in this project to ensure that adequate data is collected. Staff visited the probe sites several times over the course of the growing season to check on their physical status and to raise the probe transmitters on stakes and poles, to get them above the height of the growing crops.
Payments are in process for this year’s soil health fields.Staff discovered that different tillage practices than expected were used on some of the soil health fields.We are evaluating whether those practices qualify under the producer's contract. If not, payment will not be made on those fields.We will continue to work with the producers to encourage implementation of conservation practices in those fields in 2024.
There have been some technical issues with the soil probes. Staff has worked with the company (Hobo Onset) IT to resolve those issues. Two probes were not transmitting the data to the computer. IT told staff that after the transmitters were elevated, the stored data would be transmitted. However, though elevating the transmitters allowed new data to be collected, the old data did not transmit and Hobo Onset IT was not able to recover it.

**Dissemination**
We held one field day event in 2023. We are planning two additional field days in 2024. We will work with the coops and Minnesota Soil Health Coalition to get word out about the field days and drive attendance.
Were are in the process of cutting checks to the producers for the 2023 crop year. Those payments will be included in the next quarterly report.

# Status Update Reporting

## Status Update June 1, 2023

**Date Submitted:** August 7, 2023

**Date Approved:** September 5, 2023

**Overall Update**

We collected the first year of economic data. Specifically, collected data to compare the control fields to the soil health fields. Used Iowa Farm Custom Rate Survey to compare and confirm the data. Expanded soil health data by implementing soil health probes to measure soil moisture content and temperature in three depth zones. We purchased 20 probes and 4 repeaters, to relay information from the probes. 19 of the probes and the 4 repeaters have been installed on 11 different properties, representing different tillage practices. The probes collect soil temperature and moisture data every hour. Temperature is collected along the entire 18" length of the probes and moisture at 6 inch intervals. We have had some issues with the probes relaying the data. The company we purchased from stated they would relay to each other and the repeaters at a distance of 2000 feet, but we have discovered that it is more like 1500 feet. We are working with the company IT dept. and have been assured that the data is being collected. We will elevate the repeaters on poles to get them above the corn, and the company will send us additional repeaters.

**Activity 1**

Interviewed farmers to confirm current and previous practices. Eleven producers are enrolled in the study, most having multiple fields enrolled. Each producer was interviewed regarding their farming practices in 2022 and data was recorded on field management forms and economic tracking forms. Information collected included herbicide, fertilizer, pesticide, and fungicide usage, planting and harvest dates, detailed tillage practices, general farming conditions, income and expenses expenses per acre, commodity prices. Confirmed economic data received using the Iowa Farm Custom Rate Survey. Records collected  or consulted include producer farm data report, Rusle2 profile erosion calculation record, USDA Web soil survey. Initial problems recovering data from the probes have largely been solved, and data has been collected, transmitted, and received. Staff is in the process of conducting preliminary evaluation of the data, specifically calculating averages for soil temperature and moisture at each site in the top six inches of the soil, to compare soil health fields averages to control fields averages.

**Activity 2**

The first field day was held on July 6, in partnership with the USDA, the Nature Conservancy, NFWF, and the Minnesota Soil Health Coalition. It focused on the financial benefit of strip tilling compared to conventional tilling. The meeting was held on a farm near Redwood Falls and was well attended (46 attendees). We have a different farm (and farmer) selected to hold our next field day. This next field day will focus on no-till and vertical till practices compared to conventional tillage. We plan to reach out to crop consultants and agricultural cooperatives to include their expertise and reach additional potential attendees.

**Activity 3**

Requested and received 2022 and 2023 cropping schedules from participating farmers. Installed soil probes on most of the fields. Interviewed farmers to confirm field status. Producers signed contracts to implement alternative practices or cover crops in their soil health fields, to compare to the control fields. Numerous sight visits were conducted to check on the data gathering equipment and confirm the contracted practices. Initial payments were made under the contracts. Soil health fields and control fields were chosen for proximity to each other and proximity to other fields in the study to facilitate communication of the probe transmitters. Care was also given to choose soil health and control fields so as to compare corn to corn and soybeans to soybeans. Soil tests were conducted to provide a data baseline and background.

**Dissemination**

Dissemination will not begin until we have begun to at least collect and analyze preliminary data. However, we have taken photos of the equipment being used, and of the preliminary soil health physical inspections conducted on the enrolled sites. We plan to work with an economist and environmental consultant to analyze the data. Our office has a web designer on retainer who can assist in creating a web portal for dissemination via our website. Field days will be documented with pictures and video and provided for viewing by the public.

# Status Update Reporting

## Status Update December 1, 2022

**Date Submitted:** December 1, 2022

**Date Approved:** December 16, 2022

**Overall Update**
We have secured the amount of acres for this demonstration that we were aiming for. We have worked with landowners to enroll them in the study, and given them forms to begin collecting their data. Maps have been made of enrolled acres. Some but not all first round payments have been made to farmers. We have a great baseline set up for this study, and most of the work and findings will begin to reveal themselves starting next fall through the remainder.

**Activity 1**
Data collection has begun. More updates to this category as study progresses.

**Activity 2**
No progress will be made until completion of study.

**Activity 3**
All acres have been enrolled and data collection has begun.

**Dissemination**
Dissemination will not begin until we have begun to at least collect preliminary data.

# Status Update Reporting

## Status Update June 1, 2022

**Date Submitted:** May 20, 2022

**Date Approved:** May 23, 2022

**Overall Update**
We are at the beginning of our project. We have successfully enrolled 4,000 acres into the demonstration, 2,000 acres will be converted to using soil health techniques and 2,000 acres will be used as control groups - matching acres for each farm enrolled. This includes 11 different individuals enrolling from 60 acres to 410 acres. Initial data collection sheets have been developed and all individuals are aware of their commitments to the study.

**Activity 1**
No progress yet. Will begin this year.

**Activity 2**
No progress yet. Will begin this year.

**Activity 3**
Demonstration sites have been established and all 2,000 study acres and 2,000 control acres have been secured. Initial data gathering will take place this year. December report will have much more to discuss.

**Dissemination**
Dissemination to the general public has not fully begun since we do not have any results to share yet. However, in enrolling the acres we did a direct mailing to all the acres in the watershed. We also posted an article to the SWCD website (https://www.redwoodswcd.org/blog/learning-the-economics-of-conservation-practices-here-in-redwood) and shared it via Facebook.