Environment and Natural Resources Trust Fund

2023 Request for Proposal

General Information

Proposal ID: 2023-198

Proposal Title: Science Based Soil Health Examination and Execution

Project Manager Information

Name: Jennifer Hahn

Organization: Washington Conservation District

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Project Basic Information

Project Summary: Examine the benefits of soil health implementation to both operators and natural resources, and support practical implementation approaches to encourage and elevate success.

Funds Requested: $199,000

Proposed Project Completion: April 30, 2027

LCCMR Funding Category: Small Projects (H)

Secondary Category: Methods to Protect, Restore, and Enhance Land, Water, and Habitat (F)

Project Location

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

Region(s): Metro, Central,

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

Statewide

When will the work impact occur?

During the Project and In the Future

Narrative

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

In recent years, soil health implementation has increased nationally yet the adoption rate remains low in Minnesota. Making changes to farm management systems requires understanding of many factors to mitigate risk and increase success. The chief barrier to soil health practice adoption is overcoming the uncertainty of logistics of a new practice. Reliable information about how to implement these practices, the effects on agronomics, and the effects of the farm economics are needed to provide dependable recommendations to producers. Climate change, ground and surface water quality, carbon sequestration, and the need to implement upland treatment that doesn't require substantial infrastructure and maintenance all warrant the need for increased soil health adoption. Producers need field scale data on the logistics of successfully implementing soil health practices as well as opportunities to increase the infrastructure needed to execute the practices. The completed research on soil health practices in Minnesota are test plot scale which doesn't transfer to field scale planning and results. The current research also lacks specifics on equipment options of implementation which are the key factors for success. The project will address and overcome barriers for soil health adoption on Minnesota farms.

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 farming operations to implement demonstration plots to display side-by-side results of soil health techniques for the first three years of implementation measured against traditional management.
The focus will be on tracking the changes in agronomics, soil health, and economics between the comparison plots. To accomplish this, we propose to implement soil health practices on 600 acres of private land over a 3-year period. We will also be observing the equipment set ups and modifications to determine successful systems for implementation and provide an opportunity for area producers to modify their existing equipment to effectively apply soil health practices. Funding will be available to area producers to modify existing equipment to allow them to plant no-till as well as seeding cover crops. By providing the means for producers to modify their current equipment, we are empowering them to independently implement soil health practices without holding reliance on area resources.
The Washington Conservation District (WCD) will also purchase a no-till drill providing opportunities for area producers to seed cover crops, which is a barrier to implementation.
These outcomes will then be analyzed and distributed 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 soil health implementation within the first three years of adoption and how soil health practices can be more profitable than traditional management. 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 and agronomics, we will be able to demonstrate the additional benefits these practices provide for water quality, erosion and runoff reduction, and increased weather resilience that is applicable for agricultural lands in Minnesota and Wisconsin.

Activities and Milestones

Activity 1: Establish Demonstration Sites and Implement Soil Health and Farming Management Practices

Activity Budget: $90,000

Activity Description:
We are proposing to implement soil health practices on 600 acres for a 3-year period. These acres will be established directly next to similar acreage that will be maintained with traditional management practices, for a total of approximately 1200 acres enrolled in the project. Individuals will be paid cost-share for the acres they are committing to implement soil health practices on for the 3 years at a rate of $50.00/acre/year. These individuals will be required to allow us access to their private property during the project in order to complete soil health testing, collect soil samples, and conduct agronomic evaluation. We will work with several participants to post signage near their fields, creating an onsite demonstration plot of the project's activities. Soil temperature and moisture sensors will be installed on four of the soil health and comparison sites each to obtain a deeper understanding of the impacts of the soil health practices. Sites will be selected by local agronomists and conservation staff to obtain representative sites.

Activity Milestones:

Description	Completion Date
Issue RFP to identify potential demonstration locations	August 31, 2023
Select locations totaling approximately 1200 acres (600 for alternative management practices and 600 traditional management)	December 31, 2023
Secure contracts with farmers to implement practices	December 31, 2023
Soil health practices determined/assigned to fields	December 31, 2023
Producers prepared to implement soil health practices and track data	February 28, 2024
Season 1 soil health practices implemented and fields planted	December 31, 2024
Season 1 soil health practices implemented and fields planted	December 31, 2025
Season 3 soil health practices maintained and fields planted	December 31, 2026

Activity 2: Soil Health Data Collection Including Soil, Agronomics, Economic, and Analysis

Activity Budget: $15,000

Activity Description:
We will conduct initial soil health assessments on all tracts of land in the project to establish the baseline conditions of the fields. Soil health testing will include infiltration, Visual Evaluation of Soil Structure (VESS), residue percentage, penetration, soil temperature, soil life, roots, Ward Laboratories Soil Health Assessment test, and the Phospholipid fatty acid (PLFA) test. The tests will also be completed at the conclusion of the project to compare to the initial baseline information and will be completed on the soil health and control fields to quantify differences.
Throughout the project, we will also be tracking a comprehensive set of economic data. These data include the following costs: harvest, planting, planting cover crops, spraying, tillage, crop seed, cover crop seed, chemical application, fertilizer, pesticides, cover crop termination, insurance, grain drying, labor, custom hire, and others.
We will also be documenting the average yield, pest and disease pressure, crop emergence, growth stages, and maturity in each field.
The findings will be analyzed and documented through various methods and in the final report to provide data to farmers, conservation staff, and the general public.

Activity Milestones:

Description	Completion Date
Baseline soil data collection	June 30, 2024

Soil samples processed and analyzed	August 31, 2024
Season 1 documenting emergence, crop maturity, pest and disease pressure	October 31, 2024
Season 1 harvest, agronomic, and economic data collected and analyzed	February 28, 2025
Season 2 documenting emergence, crop maturity, pest and disease pressure	October 31, 2025
Season 2 harvest, agronomic, and economic data collected and analyzed	February 28, 2026
Soil samples processed and analyzed	August 31, 2026
Season 3 documenting emergence, crop maturity, pest and disease pressure	October 31, 2026
Season 3 harvest, agronomic, and economic data collected and analyzed	February 28, 2027
Final Data analysis	February 28, 2027

Activity 3: Data Synthesis, Outreach, and Field Days

Activity Budget: $14,000

Activity Description:

During the duration of the project, we will be working closely with University of Minnesota professionals to set up demonstration plots, collect data, and synthesize the data collected in order to fully scope the findings. The data will be prepared in a straightforward format to easily identify the trends and the results of our efforts.

We will share the results of our project through print, online, video, social media, as well as by hosting three annual soil health practice demonstration days. The publications will be available on the Lower St. Croix Watershed Partnership website which will contain all of the results of our project. During the project we will be utilizing photos and video to capture various stages of the process, working with dedicated outreach and educational staff to complete. A final report compiling the results will be completed in the last year to provide a complete data package allowing for a detailed understanding of results. We will partner with statewide organizations such as the Minnesota Soil Health Coalition, Extension, and others to further the distribution network to invite the public to the field days and to distribute the information we have collected.

Activity Milestones:

Description	Completion Date
Outreach Material and Field Day Preparation	May 31, 2024
First Field Day	September 30, 2024
Second Field Day	September 30, 2025
Preliminary Data Synthesis Year One and Two Data	March 31, 2026
Third Field Day	September 30, 2026
Final Outreach Materials and Results Publication Complete	March 31, 2027

Activity 4: Equipment Set Up and Modifications

Activity Budget: $80,000

Activity Description:

The project will provide farmers with funds to modify their existing equipment enabling them to use no-till to plant their row crops and/or to modify to plant cover crops. Many planters can be utilized for no-till but modifications are needed for successful implementation. By allowing farmers an avenue to modify their existing equipment, we are empowering them to continue to be self reliant, reduce the great expenses of purchasing new equipment, and reducing waste by using existing equipment. The WCD will also purchase a no-till drill allowing the area farmers access to pertinent equipment to plant cover crops which has been found to be a substantial barrier for implementation. These activities will remove barriers and allow for more acres to have soil health practices utilized well beyond the project life. Funding for equipment modifications will include $1,500 per farmer for modifications for no-till and/or cover crop planting. The WCD purchase of the no-till drill will include a unit that is easy to transport and requires smaller horsepower tractors to operate, making the unit accessible to many in the area.

Activity Milestones:

Description	Completion Date
Establish equipment modification criteria	August 31, 2023
Promote equipment modification opportunity	September 30, 2023
Begin funding to producers for equipment modification for soil health implementation	December 31, 2023
Identify and purchase no-till drill	July 31, 2024
Promote the rental availability of the no-till drill for soil health practices	August 31, 2024
Begin rental of no-till drill for soil health practices	August 31, 2024
Create and provide survey to no-till drill renters and recipients of equipment modification funding	January 31, 2027
End funding to producers for equipment modification for soil health implementation	February 28, 2027
Analyze survey results from no-till drill rental and equipment modification funding and include in final report	March 31, 2027

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Jennifer Hahn	University of Minnesota Extension	Project Manager	No
Jamie Schurbon	Anoka SWCD	Partner	No
Craig Mell	Chisago SWCD	Partner	No
Paul Swanson	Pine SWCD	Partner	No
Tiffany Determan	Isanti SWCD	Partner	No
Karen Kill	Brown's Creek WD	Partner	No
Mike Isensee	Carnelian-Marine St. Croix WD	Partner	No
Aidan Read	Comfort Lake-Forest Lake WD	Partner	No
Matt Downing	Middle St. Croix WMO	Partner	No
Jamie Schurbon	Sunrise River WMO	Partner	No
Andrew Novak	Valley Branch WD	Partner	No
Matt Moore	South Washington WD	Partner	No

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 WCD will continue to share the results of this project and provide cover crop seeding opportunities for area farmers. By providing local data focusing on logistics of implementation, equipping farmers to modify equipment allowing continuance and independent implementation, as well as services to seed cover crops, we hope to overcome the largest barriers experienced locally to implement soil health practices. The project will support the broader initiative across the state to address water quality on agricultural lands. The participants will be asked to continue implementing soil health to analyze and promote progress, funded through the LSCWP.

Project Manager and Organization Qualifications

Project Manager Name: Jennifer Hahn

Job Title: Outreach Agronomist/Extension Educator

Provide description of the project manager's qualifications to manage the proposed project.

Jennifer Hahn has been awarded and managed several grants through the Minnesota Soil Health Coalition and the Redwood SWCD. Jennifer has also created and implemented many demonstration plots, completed soil health testing utilizing NRCS protocols, completed economic analysis in agricultural systems, outreach and educational events including the first soil health school in Minnesota, and has worked with farmers assessing resource concerns and

conservation planning since 2005. Jennifer received her Bachelor of Science degree in Environmental Science, minoring in Soil and Water Sciences and has been working in the conservation and soil science field since. Jennifer also has extensive relationships with partners including University of Minnesota, NRCS, SWCD, Watershed Districts, Minnesota Soil Health Coalition, and others to collaborate on the project, creating a far reach for outreach and education. Jennifer is a certified conservation planner with JAA for ecological practices including soil health practices and was hired to be the Outreach Agronomist providing technical assistance, education, and outreach within the LSCW.

Organization: Washington Conservation District

Organization Description:
The Washington Conservation District (WCD) is a local unit of government in Washington County, Minnesota dedicated to soil and water conservation. Our mission to enhance, protect, and preserve the natural resources of Washington County through conservation projects, technical guidance, and educational services is governed by the state law and the Soil and Water Conservation Policy listed below. We have been providing local expertise on water quality, erosion control and natural resource information since 1942 through partnerships with individuals, local government units, and other organizations and agencies to meet our mission of the protection, conservation, and enhancement of natural resources. The Washington Conservation District has a total of 17 highly trained and well-credited staff that specialize in outreach, design, installation, maintenance, administration, and monitoring of conservation practices. The Washington Conservation District has an established and successful conservation program that will contract or hire additional specialized staff to deliver high quality conservation practices if needed.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
							Sub Total	-
Contracts and Services								
							Sub Total	-
Equipment, Tools, and Supplies								
	Equipment	Soil water and temperature sensing equipment	In field testing of soil water and temperature for demonstration plots					$11,000
							Sub Total	**$11,000**
Capital Expenditures								
		No-till drill	No-till drill to plant demonstration plots and area fields to cover crops	X				$50,000
							Sub Total	**$50,000**
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
							Sub Total	-
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								

	Printing	Demonstration plot results report	A report to summarize the findings from the demonstration plots and providing to area farmers, landowners, and staff to further education of implementing soil health practices and improving natural resources and farm agronomics					$5,000
	Printing	Promotional materials and mailings	To share the results of our project					$3,000
	Printing	Signage and educational materials	Signage and handouts available at demonstration plot areas.					$3,000
							Sub Total	**$11,000**
Other Expenses								
		Landowner costs share for participation	Landowners will be paid $50.00/acre/year to commit to the demonstration project					$90,000
		Field Days and workshops	Conduct 3 field days to provide education and demonstrate results					$3,000
		Soil testing	Complete the Soil Health Assessment test, and PFLA testing the first and third year on all demonstration plots					$4,000
		Equipment modification	Funding for producers to modify existing equipment in able to no-till row crops and/or plant cover crops $1,500 per modification					$30,000
							Sub Total	**$127,000**
							Grand Total	**$199,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Capital Expenditures		No-till drill	The no-till drill will be utilized to plant cover crops in the demonstration plots as well as providing area farmers the opportunity to utilize to plant cover crops. This will not only allow for the implementation of the demonstration plots for the project but will also provide many years of soil health practice implementation within the basin to continue protecting our natural resources. The in-kind contributions will more than double the expense for the no-till drill while providing a larger impact for resource protection and increase in soil health practice adoption well beyond the years of the project. **Additional Explanation :** The no-till drill will be available to area farmers to plant cover crops and convert row crop to permanent vegetation well beyond the years of the project. This will provide the area farmers a tool that is lacking to implement soil health practices while limiting barriers for adoption and increasing acres of adoption. The drill will be made available for use and will be maintained to extend the useful life of the equipment.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
In-Kind	Watershed Based Implementation Funding	Staff time to plan with producers, complete in-field soil testing, compile and analyze results, and develop outreach and education materials	Secured	$72,000
			State Sub Total	**$72,000**
Non-State				
In-Kind	Local District Funds	Landowner outreach	Secured	$30,000
In-Kind	Local District Funds	Equipment for completing in field soil health testing	Secured	$18,000
			Non State Sub Total	**$48,000**
			Funds Total	**$120,000**

Attachments

Required Attachments

Visual Component

File: 369adf94-2d3.pdf

Alternate Text for Visual Component

Science based soil health examination and execution - soil health demonstration plots, resources to increase and expedite implementation, and sharing the results to further education and understanding. Pictures of cover crops, planting equipment, and education....

Board Resolution or Letter

Title	File
Board Approval for Submission	65216328-ec3.pdf

Optional Attachments

Support Letter or Other

Title	File
Financial Capacity	9267981d-716.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

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?

Yes

Does the organization have a fiscal agent for this project?

Yes, Washington Conservation District

SCIENCE BASED SOIL HEALTH EXAMINATION AND EXECUTION

LEARNING AND DEMONSTRATING FOR INCREASED ADOPTION

1. Soil Health Demonstration Plots

Utilize approved methods of assessing soil health, agronomics, and economics. Engage farmers and analyze success in implementation

2. Resources to Increase and Expedite Implementation

Support implementation on demonstration plots, equipment modifications, and cover crop seeding

3. Share the Results to Further Education and Understanding

Equip farmers and conservation staff the knowledge for successful implementation