

**Environment and Natural Resources Trust Fund
2019 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 142-CH

A Farm Laboratory for Environmental Studies

Category: H. Proposals seeking \$200,000 or less in funding

Sub-Category: C. Environmental Education

Total Project Budget: \$ 199,900

Proposed Project Time Period for the Funding Requested: June 30, 2022 (3 yrs)

Summary:

This project gives undergraduate students unique opportunities to interact with working farmers, state agencies, and others as they conduct research on agricultural productivity and ecosystem resilience.

Name: Alan Kraus

Sponsoring Organization: Cannon River Watershed Partnership

Title: Conservation Program Manager

Department: _____

Address: 400 Washington Street
Northfield MN 55057

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Location

Region: Southeast

County Name: Dakota

City / Township: Greenvale Township

Alternate Text for Visual:

Aerial view of the buffer zone with edge-of-field and in-field practices shown on the Legvold Farm located near Northfield, MN - Dakota County.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____ %
_____ If under \$200,000, waive presentation?			



PROJECT TITLE: A Farm Laboratory for Environmental Studies

I. PROJECT STATEMENT

Few St. Olaf College and Carleton College students seeking degrees in environmental science have any on-farm experience, creating an “experience void” that must be filled if graduates from these programs are to excel in their chosen field. This void exists despite student enthusiasm for agricultural education and the colleges’ proximity to Northfield’s farms, valuable but currently untapped teaching resources for students and faculty. In the proposed project, the Cannon River Watershed Partnership (CRWP) will collaborate with area colleges, governmental agencies, private enterprises, and farmers David and Mark Legvold to create a farm-based living laboratory in which students gain necessary farm experience. This collaboration may serve as a model for other rural Minnesota colleges that wish to fill their own students’ “experience voids.” Additionally, as technologies emerge, national and international organizations will look to innovative institutions of higher learning to engage and assist in broadening undergraduate education. At the Legvold farm, students will engage in field research applicable to a corn-soybean rotation practiced on nearly 16 million acres of Minnesota farmland. The Legvold farm is ideal for the project for three reasons: 1) the landowners are former educators and have a history of collaboration with Northfield’s colleges; 2) the farm’s soils, drainage and crop rotations are typical of many Minnesota watersheds; and 3) organizations such as Environmental Tillage Systems, Environmental Services Exchange, The Fertilizer Institute and the Minnesota Department of Agriculture have recognized and worked with the Legvold Farm on conservation and drainage demonstrations.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Create infrastructure of farm laboratory.

ENRTF BUDGET: \$72,700

The goal is to provide a working farm representative of many Southeast Minnesota soils and corn-soybean rotations. The task is to design (in-kind technical guidance), implement and manage (\$7,200 Legvold Farm; \$16,500 CRWP) structures including near channel buffers, drainage controls, sampling wells, saturated buffer components and a woodchip bioreactor (structures total \$49,000). Evaluation will be the resulting sampling and data collection sites and measurable comparisons between treatments.

Outcome 1: Structures established to conduct nutrient concentration, carbon sequestration, flow rates and streambank stability comparisons between treatments.

Completion Date: 2020

Activity 2: Create crop plans to provide in-field practices and systems.

ENRTF BUDGET: \$58,200

The goal is to provide a working farm site for students to test treatments of various cropping and tillage practices. The task is to design, implement and manage (\$33,000 CRWP; \$14,400 Legvold Farm) replications of cover crops (\$6,480), tillage practices (\$4,320) and corn varieties. Evaluation will be the resulting sampling and data collection sites and measurable comparisons between treatments.

Outcome 1: Field replications to measure nutrient concentration, carbon sequestration, water holding and infiltration and yield comparisons between treatments.

Completion Date: 2020, 2021, 2022

Activity 3: Create farm based educational research projects for college students.

ENRTF BUDGET: \$69,000

The goal is to provide a working farm where 10-12 students conduct research involving conservation structures, practices and systems affecting ecosystem resilience and agricultural productivity. Research includes measurements of surface runoff and infiltration, biomass growth, tile line root penetration, nitrate and phosphorus abatement, carbon sequestration, wildlife activity, and stream corridor impacts comparing native grasses, fruit and nut bearing plants, and big woods buffer plantings. Weed suppression, water infiltration, and



**Environment and Natural Resources Trust Fund (ENRTF)
2019 Main Proposal**

grain yield measurements will compare field treatments of cover crops, tillage and corn varieties. Students will have summer employment opportunities (\$36,000) to conduct sampling and testing (\$33,000) to measure comparisons between treatments. Additionally, 175-200 students along with 75-100 farmers, industry professionals and higher education representatives will attend symposia and field day events. Evaluation will be the quantity and quality of student research reports and field day events.

Outcome 1: 10-12 student research projects and presentations on buffers, edge of field and in-field treatments.

Outcome 2: 3-6 informational field day events to farmers, industry professionals and educational institutions.

Completion Date: 2020, 2021, 2022

III. PROJECT PARTNERS:

A. Partners receiving ENRTF funding

Name	Title	Affiliation	Role
David and Mark Legvold	Farm Owners	Legvold Farm	Managing Farm, Mentoring Students
Kathy Shea	Professor of Biology	St. Olaf College	Student Guidance
Mary Savina	Professor of Geology	Carleton College	Student Guidance

B. Partners NOT receiving ENRTF funding

Name	Title	Affiliation	Role
Brian Watson	District Manager	Dakota Co. SWCD	Technical Guidance
Mark Dittrich	Drainage Specialist	MN Dept of Agriculture	Technical Guidance

IV. LONG-TERM- IMPLEMENTATION AND FUNDING:

This project will result in an established farm based environmental laboratory for continued education, training and outreach. Students will have gained necessary farm experience (thus filling the “experience void”) and enter the environmental science workforce with skills relevant to agricultural production and ecosystem resilience. Farmers and industry professionals will have gained knowledge of practices and systems supported by farm-based research findings. Also, educational institutions throughout Minnesota will have gained insight into a workable model to fill their students’ “experience voids” in agriculture as they train the next generation of environmental scientists. After the funding period has ended, the relationships between the Legvolds and the Northfield colleges will endure as both colleges plan to continue to use the site for education as part of a collaboration on Heart of the Heartland and Broadening The Bridge projects funded by independent sources.

V. TIME LINE REQUIREMENTS:

The proposed timeline for this project is 3 years, during which 10-12 students will conduct research and present results as part of senior research projects in environmental science. For the duration of the project, faculty members Kathy Shea (St. Olaf) and Mary Savina (Carleton) will oversee curricular activities. The colleges and the Legvolds plan to utilize the farm laboratory to provide many future educational opportunities.

VI. SEE ADDITIONAL PROPOSAL COMPONENTS:

- A.) Proposal Budget Spreadsheet; B.) Visual Component or Map; C.) Project Manager Qualifications and Organization Description; D.) Letter or Resolution; E.) Certified Audit or 990 Tax Information**

2019 Detailed Project Budget

Project Title: A Farm Laboratory For Environmental Studies

IV. TOTAL ENRTF REQUEST BUDGET \$199,900 years 3

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel: Cannon River Watershed Partnership - project guidance, coordination, reporting, grant management, educational outreach, in-field practices planning. 0.15 FTE for Conservation Program Manager (100% is for salary).	\$ 49,500
Professional/Technical/Service Contracts: David and Mark Legvold - Past educators and farm owners with established history working with St. Olaf and Carleton students, conservation tillage and drainage organizations. Ideal location to Northfield Colleges, typical SE MN soils and a corn/soybean rotation. Allowance for access, facilities, crop management and student mentoring - \$21,600. Allowance for in-field crop and tillage replications - \$10,800	\$ 32,400
Professional/Technical/Service Contracts: Allowance for 10-12 Student Summer Employment Opportunities - water and soil sample collection, data analysis, research project presentations, educational outreach.	\$ 36,000
Equipment/Tools/Supplies: Four vegetated buffers - materials and establishment.	\$ 8,000
Equipment/Tools/Supplies: Bio-reactor - materials and establishment.	\$ 21,000
Equipment/Tools/Supplies: Drainage water management - materials and establishment	\$ 7,000
Equipment/Tools/Supplies: Sampling supplies and testing	\$ 33,000
Equipment/Tools/Supplies: Saturated buffer - materials and establishment.	\$ 13,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 199,900

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ To Be Applied To Project During Project Period:	N/A	N/A
Other State \$ To Be Applied To Project During Project Period:	N/A	N/A
In-kind Services To Be Applied To Project During Project Period: \$26,600 - David and Mark Legvold - Farm management, site access, student mentoring ; \$47,660 - St. Olaf College, Carleton College - Professorial Guidance on student projects, analysis, education and outreach and student support for sampling, analysis, research project presentations; \$30,375 - Minnesota Department of Agriculture - Professional technical service; \$16,500 - Cannon River Watershed Partnership - grant management, reporting, cropping and tillage assistance; \$2,700 - Dakota County SWCD - Professional Technical services ;	\$123,835	Secured
Past and Current ENRTF Appropriation:	N/A	N/A
Other Funding History:	N/A	N/A

Legvold Farm – Northfield, MN – Dakota County

A Farm Laboratory for Environmental Studies

Environment and Natural Resources Trust Fund Project 2019-2021



Surface drainage area ~ 40 acres
Subsurface drainage ~ 20 acres

Tile main

Buffer Plantings of native grasses, trees, and nut-bearing shrubs

Saturated Buffer ~ 1 acre

Control Structure

Mud Creek

Woodchip Bioreactor located per technical requirement
05/06/2018

INPUTS:

- 10-12 Student Research Projects
- 8-10 Class Lectures
- 3-6 Field Days for Farmers & Industry Professionals

OUTCOMES:

- 10-12 St. Olaf & Carleton Graduates enter workforce with skills relevant to Agriculture & Ecosystem Resilience
- 15-20 Farmers & Industry Professionals implement knowledge of practices and systems
- Research findings support recommendations



**Environmental and Natural Resources Trust Fund
2019 Request for Proposal (RFP) Submission**

Project Title: A Farm Laboratory for Environmental Studies

Project Manager:

Alan Kraus, Conservation Program Manager for the Cannon River Watershed Partnership, earned an M.S. in Agricultural Economics and B.S. in Dairy Science and from the University of Wisconsin - Madison. He has 25 years of experience dairy farming in Central Wisconsin. As a member of the Marathon County Board of Supervisors for 13 years, Alan Chaired the Environmental Resources Committee and was Vice Chair of the Land Conservation and Zoning Committee. He is also a past University of Wisconsin – Extension Dairy and Livestock Agent.

Other collaborating organizations and staff:

David Legvold - Farm Owner/Operator - The Legvold farm is ideal for the project for three reasons: 1) the landowners are former educators and have a history of collaboration with Northfield's colleges; 2) the farm's soils, drainage and crop rotations are typical of many Minnesota watersheds; and 3) organizations such as Environmental Tillage Systems, Environmental Services Exchange, The Fertilizer Institute and the Minnesota Department of Agriculture have recognized and worked with the Legvold Farm on conservation and drainage demonstrations.

Kristi Pursell, Executive Director, Cannon River Watershed Partnership, is a graduate of St. Olaf College in Northfield, MN, with a degree in English and Environmental Studies. Her background is in environmental education and nonprofit work. She and her husband also own and operate a small farm near Northfield.

St.Olaf College - Dr. Kathleen Shea, Professor of Biology

Carleton College - Dr. Mary Savina, Professor of Geology

Dakota County SWCD - Brian Watson, District Manager

Minnesota Department of Agriculture - Mark Dittrich, Senior Planner Conservation Drainage

Organization Qualifications:

The Cannon River Watershed Partnership is a well-respected, member-based, 501 (c) (3) non-profit organization that began in 1990. Its mission is to engage people in protecting and improving the water quality and natural systems of the Cannon River watershed. CRWP partners with county planning and zoning offices, soil and water conservation districts, cities, state and federal agencies, academia, citizen groups and land owners in order to create long term watershed improvement. CRWP is currently governed by a 25 member Board of Directors. Twelve are elected officials that are appointed to CRWP's Board – six county commissioners and six Soil and Water Conservation District Supervisors from the six counties of the watershed. Thirteen are citizen members who are elected by our membership.