Environment and Natural Resources Trust Fund

2027 Request for Proposal

General Information

Proposal ID: 2027-538

Proposal Title: Perennial Crops for Wildlife - Education and Demonstration

Project Manager Information

Name: Katy Guthrie

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

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Project Basic Information

Project Summary: Create curricula and demonstration fields to educate students, farmers, and the public on how perennial crops can conserve natural resources.

ENRTF Funds Requested: $377,000

Proposed Project Completion: June 30, 2030

LCCMR Funding Category: Education and Outdoor Recreation (C)

Project Location

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

Statewide

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

Statewide

When will the work impact occur?

During the Project

Narrative

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

Perennial grasses of the tallgrass prairie once covered 32% of Minnesota land prior to colonial settlement. These perennials produce deep roots that inject carbon and leave organic matter in the soil, which serves as the basis for our impressive agricultural economy. Since the 20th century, Minnesota has capitalized on these rich soils and replaced over 99% of perennial grasslands with annual row crops. Although these row crops support economies and communities across Minnesota, they come with some challenges. Many of the annual crops in Minnesota don't provide the habitat and resources necessary for wildlife including hundreds of species of insects. Most annual crops are tilled each year and require multiple applications of fertilizers and pesticides for profitable production. Nitrogen fertilizer, perhaps the costliest input, leaches from crop fields into ground- and surface-waters where it pollutes drinking and recreational waters. Tillage and inputs also release greenhouse gas emissions that fuel climate change.

Fortunately, Minnesota is at the forefront of developing solutions to these challenges – new perennial grain crops. This project will foster collaborations among high schools, students, researchers and farmers to demonstrate the economic and environmental benefits of perennial crops. Educational efforts will lead to landscape changes and improved environmental outcomes.

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.

This project brings together farmers, local businesses, Great River Greening and three Minnesota high schools to plant demonstration-scale plots of Kernza®, the world's first commercially viable perennial grain crop. These "living labs" are where local FFA students will learn about the potential environmental benefits of perennial crops. We will design formal secondary and postsecondary curricula, which will be tested in partnership with three high schools, alongside formal teacher training modules to support integration into classrooms. To showcase economic viability, Kernza grain harvested from the plots will be milled and provided to a local bakery to make food products for students, teachers and community members.

These living labs will also host field days to provide farmers and other land managers with technical assistance to grow their own fields of Kernza. A capstone Kernza Community Festival will be organized to increase broader public awareness. The festival will feature Kernza foods, hands-on educational activities hosted by farmers and scientists, and opportunities for the public to survey insects – which will be led by students. We will develop and share curricula with high school agriculture teachers at the annual Minnesota Association of Agricultural Educators (MAAE) summer conference.

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?

1. Curricula for teaching FFA students on natural resource conservation in agriculture.
2. Curricula for first-year college students introducing them to community engaged sustainable agriculture.
3. Establishment of three living-labs as an experiential learning tools to promote student environmental stewardship.
4. Field days to provide applied technical knowledge and tools to farmers to help them adopt new perennial crops.
5. A Kernza Community Festival for broad stakeholder audiences that will showcase how Kernza can benefit the environment and the economy by demonstrating real-world plantings and Kernza food products.

These outcomes will have positive impacts on Minnesota long beyond this project.

Activities and Milestones

Activity 1: Develop and manage “living labs” of Kernza in partnership with three high schools.

Activity Budget: $171,243

Activity Description:
A team of UMN researchers, high school teachers, FFA chapters, and local farmers will collaborate to plant and maintain three small demonstration fields of Kernza, the world’s first perennial grain crop. These “living labs” will be hosted near a partnering high school location by a local farmer and used to teach high school students about wildlife ecology, agriculture, food science, economics, and sustainability (See Activity 2 – 3 below). Each “living lab” will be between 1-10 acres, ideally within a wellhead protection area to reduce nitrate leeching to groundwater.

Activities include 1) the planting, fertilizing, managing weeds, 2) harvesting grain and straw from the plots, and 3) transport, cleaning, and milling of grain. Some milled grain will be sent to local bakeries to be used in food product R&D, including high school meal programs. Funding will provide a stipend to the farmer equal to the average profit return of corn or soybean in the country. Specific activities and local partnerships will be managed by individual high school partners. Remaining milled grain will be used for Activity 3. This activity includes implementation of educational materials to high school students, and thus includes all the high school contracts.

Activity Milestones:

Description	Approximate Completion Date
Plant Kernza "living labs"	July 31, 2027
Harvest grain	August 31, 2028
Process grain/deliver ingredients to bakeries and HS partners	December 31, 2028
Bakeries and FFA chapters experiment/R&D	June 30, 2029
Harvest grain	August 31, 2029
Process grain/deliver ingredients to bakeries and HS partners	December 31, 2029

Activity 2: Develop, test, and deploy curricula for secondary and post-secondary education.

Activity Budget: $55,252

Activity Description:
Curricula will be designed and used to teach secondary and post-secondary students about the potential environmental benefits of perennial crops. For high schools, the team will develop modules that can fit into existing courses aligned with the state AFNR curricula. There will be a focus on experiential learning – students will collect data and make observations on insect biodiversity within the Kernza living labs. The team will design and deliver a two-day training workshop for teachers at partnering high schools to demonstrate how the modules can be integrated into their classes. At the college level, a CFANS “first year experience” course will be developed to introduce freshmen to the field of sustainable agriculture and will involve field trips to each of the living labs where college students will engage with high school students and local farmers.

Both curricula will be presented at a MAAE Conference in year 3. Materials, including lesson plans and teacher training resources, will be publicly available by the end of the grant period. The student datasets gathered from each living lab will be used to develop virtual activities that can be leveraged by schools without easy access to a living lab, broadening our impact.

Activity Milestones:

Description	Approximate Completion Date
Develop curricula for high school students, high school teachers, and college freshman	July 31, 2027
Train teachers to use curricula	August 31, 2027
Teach developed curricula at partnering high schools	December 31, 2029
Teach first-year experience course in CFANS at UMN	December 31, 2029
Present curricula at MAAE Conference	June 30, 2030

Activity 3: Host farmer field days and Kernza Community festivals to raise awareness about perennial agriculture to different stakeholders

Activity Budget: $150,505

Activity Description:
The team will plan farmer field days and a Kernza Community Festival to raise awareness about perennial agriculture and the environment for the public. Field days will be hosted at each of our partnering living labs, each with special programming designed for specific audiences including farmers, federal land managers (NRCS), state agencies (DNR, MDA, BWSR), and non-profits and educators. These field days will be more technical in nature, aimed to support farmers in the adoption of perennial crops, with presentations from GRG, UMN educators and the living lab host farmer, who will be paid for their time dedicated to this field day.

The Kernza Community Festival, held at a living lab in the Spring, will connect multiple stakeholders with potential environmental benefits of perennial crops. It will have various demonstration stations like the rainfall simulator, a soil pit to showcase Kernza roots, and presentations from farmers. Local bakeries/businesses using Kernza will be showcased to share their experiences working with the grain while providing products for sampling. Students will host live demonstrations of insect biodiversity sampling to demonstrate their learning to the public. Partner high schools will bake Kernza products using grain from Activity 1 for the event.

Activity Milestones:

Description	Approximate Completion Date
Host farmer field days – Year 2	September 30, 2028
Kernza Community Festival – Year 2	June 30, 2029
Host farmer field days – Year 3	September 30, 2029
Kernza Community Festival – Year 3	June 30, 2030

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Tamara Berger	ROCORI High School	High School Partner	Yes
Jennifer Grommes	Great River Greening	Project Collaborator	Yes
Ben Penner	Penner Farms	Farmer Collaborator	Yes
Jacob Jungers	University of Minnesota	Co-Project Manager	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.
The results of this project will be disseminated at Farmer Field Days, Kernza Community Festivals, and through formal presentations at the MAAE Summer Conference and Post-Secondary Summit. The benefits from this project is expected to encompass multiple stakeholder groups including farmers, high school students, first-year college students, federal land managers (NRCS), state agencies (DNR, MDA, BWSR), and non-profits and educators.

The Minnesota Environment and Natural Resources Trust Fund 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 ENTRF Acknowledgment 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?
Results of this project will be presented at the MAAE summer conference and Post-Secondary Summit and made publicly available to instructors across Minnesota through MAAE. While we do not believe project implementation will extend beyond the grant period, the project partners may seek additional funds to broaden the project to include other high schools in the future. Based on early evaluations of this project, we may seek additional funding from other entities to develop virtual lab lessons, which will support broader implementation across Minnesota high schools.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Long-Term Nitrate Mitigation By Maintaining Profitable Kernza Production	M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 04i	$485,000

Project Manager and Organization Qualifications

Project Manager Name: Katy Guthrie

Job Title: Teaching Assistant Professor

Provide description of the project manager's qualifications to manage the proposed project.
Dr. Katy Guthrie is a trained plant geneticist and educational researcher with over ten years of experience teaching at

the post-secondary level. In her current position as a Teaching Assistant Professor at the University of Minnesota, she teaches over six classes within the Plant Science and Sustainable Agriculture and Food Systems majors. Her undergraduate studies included a special education minor (K-12) and experience working in public schools. This, paired with her experience in developing and publishing activities aligned with core curriculum at the secondary level, she is familiar with the needs of both students and teachers in public school systems. Her experience in academic project management includes 1) award and oversight of a USDA NIFA pre-doctoral fellowship, where she managed a project team to study maize developmental genetics, 2) oversight of a USDA HEC sub-award to the University of Minnesota to develop systems thinking capacity in first-year College of Food, Agricultural and Natural Resource Sciences (CFANS) students, and 3) oversight of a pilot program evaluation for our First Year Experience (FYE) courses in CFANS, including student surveys, interviews, focus groups, and classroom observations. Together, Dr. Guthrie has strong organizational, communication and management capacity, paired with field specific knowledge and educational experience that will support this project's success.

Dr. Guthrie will work closely with Dr. Jacob Jungers, the project Co-PI for mentorship and support. Dr. Jungers brings a depth of expertise in Kernza research, close relationships with Minnesota farmers, and previous LCCMR grant experience that will increase the impact of this project.

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

Organization Description:
The University of Minnesota College of Food, Agricultural and Natural Resource Sciences (CFANS) is a leader in research, education, and outreach dedicated to conserving natural resources. With a strong emphasis on sustainability, CFANS integrates cutting-edge science, policy, and practical solutions to address environmental challenges such as climate change, water quality, biodiversity loss, and sustainable land management. CFANS develops innovative strategies to protect ecosystems, manage wildlife populations, and restore habitats. Faculty and researchers collaborate with government agencies, nonprofits, and industry to develop science-based conservation policies and resource management practices that ensure the long-term health of forests, wetlands, and agricultural landscapes. CFANS also provides students with hands-on learning opportunities, from fieldwork in Minnesota's diverse ecosystems to internships with environmental organizations. Programs such as sustainable agriculture, ecological restoration, and environmental sciences prepare future leaders to tackle pressing conservation issues. By integrating education, research, and community engagement, CFANS plays a critical role in conserving natural resources while promoting sustainable practices that balance environmental, economic, and social needs for future generations.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Project Manager		Overall project management, planning and implementation of Activity 2			36.6%	0.21		$66,912
Co-PI/Project Manager		General project management, direct oversight of Activity 1			36.6%	0.12		$25,444
Field Technician		Oversee living lab logistics including arranging equipment for field operations, operating machinery for planting and harvesting biomass, application of restricted pesticides (technician will have state applicators license) and contribute to plot management and data collection.			32.3%	0.3		$26,793
Post-Doctoral Researcher/Education Specialist		Provide the primary support for the development, testing, and deployment of curricula for secondary and post-secondary educators.			26.1%	0.3		$24,178
Undergraduate researchers		Provide technical support and aid in data collection, plot management, field day coordination.			0%	0.3		$11,572
							Sub Total	**$154,899**
Contracts and Services								
ROCORI High School	Service Contract	Funds are requested for ROCORI High School for supplies, land rental and contracts for additional services such as farmer payments for planting, spraying, harvesting and payments to millers, processors.				0		$14,144
Alexandria High School	Service Contract	Funds are requested for Alexandria High School for supplies, land rental and contracts for additional services such as farmer payments for planting, spraying, harvesting and payments to millers, processors, and summer salary for one HS educator.				0.3		$45,364
Great River Greening	Subaward	Oversight for Activity 3; planning for farmer field days and Kernza Community Day in years 2 and 3. Funds for personnel, travel, mileage,		X		0.66		$103,790

		supplies, and other: event expenses include handouts, health food/beverages, and toilet/tent rental. Additional grant support in the development of educational activities, field management, and administration.						
MN High School Partner #3 - TBD	Service Contract	Funds are requested for a third High School partner, to be determined. This includes land rental and contracts for additional services such as farmer payments for planting, spraying, harvesting and payments to millers, processors, and summer salary for one HS educator.				0.3		$45,364
							Sub Total	**$208,662**
Equipment, Tools, and Supplies								
	Tools and Supplies	Fertilizers, pesticides and other agricultural inputs for Kernza Living Lab field management ($1,005; estimated $335 per living lab site). Educational supplies for a 25-person class ($1,433) including, but are not limited to: quadrats ($50 each), sweep nets ($15/each), pollinator bowls ($10 each), magnifying glasses ($5-10 each), and identification books ($9-15 each), and gardening gloves ($2/pair).	General operating supplies to support field experiments and site activities. This includes fertilizers, pesticides and other agricultural inputs for Kernza field management and educational supplies to support a 25-person class that can be shared across living lab sites and used for community day demonstrations.					$2,438
							Sub Total	**$2,438**
Capital Equipment								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	Estimated 300 miles per year for travel to three different living lab sites this estimate includes five round trip visits/year over the three year duration of the project and UMN mileage reimbursement of 0.725/mile. No lodging or per diem is being requested.	Site visits will for field days, Kernza community fest, teacher training, activity implementation, data collection, team meetings.					$9,789

	Conference Registration Miles/ Meals/ Lodging	Conference registration (estimated at $500), lodging for four nights (UMN rate of $110/night for 4 nights; total $440), and per diem (UMN rate of $68/day, for 4 days; $272 total).	Present results from project period, share curricula with MN educators across the state					$1,212
							Sub Total	**$11,001**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
							Sub Total	**-**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$377,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Contracts and Services - Great River Greening	Subaward	Oversight for Activity 3; planning for farmer field days and Kernza Community Day in years 2 and 3. Funds for personnel, travel, mileage, supplies, and other: event expenses include handouts, health food/beverages, and toilet/tent rental. Additional grant support in the development of educational activities, field management, and administration.	Events will include supplies and rentals as a standard recruitment tool and safety item: healthy food, beverages, tables, chairs, portable toilets, and tent rentals. Field days may be in remote farm locations where access to hydration, food and other essential amenities can be challenging. We do not want attendees hungry or thirsty while gaining knowledge and experience. Standard food items and beverages include selections of fruit, granola bars, juice, water, coffee, and sandwiches.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	**-**
Non-State				
			Non State Sub Total	**-**
			Funds Total	**-**

Total Project Cost: $377,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: e8b887ef-a90.pdf

Alternate Text for Visual Component

Visual Flowchart depicting the Perennial Crops for Wildlife - Education and Demonstration project. Includes how the four major relationships will interact to teach various stakeholders about the ecological benefits and opportunities of perennial crops....

Supplemental Attachments

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

Title	File
Letter of Support, UMN CFANS Director of Strategic Outreach	5aa14b45-fbe.pdf
Letter from UMN Sponsored Projects Administration	a590e6ce-149.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

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?

Yes, I understand the UMN Policy on travel applies.

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?

No

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing $10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care,

treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

Dr. Jacob Jungers, University of Minnesota and Jennifer Grommes, Great River Greening

Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements

Yes, I understand