Environment and Natural Resources Trust Fund

2026 Request for Proposal

General Information

Proposal ID: 2026-481

Proposal Title: Resilient Dairy Calf Systems to Support Minnesota's Communities

Project Manager Information

Name: Isaac Haagen

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

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Project Basic Information

Project Summary: This project will support more resilient dairy farm systems in the face of increased extreme weather events in MN. In turn, this will support strong rural communities.

ENRTF Funds Requested: $406,000

Proposed Project Completion: June 30, 2029

LCCMR Funding Category: Resiliency (A)

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 and In the Future

Narrative

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

Extreme weather events, such as high temperatures and wildfire smoke, are becoming more common in MN. These events pose threats to dairy operations and the rural communities they support. Dairy operations are an integral part of MN statewide and within their communities. Minnesota's dairy industry is the 7th largest in the United States in terms of milk produced and is one of only five states that have greater than 1000 dairy operations remaining. In addition, over 75% of the operations that remain have less than 200 cows. However, extreme weather likely is having negative consequences on the resiliency of dairy cattle which directly threatens the MN dairy industry and the agricultural communities that dairies support. The average temperature in MN according to the MN DNR has increased by 3 degrees F between 1980 and 2020. It is well-known that higher temperatures negatively impact adult dairy cattle. However, the impact on young animals (youngstock less than 3 months of age), is not well understood. This project will determine the impacts of extreme heat and weather on the resiliency of dairy youngstock and develop strategies to address.

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 will evaluate the impacts that extreme weather are having on the resiliency of dairy youngstock. We will evaluate the the impacts of heat stress and air quality on dairy youngstock growth, health, and behavior. Finally we will evaluate the genetics of animals to determine animals that are genetically more resilient to negative weather conditions such as heat and poor air quality.

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 determine the impacts of extreme weather on dairy youngstock growth, health, and behavior. This will allow us to develop management and genetic strategies for dairy producers to improve growth efficiency and disease resistance in dairy cattle. By improving animal health and growth, we can reduce the impact of dairy on consumption of natural resources as well as reduce the risk of antibiotics to treat disease in dairy animals. It will also assist producers in remaining economically viable which in turn will protect rural communities against development in the future.

Activities and Milestones

Activity 1: Evaluate the impact of extreme weather on dairy youngstock growth, health, and behavior

Activity Budget: $199,683

Activity Description:
Calves will be raised at the UMN Southern Research and Outreach Center (SROC) in Waseca, MN and the UMN West Central Research and Outreach Center (WCROC) in Morris, MN. SROC calves will originate from 3 dairy farms in MN. WCROC calves will be born and raised at WCROC. Weather (temperature, air quality) conditions will be extracted from the nearest weather stations. Data related to dairy calves will include body weight and hip height recorded upon birth/arrival and on d 56. Approximately 500 calves are enrolled in preweaning applied nutritional studies per year which provides denser data. In addition to the above data, calves enrolled in studies have the following data recorded until 56-d: daily milk intake (offered – refused), daily dry feed intake (offered – refused), daily fecal consistency scores, all disease treatment, total disease treatment costs, and bi-weekly body weights. In addition, we will record behavior data from sensors attached to the calves to measure activity (lying time, steps, and rumination). These three sources of information will be merged to determine relationships between calf measures and weather data. Data will be collected from years 1 to 3.

Activity Milestones:

Description	Approximate Completion Date
Purchase and install sensors	September 30, 2026
Mid-point analysis of relationships between weather data and calf data	January 31, 2028
Collect calf data and sensor data	June 30, 2029
Finalize analysis of relationship between weather data and calf data	June 30, 2029

Activity 2: Determine genetic strategies to improve resiliency in dairy youngstock

Activity Budget: $194,000

Activity Description:
We will collect (switch) hair from 1500 calves. Priority of hair collection will be given to calves enrolled in nutritional studies for denser data collection that is
already part of the SOP outlined in Activity 1. We will follow the procedure as outlined by Zoetis, and hair samples will be submitted to Zoetis for Clarifide Plus genetic testing. Genomic data and genetic predictions for important economic traits (yield, cow health, cow longevity) will be obtained from Zoetis. Utilizing this data we will determine if there is genetic contribution to dairy youngstock resiliency to poor weather conditions (temperature and air quality) and if more resilient animals excel in other economically important traits. We will also determine in individuals that are more genetically diverse are more resilient.

Activity Milestones:

Description	Approximate Completion Date
Collect hair samples and obtain genomic test results	June 30, 2029
Analyze genetic data to determine genetic component to dairy youngstock resliency	June 30, 2029
Determine relationship between resiliency and other important economic traits	June 30, 2029

Activity 3: Develop education and outreach activities to inform dairy producers and the public

Activity Budget: $12,317

Activity Description:

It is imperative that information from this project reach dairy producers and the general public to inform decisions. We will develop a comprehensive Extension and outreach program to disseminate results. Producers will be informed of genetic selection strategies and management strategies that improve dairy youngstock resiliency to decrease use of natural resources and decrease antibiotic usage. We will maintain a webpage on the UMN Dairy Extension Team website to disseminate information. Results will be also be presented at Extension Field Dairy hosted throughout MN. We will utilize UMN Extension Team podcasts (The Moos Room) to share results with a broader audience. Finally, results will be shared on social media (Facebook, Instagram, etc) and in popular press articles for the general public.

Activity Milestones:

Description	Approximate Completion Date
Create webpage dedicated to project	December 31, 2026
Write press articles and host field days to disseminate results	June 30, 2029
Host podcast and create social media posts to share progress reports and final results	June 30, 2029

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Bradley Heins	University of Minnesota	Co-Project Manager	Yes

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 will inform future management and genetic decisions on dairy farms. Results will be dissemented through peer-reviewed research articles and Extension articles, podcasts, and webpages.

Project Manager and Organization Qualifications

Project Manager Name: Isaac Haagen

Job Title: Building resilient dairy calf systems to support Minnesota's resources

Provide description of the project manager's qualifications to manage the proposed project.
Dr. Haagen, project manager, is an Assistant Professor, Dairy Production and Extension Dairy Specialist at the University of Minnesota. Dr. Haagen currently serves as the PI of two sponsored research projects including one from the USDA and a recently approved project from the Rapid Ag Response Fund administered by the UMN. Dr. Haagen has extensive experience with dairy cattle genetics, dairy youngstock management, and dairy production, and his research often deals with the intersection of environmental sustainability of dairy production, dairy cattle health, and animal efficiency. Dr. Haagen currently serves as advisor or co-advisor to three graduate students. Dr. Haagen will oversee the completion of the project, outreach/extension and one graduate student.

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

Organization Description:
The College of Food, Animal, and Natural Resource Sciences at the University of Minnesota is one of the premier agricultural research and teaching colleges in the United States. Within CFANS, the Department of Animal Science is internationally recognized for the dairy cattle research it completes related to dairy cattle genetics. Multiple locations across the system raise dairy cattle, including the Southern Research and Outreach Center in Waseca, MN and the West Central Research and Outreach Center in Morris, MN. These locations allow faculty at the UMN to conduct system and place based research across the state of MN.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Isaac Haagen		Project leader, Isaac Haagen, is an Assistant Professor, Dairy Production in the Department of Animal Science. Dr. Haagen has extensive experience with genetics in dairy youngstock and youngstock management Dr. Haagen will oversee the project, outreach/extension and one graduate student.			36.6%	0.15		$26,337
Bradley Heins		Co-investigator, Bradley Heins, is a Professor of Dairy Management in the Department of Animal Science. Dr. Heins has previously successfully completed several LCCMR projects and routinely analyses sensor data. Dr. Heins will assist in analyses and co-advise the graduate student with Dr. Haagen.			36.6%	0.06		$21,192
Graduate student		Data collection and analysis			23.2%	3		$164,517
Undergraduate worker		Assistance in data collection			0%	0.3		$6,121
							Sub Total	**$218,167**
Contracts and Services								
Genomic tests	Service Contract	Genomic testing of dairy youngstock will be performed by Zoeits				1.2		$67,500
SROC and WCROC	Internal services or fees (uncommon)	Services that include use of dairy cattle for projects. This is internal to the U of MN.				0.6		$18,000
							Sub Total	**$85,500**
Equipment, Tools, and Supplies								
	Equipment	CowManager animal data sensors. 500 sensors will be purchased at $170/unit.	CowManager will be utilized to collect individual animal data as it relates to behavior and stress. 500					$85,000

			sensors will be purchased in year 1 at a cost of $170/sensor. Sensors will be used for the duration of the project.					
	Equipment	Portable air quality monitors will be purchased to monitor continuous air quality in animal rooms. 10 monitors will be purchased in year 1 at $300 per unit.	Portable air quality monitors will be purchased to monitor continuous air quality in animal rooms. 10 monitors will be purchased in year 1 at $300 per unit.					$3,000
							Sub Total	**$88,000**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	Travel funding is requested to travel to and from St. Paul, MN to Waseca, MN to collect hair samples for genomic testing. We include 30 round trips (~ $100 / trip assuming $0.70 /mile and 152 miles round trip), for a total cost across years 1-3 of $3,210. Funding is requested to travel to and from St. Paul, MN and Morris, MN to collect hair samples for genomic testing at WCROC. We include 15 round trips (~ $180 / trip assuming $0.70/mile and 280 miles round trip) for a cost of across years 1-3 of $2,940.	Travel is requested for data collection related to this project.					$6,150
							Sub Total	**$6,150**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Printing	Extension printing costs	Extension printing costs will be incurred for printing materials for					$3,000

			extension field days and workshops related to this topic					
	Publication	Peer-reviewed publications	Results will be published in peer-reviewed open-access journals so they are accessible to everyone.					$5,183
							Sub Total	**$8,183**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$406,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request

Non ENRTF Funds

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

Total Project Cost: $406,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: 62dc0556-128.pdf

Alternate Text for Visual Component

The image shows a sun, barn, sensor, and DNA strand surrounding a dairy calf to show that these will be combined to evaluate environmentally resilient dairy youngstock....

Supplemental Attachments

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

Title	File
Letter of Support	a0fa2318-434.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?

Yes

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:

Bradley Heins, Stephanie Larson, Sarah Hulke

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