



Environment and Natural Resources Trust Fund

2023 Request for Proposal

General Information

Proposal ID: 2023-065

Proposal Title: Quantifying and Creating Fire Resilience in Northern Minnesota

Project Manager Information

Name: Marcella Windmuller-Campione

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

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Email: mwind@umn.edu

Project Basic Information

Project Summary: Fire is a natural ecosystem process, but communities are threatened by wildfire. This project increases our understanding of fire in northern Minnesota and effective treatments to protect lives and property.

Funds Requested: \$174,000

Proposed Project Completion: June 30, 2025

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): NW, NE, 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.

Wildfire was once again a major news headline during the summer of 2021. While western fires raged, the Greenwood Fire in northern Minnesota also captured our attention. News headlines included: Hit or miss: Greenwood Fire levels some cabins, spares others (MN NPR) and Greenwood fire: Media allowed to survey devastation left by wildfire in Superior National Forest (Fox 9). The 3-month long fire burned more than 26,000 acres, required evacuation orders, and continues to impact communities and businesses. The impacts from the Pagami Creek fire in northern Minnesota are still being felt 10 years later.

Fire is a natural process within many forest ecosystems; these forests are often described as fire dependent. However, the landscape surrounding fire dependent forest ecosystems has changed over the last 150 years. In northern Minnesota the density of homes and businesses has increased. Local outdoor-based recreation, tourism (e.g. Boundary Waters), and other industries important to the area are impacted by fire.

With climate change, summers with extreme heat and drought (like summer 2021) are expected to be more common; wildfire is also expected to increase. More data are needed to better understand fire in northern Minnesota and its effects on nature and people.

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.

Through a collaborative effort among the University of Minnesota, Dovetail Partners, Inc. (local environmental non-profit with staff in northern Minnesota), natural resource management organizations, and private landowners, our goal is to understand how previous decisions related to forest management influenced fire behavior. We will gather information on previous forest treatments through surveys, interviews, and written forest management plans to document the range of treatments implemented in northern Minnesota. Within those surveys or interviews we will also request information on the extent of damage caused by the Greenwood fire.

We will pair data collected from natural resource managers and individual private landowners, with post-fire sampling of the vegetative community. The intensity and severity of a fire leaves signs – the number of standing live trees, the types of species present in the understory, and number of dead trees standing or down. Sampling after a fire allows us to better understand the structure and composition of forests with a range of fire resilience. By pairing this with information gathered about the treatment implemented, we can quantify which types of treatments were most successful at mitigating wildfire risks and impacts.

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?

Fire does not recognize ownership boundaries. Fire spreads and changes based on many variables – many of which we cannot control (daily weather). We can, however, influence the forest community – the structure (the size of trees) and composition (which species are present). To better develop management approaches and treatments for fire risk mitigation, sampling must cross ownership boundaries and include privately-owned forest land. Individuals and forest management organizations have implemented a variety of fire treatments with varying success. By understanding the results of these treatments, we can reduce the impact of future large-scale wildfires in northern Minnesota.

Activities and Milestones

Activity 1: Collect and quantify types of fire resilient treatments on public and private forest lands

Activity Budget: \$100,000

Activity Description:

Since the Pagami Creek fire, there has been concerted effort to increase resilience to large scale wildfire in northern Minnesota. The types of treatments implemented and the scope of the work varies from relatively small actions (creating fuel breaks between a structure and the forest) to larger scale management treatments (reducing ladder fuels and prescribed burning). However, the Greenwood fire still occurred in 2021.

By working through already established partnerships, we will gather information on the full scope of treatments that have been implemented within the last 10 years related to fire resilience within 150 miles of Ely, MN. Information will be gathered through formal written forest management plans and interviews and surveys with individual private landowners and natural resource managers.

We will select 30 forest stands to sample for detailed information on forest structure and composition that span a range of fire impacts from the Greenwood fire. We will collect standard forest inventory data on the overstory, regeneration layer, and herbaceous layer. We will also collect data on fuels – dead standing and down trees.

We will summarize post-fire vegetation response and compare it to pre-fire conditions noted in the forest management plans to begin to develop ranking for treatments.

Activity Milestones:

Description	Completion Date
Collection of fire management treatments through management plans, surveys, and interviews	June 30, 2024
Sampling of 30 forest stands for structure and composition post fire	August 31, 2024
Data summerization and sharing of results	January 31, 2025

Activity 2: Develop recommendations for future fire resilience treatments

Activity Budget: \$74,000

Activity Description:

Fire is a critical process within forest ecosystems in Minnesota. Fire is predicted to increase as climate change continues to impact ecosystems. Minnesotans need options to develop strategies for fire resilient ecosystems and communities.

Utilizing data collected in Activity 1 and in partnership with community members and natural resource management organizations, we will develop treatment recommendations for increasing fire resilience. We will use information related to the types of treatments, the timing of treatments, and the frequency of treatments.

By working with community members and natural resource organizations, we will hear their concerns and limitations which may point to future research or policy needs.

At the end of this work, we will create a document which can be shared through the publicly available Dovetail Partners' website and within their newsletter (which has over 40,000 subscribers). This will complement the already-produced video - Oshkigin Spirit of Fire- which was produced in partnership with Dovetail Partners, Inc.

Activity Milestones:

Description	Completion Date
Host a series of community meetings and focus groups to share results and hear feedback	March 31, 2025
Develop ranking of treatments related to fire resilience	June 30, 2025
Share recommendations through multiple outlets	June 30, 2025

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Kathryn Fernholz	Dovetail Partners, Inc	Dovetail Partners have been working to build fire resilient communities for close to a decade in northern Minnesota. They have build amazing partnerships among land management agencies and individual private landowners. We will work together to answer questions about fire resilience treatments and management strategies.	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?

By working in partnership with Dovetail Partners, Inc., we will be able to distribute our findings through conventional academic outlets (peer reviewed journals, academic conferences, webinars) and through an e-newsletter that reaches over 40,000 individuals. Additionally, Dovetail Partners, Inc. is part of the community that will be impacted by this work. They have been working across northern Minnesota in forest management actions for fire resilience, and these relationships will allow our findings to be implemented directly by stakeholders. Based on the study's results, we can work through organizations to apply for implementation funding through state and federal sources.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Peatland Forest Management	M.L. 2018, Chp. 214, Art. 4, Sec. 2, Subd. 03d	\$600,000

Project Manager and Organization Qualifications

Project Manager Name: Marcella Windmuller-Campione

Job Title: Associate Professor

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

Dr. Marcella Windmuller-Campione is an Associate Professor in Silviculture in the Department of Forest Resources at the University of Minnesota. Since starting at the University of Minnesota, Dr. Windmuller-Campione has been the principal investigator (PI) on grants totaling more than \$4 million with additional grants as Co-PI. She has successfully mentored and graduated 2 PhD students and 9 MS students within graduate programs at the University of Minnesota. Dr. Windmuller-Campione's research focuses on developing solutions and management treatments for applied forestry questions across the state of Minnesota. She regularly collaborates with multiple organizations including state, federal, county, private industrial, non-profit, and Tribal Sovereign Nations.

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

Organization Description:

For over 100 years, the Department of Forest Resource at the University of Minnesota has been the leader in producing high quality research regarding natural resource management issues across the state of Minnesota. Within the broader community of the College of Food, Agricultural and Natural Resource Sciences, there is a mission to develop, explore, and share applied knowledge and teaching related to natural resource communities.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Marcella Windmuller-Campione/Summer Salary		Project Lead			36.8%	8		\$11,624
Laura Reuling/Researcher 5		Data collection, analysis, and writing related to Activity 1 and Activity 2			36.8%	60		\$52,276
Two Student Field Technician		Collection of vegetation data, interviews, and management plants			0%	80		\$25,600
							Sub Total	\$89,500
Contracts and Services								
Dovetail Partners, Inc	Sub award	Relationships with private land owners and organizations and experience with surveys and focus groups. Sharing of information through their extensive networks				40		\$60,000
							Sub Total	\$60,000
Equipment, Tools, and Supplies								
							Sub Total	-
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Vehicle rental, mileage, per diem, and lodging for 2 people for 25 days for 2 years	Collection of vegetation and survey data related to Activity 1					\$24,500

							Sub Total	\$24,500
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
							Sub Total	-
Other Expenses								
							Sub Total	-
							Grand Total	\$174,000

Classified Staff or Generally Ineligible Expenses

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

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

Attachments

Required Attachments

Visual Component

File: [06ca3e60-fd4.pdf](#)

Alternate Text for Visual Component

Map of predicted fire frequency increase in the future 21st century of the conterminous United States. Darker colors represent increased fire risk. Bottom photographs show fire treatments and differences between low intensity and high intensity fires....

Optional Attachments

Support Letter or Other

Title	File
U of MN submission approval letter	93e2b8d3-f8f.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, Sponsored Projects Administration

**2023-065: Quantifying and Creating
Fire Resilience in Northern Minnesota
PI: Dr. Marcella Windmuller-Campione**

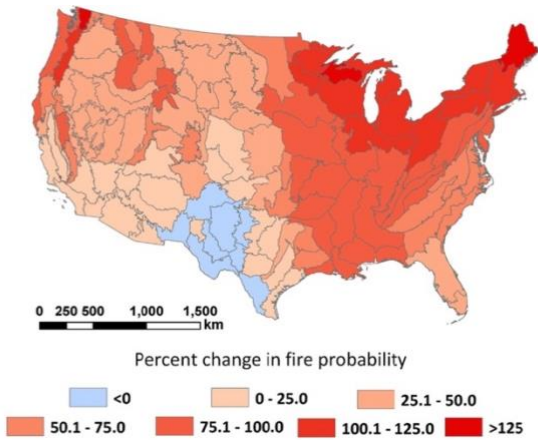


Figure 1 (above): Map of the conterminous United States and predicted change in fire probability. Minnesota is expected to have the greatest increase in fire probability (darkest reds - > 125%) during the 21st century. Figure from Gao et al. 2021

The Problem: *Fire is part of the disturbance dynamics of Minnesota forests. However, the ecosystems surrounding our fire dependent forest have changed. Additionally, fire is predicted to become more common in Minnesota, especially northern Minnesota (see Figure 1).*

The Question: *How can we better manage for fire resilience in Minnesota communities?*

The Solution: *By quantifying and gathering information on forest management treatments AND collecting post-fire forest data, we can develop recommendations for fire resilient treatments (see Figure 2) to reduce the chance of large crown fires near communities.*



Figure 2 (to the left): Large photo displays fuel reduction treatments in red pine forests (photo – Windmuller-Campione); small photo on top shows a prescribed low intensity fire in a forest treated with fuel reduction treatments (photo – Windmuller-Campione); small photo on the bottom is a high intensity crown fire from the Greenwood fire (photo from Superior National Forest)

