Environment and Natural Resources Trust Fund

2026 Request for Proposal

General Information

Proposal ID: 2026-273

Proposal Title: Increasing Ecological and Economic Resiliency in Aspen Forests

Project Manager Information

Name: Marcella Windmuller-Campione

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

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Project Basic Information

Project Summary: Aspen is Minnesota's most abundant forest community. Most aspen forests are monocultures and have limited ecological and economic resiliency. Can we harvest and plant to increase diversity and resiliency?

ENRTF Funds Requested: $485,000

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?

Region(s): Central, NE, NW,

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.

Aspen represents 6.4 million acres or 28% of forests in Minnesota. Annually, aspen represents over half (51%) of all wood harvested, representing more than $42 million dollars in direct revenue from timber sales and 30,045 direct jobs and contributes $17.4 billion total output to businesses and rural communities across greater Minnesota. Numerous wildlife species including game species such as Ruffed Grouse and American woodcock and many migrants such as Veery and Rose-breasted Grosbeak call aspen forests their home for all or part of the year.

Aspen readily regenerates with sustainable forest management. However, aspen regenerates so well it creates single species, monocultures with over 95% of the trees being aspen. Historically, aspen stands were less numerous across the landscape and were more diverse. Aspen trees were mixed with long-lived conifers like white spruce and eastern white pine and hardwood species like birches, maples, and oaks. As we have seen with EAB and ash, monocultures are especially susceptible to unanticipated invasive species and disturbances. How can we efficiently and effectively use forest practices to increase tree species diversity resulting in greater economic and ecological resiliency in our aspen forests? What can we learn from previous attempts at diversification?

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.

From previous and on-going research, MN DNR Forestry, Saint Louis County Lands & Mineral, Carlton County Land Department, UPM Blandin, and Audubon Upper Mississippi Flyway Chapter are actively working on increasing forest diversity in aspen stands. However, increasing tree species diversity can be difficult in aspen forests because aspen regenerates so well. Our goal is to explore alternative harvesting and planting methods to increase tree species and structural diversity in aspen stands. First, we will use a retrospective approach on sampling a minimum of 30 stands previously managed with the goal of increasing forest tree diversity to assess longer term outcomes. Second, we will start a new replicated experiment in current aspen stands to test if harvest patterns (e.g. strips or patches) and season of harvest (winter versus summer), mechanical control of competing vegetation (e.g., site preparation, brush sawing) can allow for greater efficiency in planting while maintaining economic return when aspen are harvested. We will quantify changes in vegetation and wildlife communities to be able to quantify how different harvesting techniques influence different parts of the ecosystem. By exploring alternative harvesting and management treatments, forest organizations in Minnesota can more efficiently increase tree species diversity in forest communities.

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?

Minnesota's aspen forest provide critical ecological, economic, and cultural services. However, the simplified nature of current aspen forests represents a key vulnerability to future risks from invasive pests, disease, and climate change. By working across agencies, we can identify harvesting and management techniques that can more effectively increase tree species diversity and increase ecological and economic resiliency of our aspen forests.

Activities and Milestones

Activity 1: Identification, Sampling, and Implementation of Alternative Aspen Harvesting Experiment

Activity Budget: $217,500

Activity Description:
In collaboration with our partners (MN DNR, St. Louis County, Carlton County, UPM Blandin) we will identify a minimum of 20 stands within dominant aspen forest community types (e.g. northern wet-mesic boreal hardwood-conifer forest MHn44). Working with our partners we will test two different harvesting strategies: the creation of gaps or patches with underplanting, the use of strip cuts and planting. Additionally, we will test to see if there are differences in harvesting during the summer versus during the winter. Harvesting will be completed by each organization in accordance with best management practices. Prior to harvesting, vegetation and wildlife data will be collected to understand current conditions. We will establish permanently marked plots for vegetation and will sample the overstory, regeneration layer, and understory. We will perform wildlife surveys to track potential changes in community composition that occur after harvest. Specifically, in the spring and summer, we will assess variations in the abundance and diversity of Ruffed Grouse, American Woodcock, and breeding birds. To document small mammal populations, we will deploy a combination of camera trap arrays and live traps. Collecting the vegetation and wildlife data before the harvests will provide import benchmarks to assess impacts of harvest strategies

Activity Milestones:

Description	Approximate Completion Date
Identification of aspen stands	August 31, 2026
Pre-harvest vegetation sampling	October 31, 2027
Pre-harvest Wildlife Sampling	October 31, 2027
Implementation of Harvesting	December 31, 2028
Planting of diverse tree species	May 31, 2029

Activity 2: Retrospective Sampling of Previous Diversification Management in Aspen Forests

Activity Budget: $217,500

Activity Description:
UPM Blandin, MN DNR, St. Louis County, and Carlton County and other organizations and private lands across the state of Minnesota have implemented alternative management practices to increase species diversity in aspen. These efforts serve as valuable case studies. Our goal is to resample a minimum of 30 of these locations to document current conditions and quantify whether the treatments successfully increased tree species diversity. We will use standard forest inventory measurements to quantify current conditions in the overstory, understory, and regeneration layers. Additionally, we will conduct breeding bird surveys at a subset of these sites, comparing species composition and abundance to those found in typical aspen harvests. We will work with our project partners to identify the silviculture prescriptions that were used for harvesting. We will share results by publishing the case studies on the Great Lakes Silviculture Library (an online, free platform maintained by the UMN Sustainable Forest Education Cooperative).

Activity Milestones:

Description	Approximate Completion Date
Identify 30 aspen stands were diversification treatments happened	September 30, 2026
Sample current conditions of aspen stands focusing on vegetation	October 31, 2027
Write case studies on if treatments were successful	January 31, 2028
Conduct breeding bird surveys to quantify abundance and diversity	October 31, 2028

Activity 3: Management Recommendations for Increasing Tree Diversity in Aspen Forest Types

Activity Budget: $50,000

Activity Description:

Aspen is the most widely distributed forest type in Minnesota. Aspen is managed on both public and private lands. We will work with our partners to develop management recommendations from activity 1 and activity 2 that can be used across ownership on harvesting types and treatments that can increase tree diversity in aspen stands. We will share these results through local, regional, and national conferences and publish results in multiple outlets (white papers, peer reviewed journal articles).

Activity Milestones:

Description	Approximate Completion Date
Develop management recommendation for increasing tree diversity in aspen stands	May 31, 2029

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Alexis Grinde	NRRI	Expertise in Wildlife Data Collection	Yes
Mike Reinikainen	MN DNR Forestry	Management organization providing forest land, expertise in management, and collaboration in developing management recommendations	No
Sawyer Scherer	UPM Blandin	Management organization providing forest land, expertise in management, and collaboration in developing management recommendations	No
Dale Gentry	Audubon Upper Mississippi River	Assistance in highlight wildlife management opportunities in forest ecosystems	No
Mark Westphal	Carlton County Forestry	Management organization providing forest land, expertise in management, and collaboration in developing management recommendations	No
Jason Meyer	Director of St. Louis County Land and Minerals	Management organization providing forest land, expertise in management, and collaboration in developing management recommendations	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?

Forests are long-lived and starting a new experiment represents a proactive investment in long-term sustainable forest management. There is commitment of support across the agencies and organizations to help maintain this research and the experiment. We are working with natural resource managing agencies and organization that have contributed expertise to project design. Because this project incorporates slight modifications to generally accepted management practices, proposed practices can be realistically implemented into future forest management across the state.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Maximizing Lowland Conifer Ecosystem Services: Phase 2	M.L. 2023, , Chp. 60, Art. 2, Sec. 2, Subd. 03m	$482,000
Can Increased Tree Diversity Increase Community Diversity?	M.L. 2024, , Chp. 83, Art. , Sec. 2, Subd. 08c	$415,000

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 received her B.S. and M.S. in Forestry from Michigan Technological University and a PhD in Ecology from Utah State. She was hired to the UMN in 2015 and since then has been working on silviculture and applied forest management in Minnesota and the surrounding forest ecosystems. She has successfully managed over $6 million in grant funding and has graduated over 15 graduate students. The focus of her work is exploring forest dynamics and forest management through science-management partnerships to maintain resilient, sustainable forest ecosystems.

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

Organization Description:
The mission of the Department of Forest Resources housed within the College of Food, Agricultural and Natural Resource Science is to advance the science and management of forests and related natural resources by developing solutions to important problems affecting these resources; training the next generation of forest and natural resource scholars and practitioners; and informing the broad public on the economic and ecological importance of forests and natural resources and how they enrich our quality of life.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Marcella Windmuller-Campione		Principal Investigator			36.6%	1.5		$27,521
Alan Toczydlowski		Researcher			36.6%	16.89		$155,369
To Be Determined		Field Technician			0%	8.31		$25,926
Alexis Grinde		Co-Principal Investigator			36.6%	1.8		$21,805
Josh Bedna		Technician			32.3%	4.8		$35,854
Stephen Kolbe		Technician			32.3%	4.5		$33,201
Stephen Nelson		Technician			32.3%	1.8		$10,609
Reid Sieber		Technician			32.3%	1.8		$10,508
To Be Determined		Technician			7.4%	1.8		$7,253
To Be Determined		Undergraduate Student			0%	0.78		$2,222
To Be Determined		Graduate Student			23.2%	2.1		$13,102
To Be Determined		Field Technician			0%	8.31		$25,926
							Sub Total	**$369,296**
Contracts and Services								
							Sub Total	**-**
Equipment, Tools, and Supplies								
	Tools and Supplies	NRRI: Fieldwork Supplies	batteries, SD cards, small mammal trapping supplies.					$18,000
	Tools and Supplies	FR: Fieldwork supplies	Disposable Field Supplies					$2,258

							Sub Total	**$20,258**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	FR:	In State Travel for field samplings					$60,000
	Conference Registration Miles/ Meals/ Lodging	FR:	MN State Conference Registration years 2 & 3					$1,000
	Miles/ Meals/ Lodging	Mileage (75%) and lodging (25%) for frequent travel to experimental sites for field work including spring ARU deployment, summer breeding bird surveys, and small mammal trapping in a subset of sites. Estimated 35 nights of lodging @ $125 per night; 5500 miles; per diem costs associated with two field technicians $3,422 (58 days @ 59 per day).	Fieldwork					$34,446
							Sub Total	**$95,446**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
							Sub Total	**-**
Other Expenses								
							Sub Total	**-**

							Grand Total	**$485,000**

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: $485,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: e1dc04b7-905.pdf

Alternate Text for Visual Component

Table with the amount of pulp wood harvested, images of ruffed groused in aspen, the north American flyway, and forest conditions from the General Land Office Survey ~1850, at the bottom is different types of harvests with gaps, spruce seedlings, and a case study from the Silviculture Library...

Supplemental Attachments

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

Title	File
UMN SPA Approva	1735ea31-d3c.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?

Yes, Sponsored Projects Administration

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:

Fiscal agents for UMN and NRRI helped with budgets, SPA approved the submission, the ideas, concepts, and written work is a collaboration among all of the listed project partners (MN DNR Forestry, Carlton County, St. Louis County, UPM Blandin, Audubon Upper Mississippi River Chapter).

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

N/A