



Environment and Natural Resources Trust Fund

2027 Request for Proposal

General Information

Proposal ID: 2027-246

Proposal Title: Fostering Oak Regeneration via Novel Prescribed Burning Strategies

Project Manager Information

Name: Rebecca Montgomery

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

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Project Basic Information

Project Summary: Oak regeneration in Minnesota remains alarmingly low. Despite effective use of prescribed fire, oaks still require refuges to establish. Practical shifts in burning strategies will immediately improve regeneration potential.

ENRTF Funds Requested: \$342,000

Proposed Project Completion: June 30, 2030

LCCMR Funding Category: Land (F)

Project Location

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

Region(s): 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.

In Minnesota, oaks provide our most valuable timber products and support more ecosystem services than any other tree genus. However, the fire-dependent ecosystems that host our oaks are changing. The removal of Indigenous burning and fire suppression over the last 120 years has shifted the species composition toward faster-growing, shade-tolerant species such as maple and basswood. In response, prescribed burning has proven to be an important tool for restoring and maintaining these landscapes. Prevailing management practices call for multiple “complete” prescribed burns per decade. In a complete burn, the entire site receives fire often requiring secondary ignition in areas initially skipped by the fire. This approach successfully resets species composition, but land stewards widely cite a caveat: an alarming lack of young and mid-aged oak recruits. Research demonstrates that young oaks require refuge from fire to reach a size capable of surviving a burn. Historically, these refuges were created through Indigenous land stewardship, extended fire-free periods, bison behavior, and mosaic burn patterns. This highlights the complexity of managing today’s species composition alongside oak regeneration for the future.

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.

We propose to develop and test novel applications of prescribed fire designed to foster oak regeneration in fire-dependent ecosystems such as oak savanna and woodland. We plan to leverage 60 years of fire research by hosting this project at Cedar Creek Ecosystem Science Reserve (Cedar Creek) near East Bethel. Specifically, we will study mosaic burning as a pathway for oak regeneration. This approach retains refuges or “skips” that are currently eliminated during secondary ignition, if they are present at all. From our results, we will create guidelines that allow for the calculated presence of refuges while maintaining species composition. This approach also generally aligns with prevailing management concepts, policies, and resources across the state.

To ensure the immediate and future relevance of our work, we will convene a cohort of Minnesota’s leading oak researchers and stewards. Throughout the project, we will host workshops, field tours and symposia. These activities will cultivate a research-practitioner network that advances shared goals including oak regeneration. We have held preliminary discussions with natural resource managers from the Minnesota Department of Natural Resources, Shakopee Mdewakanton Sioux Community, The Nature Conservancy, Friends of the Mississippi River, and the U.S. Fish and Wildlife Service.

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?

Our project will:

- Deliver refined oak stewardship strategies directly to practitioners that will support oak regeneration through prescribed fire.
- Offer greater leveraging of resources between university, NGO, and tribal/federal/state agencies for oak stewardship.
- Provide community engagement through volunteer opportunities in data collection, prescribed fire, and educational sessions
- Share data and guidelines via symposia, field tours, peer-reviewed publications, and conference presentations.
- Create a launching point for broader, potentially long-term research of mosaic landscape management with prescribed fire.

Activities and Milestones

Activity 1: Develop and Test Prescribed Burning Strategies that Foster Oak Regeneration in Minnesota's Oak Savannas and Woodlands

Activity Budget: \$324,000

Activity Description:

In this activity, project managers from the University will develop and test novel strategies for fostering oak regeneration through mosaic prescribed burning. We will prioritize low-technology, scalable, and familiar concepts. These may be as simple as weed-whacking around patches of young oaks before burning.

Our project will be hosted at Cedar Creek Ecosystem Science Reserve to complement ongoing oak stewardship and research. We will treat and study three burn units: a 40+ acre oak savanna with 25+ years of oak savanna fire research, a neighboring 50+ acre oak savanna experiencing an extended fire-free period, and a 30+ acre oak woodland with little active stewardship. Each unit represents a real-world management scenario, offering diverse starting points for studying oak regeneration. This ensures our guidelines will be applicable to practitioners.

Before burning, we will collect baseline data on the plant community. We will establish/restore fire breaks around each unit. Units will contain multiple study plots. Plots will contain temperature/humidity sensors and a wildlife camera. We will fence half of each plot to study effects of deer browsing. We will census vegetation annually. We will hire seasonal staff and recruit trained volunteers to conduct burns and collect environmental and vegetation data.

Activity Milestones:

Description	Approximate Completion Date
Prepare Burn Units and Collect Baseline Plant Community Data	September 30, 2027
Finalize Strategies for Full-Scale Mosaic Burn Testing	November 30, 2027
Perform Experimental Burns in 120+ acres of Oak Savanna and Woodland	April 30, 2028
Survey Each Unit Annually for Regeneration and Overall Vegetation Dynamics	June 30, 2030

Activity 2: Cultivate a Network of Oak Savanna and Woodland Stewards to Advance Oak Regeneration in Minnesota

Activity Budget: \$18,000

Activity Description:

Across Minnesota, numerous land stewards are implementing a variety of management approaches in fire-dependent oak ecosystems. Many are using prescribed or cultural fire to varying degrees. Some are using grazers and mechanical harvesting. Most are struggling with oak regeneration and the resources needed to address those challenges.

In this activity, we aim to cultivate a network of oak savanna and woodland stewards to advance both shared and individual goals in these ecosystems. We will develop an advisory group whose engagement will ensure that Activity 1 results in practical, effective solutions for fostering oak regeneration. Annually, we will offer field tours at sites around central Minnesota to discuss challenges and successes in managing these systems with fire. In the final year of the project, we will organize and host a symposium at Cedar Creek Ecosystem Reserve that provides a platform to share implementation strategies and lessons learned; assess further needs; and set priorities. Finally, we will create and disseminate implementation guidelines, including a cost analysis. We will publish results in peer-reviewed journals and present findings at Minnesota-based industry and academic conferences.

Activity Milestones:

Description	Approximate Completion Date
Host an Oak Regeneration Symposium	December 31, 2029
Organize and Host Annual Field Tours (3 Total)	June 30, 2030
Attend Industry and Academic Conferences to Present Findings	June 30, 2030
Publish Guidelines and Peer-Reviewed Literature	June 30, 2030

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Dr. Caitlin Potter	Cedar Creek Ecosystem Science Reserve	Cedar Creek will host the prescribed burning of our project. They have had a burn program in place for >50 years that supports implementation of Activity 1. The history and experience with prescribed fire also promotes achievement of project goals, milestones and overall success of the project.	No

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.

Dissemination will include:

- Oak researcher-practitioner network field tours and symposium
- Presentations at conferences such as the Minnesota Society of American Foresters and MN Prescribed Fire Council
- Webinar presentation through the Sustainable Forests Education Co-operative
- Public lecture and field tour of project sites through Cedar Creek's Lunch with a Scientist lecture series
- Print and online publication of implementation guidelines that include methods and costs
- Data available in open access format
- Publication in peer-reviewed journals

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?

The oak researcher-practitioner network we develop will offer immediate implementation outlets. Our primary goal is to serve the standing need for oak regeneration, with a clear opportunity to address other challenges through mosaic land stewardship. Pests, diseases, and invasive species are among these challenges both present and emerging in Minnesota's oak ecosystems. A framework exists to continue this and similar work by collaborating with the Long-Term Ecological Research network funded through the National Science Foundation, of which Cedar Creek currently hosts 21 projects.

Project Manager and Organization Qualifications

Project Manager Name: Rebecca Montgomery

Job Title: Professor and F.B. Hubachek Sr. Chair of Forestry

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

Rebecca A. Montgomery is Professor in the Department of Forest Resources in the College of Food, Agricultural and Natural Resource Sciences at the University of Minnesota. She holds a bachelor's degree in Biology from Occidental College, a Ph.D. in Ecology from the University of Connecticut. Dr. Montgomery's research interests include forest ecology, ecophysiology, global change biology, and phenology. She has worked in tropical, temperate, and boreal ecosystems. Montgomery teaches a number of ecology courses for which she has received several collegiate teaching awards. She is board chair of Green Again Madagascar, a non-profit organization focused on community-based forest restoration in eastern Madagascar.

Dr. Montgomery has more than 20 years of experience leading grants and training students in ecology and natural resource stewardship. She has led several LCCMR and MITPPC projects and collaborated on numerous others.

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

Organization Description:

The Department of Forest Resources is one of the country's oldest and most highly-regarded forestry programs. Its mission is to inform and advance the science and management of forest and related natural resources. The Department has 15 faculty members and approximately 50 full-time researchers, scientists, postdocs, and staff representing a breadth of disciplines in the biological, physical, social, and managerial sciences. The Department hosts BS, MS, and PhD programs, supports nationally and internationally recognized research programs, and has a long tradition of public engagement and outreach.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Faculty - Dr. Rebecca Montgomery		Project manager			36.6%	0.12		\$27,368
Graduate student - Andrew Ernat		Andrew will lead research project implementation, data collection, intern supervision, data analysis and interpretation, publication and report writing, and co-lead workshops and dissemination activity.			42%	1.5		\$159,706
Burn leads - TBD		These people will lead on the ground burn planning and execution			32.3%	0.64		\$32,256
Summer interns - TBD		Two summer student interns that support for data collection and also provide training to students in field techniques in natural resources			8%	1.5		\$46,734
							Sub Total	\$266,064
Contracts and Services								
Forestry contractor - TBD	Service Contract	This entity will provide restoration and creation of fire breaks by providing mowing, tilling, tree and brush removal along fire breaks.				0.16		\$30,000
							Sub Total	\$30,000
Equipment, Tools, and Supplies								
	Equipment	Non-capitalized equipment	Materials needed for implementing burns (rakes, drip torches, nozzles, tampers, plow, saws), temperature and relative humidity sensors to measure skips (40 sensor set ups @ 100/set up), cameras to document wildlife use (60 cameras @ 150/camera)					\$19,636
	Tools and Supplies	General operating supplies	thermo paint for estimating fire intensity (2 bottles of 10 temperatures at 50\$/bottle), deer fencing supplies (60 enclosures at 150\$ each), trees for planting (~700 at ~1\$/tree)					\$10,500

	Tools and Supplies	Short term rents & leases	Station use fees for the Cedar Creek Ecosystem Science Reserve which includes office space, lab usage, UTV access, equipment use (e.g. drying ovens)					\$4,500
							Sub Total	\$34,636
Capital Equipment								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	30 people, average round trip distance of 150 miles @ 0.54/miles	Cover travel of workshop/symposium participants					\$2,500
	Miles/ Meals/ Lodging	15 people, average round trip of 150 miles @ 0.54 mile, 3 total trips	Travel of land stewards and project staff to three field tours					\$3,700
	Miles/ Meals/ Lodging	1 person, 30 trips, 60 miles/trip per year	Travel between field sites and St. Paul campus					\$3,000
	Conference Registration Miles/ Meals/ Lodging	2 people, conference registration, lodging, mileage (~300 mi @ 0.54/mile)	Travel of project staff to MN SAF Annual Meeting to present results					\$1,800
							Sub Total	\$11,000
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
	Printing	Symposium & field tour handouts and booklets	Supports exchange of information, following agenda, organization					\$300
							Sub Total	\$300

Other Expenses								
							Sub Total	-
							Grand Total	\$342,000

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				
In-Kind	Non-sponsored research funds - Dr. Rebecca Montgomery	Soil and tissue lab sampling (300 samples @ 20\$/sample)	Secured	\$6,000
			Non State Sub Total	\$6,000
			Funds Total	\$6,000

Total Project Cost: \$348,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [8d9feb9d-b04.pdf](#)

Alternate Text for Visual Component

Map of Proposed Study Area, Visual of Complete vs. Mosaic Burn...

Supplemental Attachments

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

Title	File
SPA Approval	22fffd80-658.pdf
CCESR Support Letter	a4069cdd-3db.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:

Andrew Ernat, University of Minnesota, Cedar Creek Ecosystem Science Reserve; Andrea Little, University of Minnesota, CFANS Finance Team

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