Environment and Natural Resources Trust Fund

2021 Request for Proposal

General Information

Proposal ID: 2021-297

Proposal Title: Prescribed Burning for Brushland-Dependent Species-Phase II

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: Brushlands provide critical habitat for >250 wildlife species. We compare effects of spring, summer and fall burns on birds and vegetation, providing much needed management guidelines for this key habitat.

Funds Requested: $147,000

Proposed Project Completion: 2024-06-30

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): NE

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

Region(s): NE

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.

Brushlands cover approximately ~8.5 million acres (20% land surface) in Minnesota and provide critical habitat for over 250 wildlife species, including >80 species on the MNDNR list of Species of Greatest Conservation Need (SGCN). Numerous game species also use brushland habitats including sharp-tailed grouse, American woodcock, white-tailed deer, and furbearers. Prior to European settlement, Minnesota's brushlands were maintained by frequent wildfires. These burns happened in summer and fall due to lightning strikes and fires set by Native Americans. Today, brushlands are maintained by prescribed burns conducted primarily in the spring. Prescribed fires in spring are less hot and are easy to control. However, cooler fires may be less effective in achieving habitat goals of maintaining open conditions by preventing the conversion of brushland to forest. Managers don't burn usually burn brushlands in summer and fall beause of more challenging conditions that are less frequently suitable for burning. Thus, without science clearly illustrating the benefits of summer and fall fires, little incentive exists to take on the additional challenge of trying to accomplish fall and summer burns. Showing benefits of more varied burning will help justify changes to existing management, ultimately benefiting wildlife.

What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.

We propose to extend our Phase I project that compares the response of brushland vegetation and the bird community to prescribed burns conducted in the spring, summer, and fall to include 3 and 5 year post-fire surveys. Our Phase I project documents vegetation and bird responses 1 and 2 years after fire, and builds a nice foundation, but later post-burn surveys are needed to understand how the season of burning influences the ability to effectively maintain open brushland conditions over longer time periods. Bird and vegetation responses 3 and 5 years after burns will help understand how the response to burning changes over time and if the season of burning produces different long-term effects on the brushland ecosystem. We will compare the longer-term effects of spring, summer, and fall prescribed burns on brushland breeding birds and vegetation in 1200 acres of brushland in central and NE Minnesota.

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:

- provide data on the habitat benefits of spring, summer, and fall burns
- develop best management practices for maintaining healthy brushland habitat
- improve brushland habitat management to meet the needs of diverse wildlife and native plant species

Activities and Milestones

Activity 1: Assess vegetation and bird responses 3-5 year after prescribed burns on 1200 acres of brushland habitat in central/NE Minnesota

Activity Budget: $137,000

Activity Description:
In phase I, our DNR partners conducted prescribed burns at 4 sites in each of 3 seasons: spring, summer and fall (10 burns total). Due to weather, these burns were implemented over 3 different years (2016, 2017, 2018), limiting initial plans for multiple years of post-fire data at all sites. To date we have data for either 1 or 2 years following burning for vegetation and birds. Here, we request funding to extend both plant and bird surveys, gaining valuable information for all sites 3 and 5 years after burns. The project has been very successful to date and garnered a lot of interest and attention. What remains unknown is how long the effect of fire will be seen in plant and bird communities and how that might vary with season of fire.

Activity Milestones:

Description	Completion Date
1200 acres surveyed for birds 3 and 5 years after spring, summer, & fall fires	2023-06-30
1200 acres surveyed for vegetation response 3 and 5 years after spring, summer, & fall fire	2023-08-31
Dataset of fire effects and vegetation response compiled and analyzed	2023-12-31

Activity 2: Enhance manager guide for brushland habitat

Activity Budget: $10,000

Activity Description:
We will update the best management practices guide developed in Phase I. The goal of management of these ecosystems is to restore and maintain diverse brushland habitat for non-game and game wildlife species. Having data from 3 and 5 years post burn would provide a much stronger basis for developing new prescriptions that incorporate season. Our DNR partners currently burn at least once every 5 years. Thus, collecting data on effect of seasons 3 and 5 years post-fire would cover the entire range of post-burn conditions normally associated with current management.

Activity Milestones:

Description	Completion Date
Workshop with DNR staff and stakeholders to update best management practices developed in Phase I	2024-02-28
Updated management guidelines for using prescribed fire to maintain brushland habitat	2024-06-30

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Lee Frelich	University of Minnesota	Provide expertise on fire ecology and vegetation community assessment. Project coordination and co-advise graduate student.	Yes
Lindsey Shartell	Department of Natural Resources	Provide expertise on habitat characteristics for wildlife.	No
Charlotte Roy	Department of Natural Resources	Provide expertise on habitat characteristics for wildlife.	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 be funded?

Upon completion of Phase II of the project, research sites will return to DNR fire management rotation informed by the data collected in this study. Understanding how effects vary over time will help set burn season schedules to meet desired management goals for habitat and wildlife. As part of Phase I, we had a workshop with managers that laid the foundation for creating a best management practices report and learning network.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Evaluate Prescribed Burning Techniques to Improve Habitat Management for Brushland Species	M.L. 2016, Chp. 186, Sec. 2, Subd. 08d	$267,000
Assessing Species Vulnerability to Climate Change Using Phenology	M.L. 2014, Chp. 226, Sec. 2, Subd. 05e	$175,000

Project Manager and Organization Qualifications

Project Manager Name: Rebecca Montgomery

Job Title: Professor

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

Professor, Dept. of Forest Resources, University of Minnesota, St. Paul, MN 55108.

Professional Appointments and Preparation
Professor, Forest Resources, University of Minnesota, 2018-present
Associate Professor, Forest Resources, University of Minnesota, 2011-2018
Assistant Professor, Forest Resources, University of Minnesota, 2004-2011
Research Associate, Forest Resources, University of Minnesota, 2003-2004
Instructor, Forest Resources, University of Minnesota, 2003-2004
Ph.D., Ecology and Evolutionary Biology, University Connecticut, 1999.
B.A., Biology, magna cu laude, Occidental College, 1994.

Honors, Professional Recognition and Service (Selected)
Invited speaker at regional, national and international symposia, seminars, and workshops, e.g. MN Sustainable Forest

Education Cooperative, Michigan State, UW-Madison, University of Toronto, US-Japan Workshop on Photosynthetic Plasticity and Global Change. Received Richard C. Newman Art of Teaching award (2010) and College of Food, Agricultural and Natural Resources Sciences Distinguished Teaching Award (2010). I served on the Science Team for the Minnesota Climate Change Vulnerability Assessment and on the Falcon Heights Environment Commission.

Areas of Expertise
Plant ecophysiology, forest ecology, forest regeneration and dynamics, shrub ecology, herbivory, competition, invasive species, rare and endangered species biology. Research spans temperate and tropical forests, managed and unmanaged ecosystems.

Project Management Experience and Responsibilities for this Project
More than fifteen years of research experience in prairies, oak savanna, deciduous and boreal forest of Minnesota. Principal investigator or co-principal investigator on >15 research grants from National Science Foundation, Minnesota Department of Natural Resources, US Department of Energy, US National Park Service and USDA Forest Service projects. Montgomery will provide scientific leadership, supervise funded staff, mentor the graduate student and both oversee and participate in all project activities.

Peer-reviewed publications
More than 60 publications/scholarly products including articles, book chapters, and reports. Fifty-four publications in peer reviewed journals.

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

Organization Description:
The University of Minnesota has a strong tradition of education and public service through it role as both the state land-grant university, and the state's primary research university. The Department of Forest Resources is the leading research and educational institution on forest related issues in Minnesota. For over 100 years the department has played a key role in discovering and fostering sustainable forest resource management activities in Minnesota.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Project manager		Lead all aspects of the project			36.5%	0.12		$15,620
Ecologist		Coordinate field work; provide expertise on fire ecology, community ecology; co-advise graduate student			36.5%	0.12		$7,231
4 research technicians		conduct field research			31.8%	2.1		$60,000
Research specialist		Conduct data analyses, train field staff in bird methods			36.5%	0.5		$49,077
							Sub Total	**$131,928**
Contracts and Services								
							Sub Total	**-**
Equipment, Tools, and Supplies								
	Tools and Supplies	GPS units, waders (1 per person/year), rite in the rain paper for datasheets	Navigation and safety at sites, work in high water conditions, collection of data under varied weather conditions.					$1,072
							Sub Total	**$1,072**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								

	Miles/ Meals/ Lodging	University fleet rental (3 yrs @ $3000/yr and lodging at Cloquet Forestry Center (3 yrs @ 1667/year)	We require a high clearance vehicle for site access and housing for summer staff near field sites.					$14,000
							Sub Total	**$14,000**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
							Sub Total	**-**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$147,000**

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				
In-Kind	Unrecovered indirect costs @ 54% of modified total direct cost base of $147,000 = $79,380	Keep the University workspaces that support the work going including buildings, libraries, field facilities.	Potential	$79,380
			Non State Sub Total	**$79,380**
			Funds Total	**$79,380**

Attachments

Required Attachments

Visual Component

File: c3592aac-1f0.docx

Alternate Text for Visual Component

Images of brushland and prescribed burn; project goals, activities and outcomes; map of open lands and study sites.

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have patent, royalties, or revenue potential?

No

Does your project include research?

Yes

Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration

Prescribed Burning for Brushland-dependent Species-Phase II

Management goal: Maintain open conditions that support >250 wildlife species including >80 species of greatest conservation need

Problem 1: Fire suppression leads to overgrown brushlands and loss of open conditions
Solution: Use prescribed burning to mimic historical patterns of wildfire

Overgrown Brushland

Prescribed fire in spring

Problem 2: Historically, wildfires occurred in all seasons: spring, summer and fall. Prescribed burns occur in spring. Cooler spring fires due to moist condition may hinder effective achievement of management goals.

Solution: Provide data on the impacts of summer and fall burns to support science-based guidelines for maintaining healthy brushland habitat.

Activity 1. Assess vegetation and bird response 3-5 years after prescribed burns on 1200 acres of brushland habitat in central/NE Minnesota

Activity 2. : Enhance manager's guide for brushland habitat