# Environment and Natural Resources Trust Fund
# 2020 Request for Proposals (RFP)

**Project Title:** **ENRTF ID: 245-FH**

Prescribed Burning for Brushland-Dependent Species-Phase II

**Category:** H. Proposals seeking $200,000 or less in funding

**Sub-Category:** F. Methods to Protect, Restore, and Enhance Land, Water, and Habitat

**Total Project Budget: $** 147,428

**Proposed Project Time Period for the Funding Requested:** June 30, 2023 (3 yrs)

**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.

**Name:** Rebecca Montgomery

**Sponsoring Organization:** U of MN

**Job Title:** Dr.

**Department:** Department of Forest Resources

**Address:** 1530 Cleveland Ave N

St. Paul MN 55108

**Telephone Number:** (612) 624-7249

**Email** rebeccam@umn.edu

**Web Address:**

**Location:**

**Region:** Northeast

**County Name:** Aitkin, Carlton, Cook, St. Louis

**City / Township:** St. Paul

**Alternate Text for Visual:**

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

| | | | |
|---|---|---|---|
| _____ Funding Priorities | _____ Multiple Benefits | _____ Outcomes | _____ Knowledge Base |
| _____ Extent of Impact | _____ Innovation | _____ Scientific/Tech Basis | _____ Urgency |
| _____ Capacity Readiness | _____ Leverage | _____ TOTAL | _____% |

**PROJECT TITLE:** Prescribed Burning for Brushland-dependent Species-Phase II

## I. PROJECT STATEMENT

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.

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 Minnesota Department of Natural Resources (DNR) list of Species of Greatest Conservation Need (SGCN) including 38 birds, 17 mammals, 12 reptiles, 2 amphibians, and 12 insects. 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 frequently 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.

Why don't managers burn brushlands more often in summer and fall? Burning in summer and fall seasons is more challenging because conditions 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 burns when burn windows are less frequent. Showing benefits of a more varied burn season schedule will help justify changes to existing management, ultimately benefiting wildlife.

Prior to Phase I, we knew very little about effects of burning in different seasons on brushland vegetation. Results to date provide preliminary support for implementing burns in multiple seasons. We have recorded 105 bird species, including 26 SGCNs, and documented several new county records for plant species including 2 state threatened species. However, we are limited in the inferences we can make with data from only 1-2 years post-fire. Fall and summer fires appear to create patchiness in the vegetation due to variation in where the fire burned hotter and cooler. This patchiness supports more species. However, re-sprouting occurred 1 year after spring and fall fires.

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. 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

## II. PROJECT ACTIVITIES AND OUTCOMES

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

**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.

**ENRTF BUDGET: $ 137,428**

| Outcome | Completion Date |
|---|---|
| *1.* 1200 acres surveyed for birds 3 and 5 years after spring, summer, & fall fires | *July 2022* |
| *2.* 1200 acres surveyed for vegetation response 3 and 5 years after spring, summer, & fall fire | *August 2022* |
| *3.* Dataset of fire effects and vegetation response compiled and analyzed | *February 2023* |

**Activity 2 Title:** Enhance manager guide for brushland habitat

**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.

**ENRTF BUDGET: $ 10,000**

| Outcome | Completion Date |
|---|---|
| *1.* Workshop with DNR staff and stakeholders to update best management practices developed in Phase I | *March 2023* |
| *2.* Updated management guidelines for using prescribed fire to maintain brushland habitat | *June 2023* |

**III. PROJECT PARTNERS AND COLLABORATORS:**

Partners receiving funding: Dr. Rebecca Montgomery (UMN-TC, Department of Forest Resources), overall management responsibility for project team and co-advise graduate student; Dr. Lee Frelich (UMN-TC, Department of Forest Resources), coordination and co-advise graduate student. Partners not receiving funding: Charlotte Roy (MN DNR) and Lindsey Shartell (MNDNR), provide expertise on habitat characteristics for wildlife.

**IV. LONG-TERM IMPLEMENTATION AND FUNDING:** 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.

**Attachment A: Project Budget Spreadsheet**
**Environment and Natural Resources Trust Fund**
**M.L. 2020 Budget Spreadsheet**
**Legal Citation:**
**Project Manager: Rebecca Montgomery**
**Project Title:** Prescribed Burning for Brushland-dependent Species-Phase II
**Organization: University of Minnesota**
**Project Budget:** $147,428
**Project Length and Completion Date:** 3 years; June 30, 2023
**Today's Date: April 10, 2019**

| ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET | | Budget | Amount Spent | Balance |
|---|---|---|---|---|
| **BUDGET ITEM** | | | | |
| **Personnel (Wages and Benefits)** | | $ 131,928 | $ - | $ 131,928 |
| Project manager (4% time), 74% salary 26% benefits, 2 yrs, Dr. Rebecca Montgomery; $15,620 | | | | |
| Field coordinator (4% time), 74% salary 26% benefits, 2 yrs, Dr. Lee Frelich; $7231 | | | | |
| Research Technicians (2 summers; 4 persons x 9 weeks x 40 h/week x 15/h + fringe); 66% salary, 36% benefits); $60,000 | | | | |
| Salary and fringe (45.9%) for 1 graduate student for 2 years (0.25 FTE; $49,077) | | | | |
| | | $ - | $ - | $ - |
| **Equipment/Tools/Supplies** | | | | |
| Tablet rental for data entry, waders for high water work | | $ 1,500 | $ - | $ 1,500 |
| | | $ - | $ - | $ - |
| **Printing** | | | | |
| | | $ - | $ - | $ - |
| **Travel expenses in Minnesota - in accordance with UMN Travel Policy** | | | | |
| University Fleet Rental (2 yrs * 4000$ = $8000); Lodging at Cloquet Forestry Center for two people ( 2 yrs * 3 months * 500$ per month * 2 people = 6000$) | | $ 14,000 | $ - | $ 14,000 |
| **Other** | | | | |
| | | $ - | $ - | $ - |
| **COLUMN TOTAL** | | $ 147,428 | $ - | $ 147,428 |

| SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT | Status (secured or pending) | Budget | Spent | Balance |
|---|---|---|---|---|
| **Non-State:** | | $ - | $ - | $ - |
| **State:** | | $ - | $ - | $ - |
| **In kind:** | | $ 101,002 | $ - | $ 101,002 |
| Dr. Charlotte Roy's time (5% time) and Dr. Lindsey Shartell's time (5%), 66% salary 34% benefit, 2 years , $17,080 | pending | | | |
| Unrecovered indirect costs @ 54% of modified total direct cost base of $155541 = $83,922 | pending | | | |

| Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS | Amount legally obligated but not yet spent | Budget | Spent | Balance |
|---|---|---|---|---|
| M.L. 2016, Chp. 186, Sec. 2, Subd. 08d; Evaluate Prescribed Burning Techniques to Improve Habitat Management for Brushland Species | | $ 267,000 | $ 241,000 | $ 26,000 |

**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**

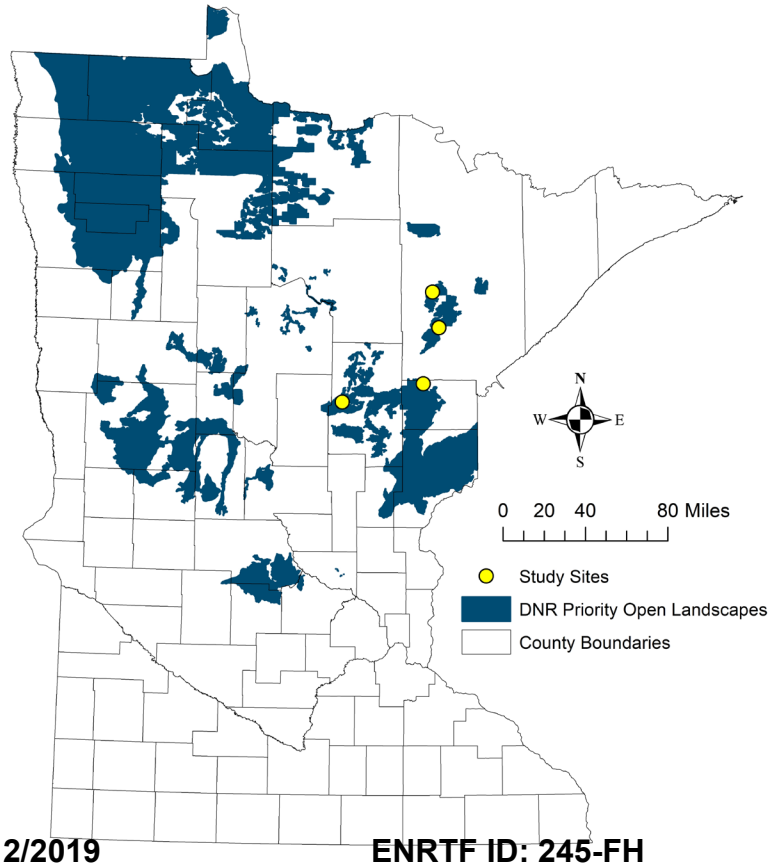
**Prescribed fire in spring**

**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



**Project Manager Qualifications and Organization Description**

**Project Manager: Rebecca A. Montgomery**
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 serve as chair of the Physiology Working Group of the Society of American Foresters and subject editor of *Forest Science*. I serve 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 fifeteen 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**
Forty publications, including articles, book chapters, and reports. Thirty-five publications in the peer-reviewed literature.

**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.