Final Abstract

Final Report Approved on February 28, 2025

M.L. 2020 Project Abstract

For the Period Ending June 30, 2024

Project Title: Prescribed Burning For Brushland-dependent Species-Phase II

Project Manager: Rebecca Montgomery

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Funding Source:

Fiscal Year:

Legal Citation: M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 08i

Appropriation Amount: $147,000

Amount Spent: $147,000

Amount Remaining: -

Sound bite of Project Outcomes and Results

Our project focused on the habitat benefits of spring, summer, and fall burns in lowland brush dominated by willow and alder. These critical habitats support both game and non-game wildlife. Our project resulted in changes to planning and implementation of burning programs by the DNR that enhanced biodiversity and wildlife.

Overall Project Outcome and Results

Our provided project provided data and inferences on the habitat benefits of spring, summer, and fall burns in lowland brush habitats dominated by willow, alder and dogwood. We did this via surveys of permanent sampling points for breeding birds and vegetation across 1200 acres of brushlands. Overall we conducted 2,214 bird point counts identifying 22,513 individual birds. We found 118 bird species 26 of which were on the list of species of greatest conservation need. We had sufficient sample size to analyze response to fire of 22 species. Analyses of showed diverse responses with some birds increasing in abundance, others decreasing and some a mix of responses. Seventeen of 22 responded to fire: six increasing, seven decreasing and 5 with mixed responses of abundance to fire. Ten of the 22 responded to season. Overall, our results show that burns in different seasons lead to heterogeneity in the habitat that support more diverse birds without negative impacts on vegetation diversity or increase in undesirable plant species. Thus, our study provided

guidelines for maintaining healthy lowland brush habitat through the application of fire in different seasons and provided evidence for benefits of flexibility in the timing of prescribed burns. Partners noted impacts of our results on planning and implementation of burning programs with less reluctance to burn in summer and fall.

Project Results Use and Dissemination

Results were shared with stakeholders via (1) presentations at local conferences attended by managers (2) a webinar with final results and (3) peer reviewed publications. It has been shared nationally at professional meetings and through peer reviewed publications. In discussions with partners, they indicated that the communication between our team and stakeholders throughout this and the Phase I granting periods has led to change in behavior in their burning programs with less reluctance to burn in summer and fall.

Environment and Natural Resources Trust Fund

M.L. 2020 Approved Final Report

General Information

Date: March 13, 2025

ID Number: 2020-052

Staff Lead: Noah Fribley

Project Title: Prescribed Burning For Brushland-dependent Species-Phase II

Project Budget: $147,000

Project Manager Information

Name: Rebecca Montgomery

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

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Project Reporting

Final Report Approved: February 28, 2025

Reporting Status: Project Completed

Date of Last Action: February 28, 2025

Project Completion: June 30, 2024

Legal Information

Legal Citation: M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 08i

Appropriation Language: $147,000 the second year is from the trust fund to the Board of Regents of the University of Minnesota to compare the effects of spring, summer, and fall burns on birds and vegetation and to provide guidelines for maintaining healthy brushland habitat for a diversity of wildlife and plant species.

Appropriation End Date: June 30, 2024

Narrative

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.

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? 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 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

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

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 to 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	Approximate Completion Date
1200 acres surveyed for birds 3-5 years after spring, summer, & fall fires	June 30, 2022
1200 acres surveyed for vegetation response 3-5 years after spring, summer, & fall fire	August 31, 2022
Dataset of fire effects and vegetation response compiled and analyzed	June 30, 2024

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	Approximate Completion Date
Workshop with DNR staff and stakeholders to update best management practices developed in Phase I	March 31, 2024
Updated management guidelines for using prescribed fire to maintain brushland habitat	June 30, 2024

Project Partners and Collaborators

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

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.
Results of this study will be presented at local, regional, and national meetings (e.g. Sustainable Forests Education Cooperative Annual Research Round-up, The Wildlife Society). Findings will be published in peer-reviewed journals, in outreach newsletters (e.g., the Lake States Fire Science Consortium), and posted annually on the Minnesota Department of Natural Resources (MN DNR) website in the Summaries of Wildlife Research Findings section found at http://www.dnr.state.mn.us/publications/wildlife/index.html. Project description and results will also be available through websites of the University of Minnesota's Department of Forest Resources (http://www.forestry.umn.edu/) and Center for Forest Ecology (http://cffe.cfans.umn.edu/).

Research will form the basis of an M.S. thesis that will be publically available through the University of Minnesota.

As described in Activity 2, webinars and workshops aimed at developing BMP and management guidelines also disseminate results. BMP and management guidelines will be made publically available on the MN DNR website (http://www.dnr.state.mn.us) and in paper form when requested.

The Minnesota Environment and Natural Resources Trust Fund (ENRTF) will be acknowledged through use of the trust fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the ENRTF Acknowledgement Guidelines.

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?
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
Assessing Species Vulnerability to Climate Change Using Phenology	M.L. 2014, Chp. 226, Sec. 2, Subd. 05e	$175,000

Evaluate Prescribed Burning Techniques to Improve Habitat Management for Brushland Species	M.L. 2016, Chp. 186, Sec. 2, Subd. 08d	$267,000

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount	$ Amount Spent	$ Amount Remaining
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		$59,668	-	-
							Sub Total	**$142,519**	**$142,519**	**-**
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.					$1,142	$1,142	-
							Sub Total	**$1,142**	**$1,142**	**-**
Capital Expenditures										
							Sub Total	**-**	**-**	**-**
Acquisitions and Stewardship										
							Sub Total	**-**	**-**	**-**
Travel In Minnesota										

	Miles/ Meals/ Lodging	University fleet rental (2 yrs @ $3000/yr and lodging at Cloquet Forestry Center (2 yrs @ 1667/year)	We require a high clearance vehicle for site access and housing for summer staff near field sites.					$3,339	$3,339	-
							Sub Total	**$3,339**	**$3,339**	**-**
Travel Outside Minnesota										
							Sub Total	**-**	**-**	**-**
Printing and Publication										
							Sub Total	**-**	**-**	**-**
Other Expenses										
							Sub Total	**-**	**-**	**-**
							Grand Total	**$147,000**	**$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	$ Amount Spent	$ Amount Remaining
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.	Secured	$79,380	$79,380	-
			Non State Sub Total	**$79,380**	**$79,380**	**-**
			Funds Total	**$79,380**	**$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....

Supplemental Attachments

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

Title	File
Background Check Form	86fa0627-b99.pdf
Bird-habitat associations and local-scale vegetation structure in lowland brushlands	8c59d330-c29.pdf
DNR Webinar - Best Practices Deliverable	d4a8559a-292.pptx

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

Changed dates for deliverables. Reduced the travel to two summers of field work due to changing timing related to delay of funding. Added funds to research technician from travel to reflect the need for an M.S. level student to deal with unbalanced research design resulting from the delay in funding.

Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?

N/A

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

Work Plan Amendments

Amendment ID	Request Type	Changes made on the following pages	Explanation & justification for Amendment Request (word limit 75)	Date Submitted	Approved	Date of LCCMR Action
1	Amendment Request	• Activities and Milestones	The original milestones were written with data collection scheduled in specific years (year 3 and 5) after burns. We amended this to be a window of years 3-5 instead of specific years. We did so because several factors made it difficult to complete data collection in specific years: staggered burn dates, delayed release of funds so that year 3 for some sites was before the grant start, manager partners needing to re-burn sites.	May 19, 2023	Yes	May 22, 2023
2	Amendment Request	• Budget • Other • Budget - Personnel • Budget - Travel and Conferences • Budget - Non-ENRTF Funds Contributed	Managers requested a webinar rather than an in-person workshop. Thus, we have no need of travel funds to support the project. We request that the remaining travel funds 5994$ be moved into personnel to support post-doc and research specialist completion of draft manuscript before the end of the funding period.	May 13, 2024	Yes	May 22, 2024

Status Update Reporting

Final Status Update August 14, 2024

Date Submitted: January 22, 2025

Date Approved: January 27, 2025

Overall Update

Our provided project provided data and inferences on the habitat benefits of spring, summer, and fall burns in brushland habitats. We did this via surveys of permanent sampling points for breeding birds and vegetation across 1200 acres of brushlands. Analyses of responses 3 to 5 years after prescribed burns showed diverse responses with some birds increasing in abundance, others decreasing and some a mix of responses. Overall, our results show that burns in different seasons lead to heterogeneity in the habitat that support more diverse birds without negative impacts on vegetation diversity or increase in undesirable plant species. Results were shared with stakeholders via (1) presentations at local conferences attended by managers (2) a webinar with final results and (3(peer reviewed publications (3) Thus, our study provided guidelines for maintaining healthy brushland habitat through the application of fire in different seasons and providing evidence for benefits of flexibility in the timing of prescribed burns. Partners noted impacts of our results on planning and implementation of burning programs with less reluctance to burn in summer and fall.

Activity 1

The goal of this activity was to assess vegetation and bird responses 3 to 5 year after prescribed burns on 1200 acres of brushland habitat in central/NE Minnesota. All data collection was completed by August 2022. A post doc and research specialist worked much of fall 2023 and spring 2024 on data processing, management and analysis of data from the full scope of the project for analysis. Overall we conducted 2,214 bird point counts identifying 22,513 individual birds. We found 118 bird species 26 of which were on the list of species of greatest conservation need. Between the last reporting period and the end of the grant, we completed several key analyses that were presented at a professional meeting. We had sufficient sample size to analyze response to fire of 22 species. Seventeen of 22 responded to fire: six increasing, seven decreasing and 5 with mixed responses of abundance to fire. Ten of the 22 responded to season. One peer reviewed paper (see attachments) was published during this granting period. The research specialist transitioned to a graduate position and I anticipate continued progress toward peer reviewed publications as a result of the grant.
(This activity marked as complete as of this status update)

Activity 2

We reached out to relevant stakeholders, land management agencies and partners to develop the most appropriate materials to meet our deliverable of "updated management guidelines for using prescribed fire to maintain brushland habitat". They indicated that formal guidelines and written materials were not needed and instead requested (1) a webinar with final results and (2) sharing of peer reviewed publications as they are completed. Tom Stevens gave a webinar (see attachment) on June 12, 2024 that was well attended and received. We have shared our first publication and have updated our dissemination list for sharing the publication on which we are currently working. In discussions with partners, they indicated that the communication between our team and stakeholders throughout this and the Phase I granting periods has led to change in behavior in their burning programs with less reluctance to burn in summer and fall.
(This activity marked as complete as of this status update)

Dissemination

Webinar, MNDNR Wildlife Research Wednesdays Seminar Series, June 12, 2024. Audience = Land stewards from across the region.
North American Congress for Conservation Biology, June 25-27, 2024. Audience = Professionals and academics in the field.

Status Update Reporting

Status Update April 1, 2024

Date Submitted: May 13, 2024

Date Approved: May 22, 2024

Overall Update
A post-doc and research specialist completed the processing, management and organization of data from the full scope of the project for analysis. This analysis will be the basis for the dissemination of results. A peer reviewed publication is in draft form and another was published during this reporting period. A webinar with managers is scheduled for June. All data collection was completed by August 2022. Thus, two of the three deliverables in Activity 1 are complete.

Activity 1
The post-doc and research specialist completed the processing, management and organization of data from the full scope of the project for analysis. The post-doc developed spatially explicit data from satellite imagery and has completed models to assess the impact of the season off fire on fire severity on bird abundance. The research specialist completed ordinations of vegetation data. These analysis will determine how birds and vegetation respond to the season of controlled burns and complete Activity 1.

Activity 2
We reached out to relevant stakeholders, land management agencies and partners to develop the most appropriate materials for use on the ground. They requested a webinar with final results and continued sharing of peer reviewed publications. The webinar is scheduled in June.

Dissemination
Our first peer reviewed publication came out. Hawkinson et al. 2024 Bird-habitat association and local-scale vegetation structure in lowland brushlands. J. of Wildlife Management. e22568. DOI: 10.1002/jwmg.22568.

Status Update Reporting

Status Update October 1, 2023

Date Submitted: November 1, 2023

Date Approved: December 20, 2023

Overall Update
We hired a post-doctoral research fellow in June of 2023. The post-doc is leading the processing, management and organization of data from the full scope of the project for analysis. This analysis will be the basis for the dissemination of results that will lead to multiple peer reviewed publications and best management practices for maintaining healthy brushlands with controlled burns. All data collection was completed by August 2022. Thus, two of the three deliverables in Activity 1 are complete.

Activity 1
The post-doc is leading the processing, management and organization of data from the full scope of the project for analysis. The post-doc is also developing spatially explicit data from satellite imagery that will allow the team to assess the impact of the season off fire on fire severity for all prescribed burns that were part of this project. This will allow us disentangle the impacts of fire severity and season of fire on vegetation and wildlife communities. This analysis will determine how birds and vegetation respond to the season of controlled burns and complete Activity 1.

Activity 2
Nothing to report at this time.

Dissemination
The post-doctoral research fellow has submitted an abstract to the Society of Conservation Biology meeting. A manuscript from the pre-burn bird and vegetation data is in revision with the Journal of Wildlife Management.

Status Update Reporting

Status Update April 1, 2023

Date Submitted: May 19, 2023

Date Approved: May 22, 2023

Overall Update
We are in the last stages of hiring a post-doctoral research fellow who will analyze data. A manuscript of data from Phase I has been submitted to a peer reviewed journal before the new year. All data collection was completed by August 2022. Thus, two of the three deliverables in Activity 1 are complete.

Activity 1
We are in the last stages of hiring a post doctoral research scholar who will further advance data management, analyze data and write peer reviewed publication. Until that hour the project is in a holding pattern. The post-doc will complete the third deliverable in this Activity. The first two are complete as data collection was finished in August 2022.

Activity 2
Nothing to report at this time.

Dissemination
Nothing to report at this time.

Status Update Reporting

Status Update October 1, 2022

Date Submitted: December 1, 2022

Date Approved: December 15, 2022

Overall Update
We completed bird and vegetation surveys in summer 2022 at all sites. All data have been entered in we are in the process of hiring a post-doctoral research fellow who will analyze data. A draft manuscript of data from Phase I is complete and will be submitted to a peer reviewed journal before the new year.

Activity 1
In summer 2022, we surveyed all sites and all burn units for birds and vegetation. Birds were surveyed in June 2022. Vegetation was surveyed in July and August 2022 with two plots at one site surveyed in early September. This provides year 4 post burn data for two sites (Deer Run and Gerzin) and 5 year post burn data for two sites (Hasty Brook and Hwy 29). For Deer Run, we sampled 6 of 8 points for vegetation due to staffing issues. All data have been entered. We are in the process of hiring a post doctoral research scholar who will further advance data management, analyze data and write peer reviewed publication.

Activity 2
We are in the process of hiring a post doctoral research scholar to analyze data and work on updating best management practices.

Dissemination
Nothing to report at this time.

Status Update Reporting

Status Update April 1, 2022

Date Submitted: May 11, 2022

Date Approved: May 12, 2022

Overall Update
We held a team meeting to discuss plans for the 2022 season. We plan to resurvey all four sites for birds in June and vegetation in July/August. We identified next steps to move the summer field work season forward. We advertised, interviewed, and offered positions to four summer staff: three accepted the position. We began the process of hiring, on-boarding and training. We assessed supply needs for summer field work and reserved a vehicle and housing for our crew.

Activity 1
We held a team meeting to plan the summer 2022 field season. We plan to resurvey all four sites for birds in June and vegetation in July/August. We advertised and conducted interviews for summer field staff. We are in the process of hiring summer staff to complete bird and vegetation surveys. We lined up resources for on-boarding and training. We assessed supply needs for summer field work and reserved a vehicle and housing for our crew.

Activity 2
Nothing to report at this time.

Dissemination
Nothing to report at this time.