

Final Abstract

Final Report Approved on July 7, 2026

M.L. 2022 Project Abstract

For the Period Ending June 30, 2026

Project Title: How Do Prescribed Fires Affect Native Prairie Bees?

Project Manager: Stuart Wagenius

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Website: <https://echinaceaproject.org/>

Funding Source:

Fiscal Year:

Legal Citation: M.L. 2022, Chp. 94, Sec. 2, Subd. 03d

Appropriation Amount: \$500,000

Amount Spent: \$464,405

Amount Remaining: \$35,595

Sound bite of Project Outcomes and Results

Our main experiment showed that preserving remnant prairie and managing it with fire are critically important for bee conservation. The substantial benefits of fire for nesting bees are even greater in remnants compared to restorations. Our findings and recommendations help managers use fire effectively for conservation of ground-nesting bees.

Summary of Project and Outcomes

Pollinators are declining in Minnesota's tallgrass prairies. We know that plant diversity declines when prairie remnants are not managed with prescribed fires. Much less was known about how fires might affect bees, the main pollinators in prairies. We designed experiments to learn how fires affect ground-nesting bees, the most prevalent kind of bees in remnant prairies and in prairie restorations.

Our project showed that preservation of remnant habitat and management with fire is critically important for bee conservation. Our main experiment revealed that prescribed fires boost the abundance of ground-nesting bees in both remnants and restorations. Fire in either type of prairie habitat provides immediate benefits for nesting bees. In particular, the largest boosts in bee abundance and diversity accrue in remnants that have not burned recently, followed

by recently burned remnants, followed by restorations. Another experiment showed that across the landscape, fires increase the amount of pollen of the native purple coneflower, a critical food resource for native bees. Another experiment showed that plants experienced improved pollination and seed production in recently-burned compared to unburned prairies, even though bee visits didn't change.

Based on our strong and clear findings, we recommend prioritizing (1) preservation of remnant prairies and (2) active use of prescribed fire in both remnant and restored prairies. We note that bee diversity and nesting habitat for ground-nesting bees is better in remnant prairies, even small remnants, than restorations, but fire increases nesting in both remnants and restorations. We recommend fire to increase flowering, food for pollinators, pollination, and seed production in many prairie plants. We have shared these recommendations (see tab 7) online, in meetings with land managers and other audiences, and in manuscripts that will be published in peer-reviewed journals. More dissemination will continue after the award has ended.

Project Results Use and Dissemination

Our main dissemination activities include 1) sharing three one-page non-technical documents with recommendations for land managers and policymakers, 2) giving presentations to resource managers and others in formal and informal meetings, large and small, 3) preparing manuscripts for publication in peer-reviewed journals. One manuscript is accepted, one is in review, one is almost ready for submission, and a MS thesis is being revised for publication. The one-page recommendations are online and the thesis is on Tab 7. We will acknowledge the Environment and Natural Resources Trust Fund in all future dissemination activities, including forthcoming papers.



Environment and Natural Resources Trust Fund

M.L. 2022 Approved Final Report

General Information

Date: September 15, 2026

ID Number: 2022-091

Staff Lead: Mike Campana

Project Title: How Do Prescribed Fires Affect Native Prairie Bees?

Project Budget: \$500,000

Project Manager Information

Name: Stuart Wagenius

Organization: Negaunee Institute for Plant Conservation Science and Action at the Chicago Horticultural Society

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Web Address: <https://echinaceaproject.org/>

Project Reporting

Final Report Approved: July 7, 2026

Reporting Status: Project Completed & Additional Update Approved

Date of Last Action: July 7, 2026

Project Completion: November 30, 2025

Legal Information

Legal Citation: M.L. 2022, Chp. 94, Sec. 2, Subd. 03d

Appropriation Language: \$500,000 the second year is from the trust fund to the commissioner of natural resources for an agreement with Negaunee Institute for Plant Conservation Science and Action at the Chicago Horticultural Society to investigate how prescribed fire in Minnesota's tallgrass prairies affects the nesting habitat, food resources, and diversity of ground-nesting bees.

Appropriation End Date: June 30, 2025

Narrative

Project Summary: Pollinators are declining in Minnesota's tallgrass prairies. We will investigate how prescribed fire affects the nesting habitat, food resources, and diversity of ground-nesting bees to make recommendations for prairie management.

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Prescribed fire is widely used to maintain tallgrass prairie in Minnesota. Burning promotes native plant diversity, and a 21-year investigation from Dr. Wagenius' research group in Douglas County, MN (Echinacea Project) shows that fire also improves pollination. However, we know very little about how fires affect solitary bees – the most diverse and important pollinators in tallgrass prairie. Fire harms some insects and but benefits others. Natural resource managers currently lack clear guidance about prescribed fire and pollinator conservation. We do not know if fire directly threatens solitary bees, most of which nest belowground. We also don't know how prescribed fires affect bee nesting habitat or the nutritional quality of their food resources (pollen and nectar from wildflowers). Better understanding how prescribed fires influences solitary bee nesting habitat, food resources, and diversity is critical for providing recommendations about how prescribed fire should be used to promote pollinator conservation and healthy prairie. With over 25 years of experience researching insects and plants in western Minnesota, as well as active research investigating fire effects on prairie plants and pollination, the Echinacea Project is uniquely well-positioned to investigate how prescribed fire affects native solitary bees, and to develop guidelines for promoting pollinator conservation.

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 investigate how prescribed fires influence the nesting habitat, food resources, and diversity of ground-nesting solitary bees in Minnesota tallgrass prairie. This research is distinct from and complements previous ENRTF-funded projects that investigated habitat requirements of cavity-nesting solitary bees and cataloged native bee diversity in Minnesota. We will conduct prescribed burns in a sample of 50 prairie remnants and restorations in Douglas and Grant Counties, where we have been researching prairie plants and insects since 1995. We will characterize bee nesting habitat and survey solitary bees before and after prescribed burns to determine how fire affects nesting habitat and solitary bee diversity. In addition, we will repeat the pan trap surveys our research team began in 2004. This will allow us to characterize the population trends and habitat requirements of numerous solitary bee species (Activity 1). We will then investigate how fire influences food resources and pollinator activity by surveying flowering plant density, measuring the quantity and nutritional quality of pollen and nectar, and monitoring how frequently bees visit different wildflower species (Activity 2).

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?

We will provide guidelines and offer recommendations to conservation practitioners and policymakers about best management practices for maintaining healthy prairie plant and pollinator populations. The proposed research will directly inform conservation efforts in Minnesota tallgrass prairie by revealing how prescribed fire influences the nesting habitat, quantity and quality of food resources, and diversity of ground-nesting prairie bees. Additionally, our research will provide valuable information about nesting habitat requirements for different bee species, preferred wildflower species, and population trends.

Project Location

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

County(s): Douglas, Grant, Pope, Stevens,

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

Activities and Milestones

Activity 1: Investigating how prescribed fire influences the nesting habitat and diversity of solitary, ground-nesting bees in Minnesota tallgrass prairie

Activity Budget: \$255,000

Activity Description:

We will survey solitary bee diversity and nesting habitat before and after prescribed fires in a subset of 30 prairie remnants and 20 prairie restorations to determine how prescribed fire affects solitary bee nesting habitat and abundance. We will use emergence traps and detailed measures of soil and litter to characterize how prescribed burning influences the nesting habitat and diversity of solitary bees. In addition to these detailed investigations, we will repeat the broader-scale pan trap surveys our research team began in 2004 to reveal population trends and habitat requirements of numerous bee species. We will provide natural resource managers and policymakers with guidelines and recommendations about how prescribed fire affects solitary bees and their nesting habitat. In addition to disseminating results at regional and national scientific meetings, we will share results locally to interested groups. Summer interns from local high schools (2 per year) will present results at their school, FFA, 4H, and other groups. Additionally, we established an experimental plot at West Central Area High School in 2018 with science teacher and research collaborator VanKempen. He will present results of fire effects on plants and pollinators within the school's restored prairie at a statewide teacher conference.

Activity Milestones:

Description	Approximate Completion Date
Repeat general bee survey using pan traps	September 30, 2022
Conduct first round of prescribed burns	May 31, 2023
Complete first round of surveys of solitary nesting habitat and diversity	September 30, 2023
Conduct second round of prescribed burns	May 31, 2024
Complete second round of surveys of solitary nesting habitat and diversity	September 30, 2024
Analyze data and write papers for publication in peer-reviewed scientific journals	June 30, 2025
Develop and disseminate management guidelines and recommendations	June 30, 2025

Activity 2: Characterizing fire effects on food resources for bees and plant-pollinator interactions in Minnesota tallgrass prairie

Activity Budget: \$245,000

Activity Description:

Healthy bee populations require sufficient quantity and quality of food (pollen and nectar). Fire could benefit bees by increasing the quantity or nutritional quality of these food resources. We will investigate how prescribed burns affect the density of flowering plants, the quantity and nutritional quality of both pollen and nectar, and the activity of pollinators within remnant and restored prairies where Dr. Wagenius and his team have been working since 1995. Most sites are owned by private landowners and many have not burned in >30 years. Assessment of fire effects on flower density and pollinator visitation will be particularly valuable because they can be compared to long-term datasets of annual variation of flowering in the absence of fire. We will measure quantity and quality of pollen and nectar from wildflowers before and after prescribed burns. Nutritional contents of pollen includes fat, protein, and micronutrients and nectar provides sugar, protein, and micronutrients. Results of these activities will reveal how fires affect food resources for bees and also pollination for plants. We will provide recommendations to managers and policymakers about which plant species are most nutritionally valuable for pollinators and how much fire affects the quantity and nutritional content of their diets.

Activity Milestones:

Description	Approximate Completion Date
Survey flower density	September 30, 2022
Collect pollen and nectar samples from prairie wildflowers & investigate pollinator visitation (first round))	September 30, 2023
Complete first round of nutritional analysis of pollen and nectar	February 28, 2024
Collect pollen and nectar samples, assess flower density, & investigate pollinator visitation (second round)	September 30, 2024
Complete second round of nutritional analysis of pollen and nectar	February 28, 2025
Analyze data and write papers for publication in peer-reviewed scientific journals	June 30, 2025
Analyze data to write papers, develop and disseminate management guidelines	June 30, 2025

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Dr. Rahul Roy	St. Catherine University	Dr. Roy is a molecular biologist specializing in pollen and nectar biology at St. Catherine University in St. Paul, MN. He will conduct biochemical assays to quantify the nutritional content of pollen and nectar.	Yes
Dr. Zach Portman	University of Minnesota Bee Lab	Dr. Portman is a bee taxonomist at the University of Minnesota in the Cariveau Native Bee Lab. His research focuses on the identification and taxonomy of Minnesota bees. We will contract Dr. Portman to identify our field-collected bee specimens.	Yes
John VanKempen	West Central Area High School	VanKempen is a high school science teacher at West Central High School (Barrett, MN) who has collaborated with the Echinacea Project on pollinator projects since 2018. VanKempen will lead the pan trapping investigation, assist with all other fieldwork, and serve as liaison to local communities.	Yes
Stacy Salvevold	Fergus Falls Wetland Management District, US Fish & Wildlife Service	Salvevold and members of the fire staff at Fergus Falls will coordinate the timing and location of prescribed burns of Waterfowl Production Areas in the study site so that they can be included in the proposed investigations of fire effects on native bees and pollination.	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.

We will publish findings from Activities 1 & 2 in peer-reviewed scientific journals. We will present results of this research at local and regional conferences. We will produce research briefs of for conservation practitioners, policymakers, and the general public that summarize our findings and provide recommendations about burning. These will be posted on the project website: echinaceaproject.org. We will also share results with local landowners and groups interested in protecting and enhancing natural prairie resources via pamphlets, presentation, and in person. We will acknowledge the Environment and Natural Resources Trust Fund through use of the trust fund logo, or attribution language, or both on all project print and electronic media, publications, signage, and other communications and outreach.

We will provide natural resource managers and policymakers with guidelines and recommendations about how prescribed fire affects solitary bees and their nesting habitat via our website and in presentations to interested groups (Activity 1). We will acknowledge the ENRTF following guidelines.

Summer interns from local high schools (2 per year from Douglas, Grant, Pope, or Stevens County) will present results at their school, FFA, 4H, and other groups. We will print posters, pamphlets, or exhibits to share information about prairies and native pollinators (Activities 1 & 2). We will acknowledge the ENRTF following guidelines.

Science teacher and research collaborator VanKempen will present results of fire effects on plants and pollinators within the school's restored prairie at a statewide teacher conference (Activity 1). He will acknowledge the ENRTF following guidelines.

Our results will reveal how fires affect food resources for bees and also pollination for plants. We will provide recommendations to managers and policymakers about which plant species are nutritionally valuable for pollinators and how much fire affects the quantity and nutritional content of their diets (Activity 2). We will acknowledge the ENRTF following 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?

Our research group, the Echinacea Project, investigates the biology, conservation, and restoration of plants and insects in tallgrass prairie. The research we propose here advances our 25-year efforts to conserve the diverse native bees and plants of Minnesota tallgrass prairie. We will publish findings from Activities 1 & 2 in peer-reviewed scientific journals, present results at local and regional conferences, and produce research briefs for conservation practitioners, policymakers, and the general public that summarize our findings and provide recommendations about burning.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount	\$ Amount Spent	\$ Amount Remaining
Personnel										
Postdoctoral Researcher		The Postdoctoral Researcher will supervise and coordinate field research activities. This individual will design and implement data collection workflows, manage data sets, conduct statistical analyses, serve as lead author for most peer-reviewed publications, and assist with the dissemination of research materials to natural resource managers, policymakers, scientists, and the general public. They will be based in Minnesota at least six months each calendar year.			28%	2.7		\$214,000	-	-
Field assistants		We will hire one field technician in summer 2022 (3 months) and 2 field technicians in summer 2023 & summer 2024 (6 months). These individuals will help conduct pan trapping surveys, bee nesting habitat and emergence trapping surveys, pollen and nectar collection, and pollinator visitation surveys.			11%	2.25		\$88,000	-	-
High School Research Interns (Participants)		Two local high school students will participate during summer 2023 and another two during summer 2024 for 10 weeks each summer. These interns from Alexandria, Minnewaska, Morris, or West Central Area will assist with all research activities and gain appreciation about Minnesota's rich natural resources. As part of the internship, students will develop a poster, pamphlet, or exhibit about prairie and native pollinators to share with school and civic groups.		X	0%	0.8		\$20,000	-	-
High School Teacher		John VanKempen, high school science teacher from West Central Area High School, will participate in all summer		X	0%	0.39		\$20,000	-	-

Researcher (Participant)		research activities, supervise pan trapping surveys, coordinate with local landowners and present research findings to educational organizations.								
Supervisor of field assistants		The field supervisor will coordinate day-to-day research activities with the post-doctoral researcher. This individual will supervise the field assistants and conduct pan trapping surveys, bee nesting habitat and emergence trapping surveys, pollen and nectar collection, and pollinator visitation surveys.			11%	1		\$42,500	-	-
							Sub Total	\$384,500	\$356,202	\$28,298
Contracts and Services										
Dr. Zach Portman (UMN Bee Laboratory)	Service Contract	Identify field-collected bee specimens at rate of \$2 per bee. Single-source provider selected due to the unique and expert skills required for accurate and efficient bee identification. This contract will be executed as part of Activity 1.		X		0.2		\$6,000	\$3,859	\$2,141
St. Catherine University	Subaward	Summer salary to support Dr. Rahul Roy for 1.5 months each summer (2023 & 2024) while he conducts pollen and nectar nutritional assays. Dr. Roy's expertise in molecular biology as well as pollen and nectar biology uniquely positions him to collaborate on this project and perform the biochemical assays.				0.26		\$18,500	\$18,494	\$6
St. Catherine University	Subaward	Dr. Roy will hire undergraduate students at St. Catherine University to assist with labwork needed to conduct nutritional assays of pollen and nectar. Students will work 20 hours/week over two 14-week periods. Dr. Roy is uniquely positioned to collaborate on this project and perform biochemical assays.				0.28		\$9,666	\$9,666	-
St. Catherine University	Subaward	Funds for chemical assays & lab supplies. Professor Roy at St Catherine's will quantify the nutritional content of				0		\$13,334	\$12,751	\$583

		field-collected pollen and nectar samples (Activity 2).								
							Sub Total	\$47,500	\$44,770	\$2,730
Equipment, Tools, and Supplies										
	Tools and Supplies	Field supplies: 50 emergence traps (\$200/trap) as well as pan traps, bee pinning supplies, pin flags, meter sticks, and other field supplies as well as replacement tools for burning.	These supplies are necessary to conduct proposed fieldwork outlined in Activities 1 & 2.					\$16,325	\$13,415	\$2,910
							Sub Total	\$16,325	\$13,415	\$2,910
Capital Equipment										
							Sub Total	-	-	-
Acquisitions and Stewardship										
							Sub Total	-	-	-
Travel In Minnesota										
	Miles/ Meals/ Lodging	Travel from research base in Douglas County to field sites in Douglas, Grant, Pope, and Stevens Counties. Estimated 120 miles per week per person at federal mileage reimbursement rate of \$0.585/mile (2 individuals for 8 weeks during summer 2022 and 5 individuals for 16 weeks during summer 2023 & summer 2024).	Local travel to research sites within Douglas, Grant, Pope, and Stevens Counties.					\$16,098	\$16,098	-
	Miles/ Meals/ Lodging	Housing near field sites for summer research crew (\$1800/month): July - September 2022 (3 months), April - September 2023 (6 months), and April - September 2024 (6 months).	Renting a house near our study sites in rural western Minnesota minimizes travel and allows us to conduct research efficiently.					\$32,257	\$31,800	\$457
							Sub Total	\$48,355	\$47,898	\$457

Travel Outside Minnesota										
	Conference Registration Miles/ Meals/ Lodging	Requested funds include travel, meals, and incidentals for one individual.	We request funds for the post-doctoral researcher to travel to an Ecological Society of America or Conservation Biology meeting to present project findings. Attendance at one of these meetings will enhance our ability to conduct the research, disseminate our results, and promote conservation of natural resources in Minnesota & beyond.	X				\$2,120	\$2,120	-
							Sub Total	\$2,120	\$2,120	-
Printing and Publication										
	Publication	Publication fees for peer-reviewed scientific papers	These publications will help disseminate our findings to practitioners, policymakers, and scientists across the state of Minnesota and more broadly.					\$1,000	-	\$1,000
	Printing	Participant costs: print posters, pamphlets, or exhibits developed by high school interns to share information about prairies and native pollinators with their high schools and civic groups.	These presentations will help disseminate our findings to local landowners and groups interested in protecting and enhancing natural prairie resources.					\$200	-	\$200
							Sub Total	\$1,200	-	\$1,200
Other Expenses										
							Sub Total	-	-	-
							Grand Total	\$500,000	\$464,405	\$35,595

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Personnel - High School Research Interns (Participants)		Two local high school students will participate during summer 2023 and another two during summer 2024 for 10 weeks each summer. These interns from Alexandria, Minnewaska, Morris, or West Central Area will assist with all research activities and gain appreciation about Minnesota's rich natural resources. As part of the internship, students will develop a poster, pamphlet, or exhibit about prairie and native pollinators to share with school and civic groups.	Our summer research team includes 1-2 interns from local high schools funded by the National Science Foundation. They are classified as participants instead of employees. We would do the same for ENRTF-funded interns.
Personnel - High School Teacher Researcher (Participant)		John VanKempen, high school science teacher from West Central Area High School, will participate in all summer research activities, supervise pan trapping surveys, coordinate with local landowners and present research findings to educational organizations.	Our summer research team includes 1-2 secondary school science teachers funded by the National Science Foundation. They are classified as participants instead of employees. We would do the same for ENRTF-funded teacher researchers.
Contracts and Services - Dr. Zach Portman (UMN Bee Laboratory)	Service Contract	Identify field-collected bee specimens at rate of \$2 per bee. Single-source provider selected due to the unique and expert skills required for accurate and efficient bee identification. This contract will be executed as part of Activity 1.	Single-source provider selected due to the unique and expert skills required for accurate and efficient identification of Minnesota bees.
Travel Outside Minnesota	Conference Registration Miles/Meals/Lodging	Requested funds include travel, meals, and incidentals for one individual.	Travel to a conference outside the state of Minnesota for postdoctoral researcher to participate in formal presentation of project findings.

Non ENRTF Funds

Category	Specific Source	Use	Status	\$ Amount	\$ Amount Spent	\$ Amount Remaining
State						
			State Sub Total	-	-	-
Non-State						
In-Kind	The Chicago Botanic Garden's Federally-negotiated indirect cost rate is 55%. This rate is applied to MTDC, which excludes participant support costs (\$500K - 41K).	Unrecovered indirect costs associated with this proposal.	Secured	\$252,450	\$214,223	\$38,227
In-Kind	In kind from USFWS for conducting prescribed burns.	Fire staff from Fergus Falls will burn Waterfowl Production Areas in study area.	Secured	\$10,000	\$10,000	-
			Non State Sub Total	\$262,450	\$224,223	\$38,227
			Funds Total	\$262,450	\$224,223	\$38,227

Attachments

Required Attachments

Visual Component

File: [252ff170-742.pdf](#)

Alternate Text for Visual Component

Three panels, each with an illustration and a question: 1) Native bees before and after a prairie fire, "Does burning affect bees?"; 2) Bees seeking locations to nest with inset photo of bee, "Do more bees nest in burned areas?"; and 3) Bees and seeking food with inset USDA nutrition label, "Does fire affect the nutritional value of pollen and nectar?"...

Financial Capacity

File: [b80071bf-1c0.pdf](#)

Board Resolution or Letter

Title	File
Board Letter	96e60ee9-1ec.pdf

Supplemental Attachments

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

Title	File
revised research addendum	b25e5793-ef9.pdf
Background Check Certification Form	6a210fac-a2d.pdf
Dissemination Products and Activities	958d77bd-eb0.pdf
Recommendations about Fire & Nesting Bees	320e6d74-864.pdf
Recommendations about Fire & Pollen	16fbef6e-5de.pdf
Recommendations about Fire, Pollination, and Pollinator Visitation	0d97cd78-fff.pdf
Robert's thesis	35c8602a-e16.pdf
slides for presentation given by wagenius to land managers	71c3437c-b57.pdf

Media Links

Title	Link
2022 Update: Nectar experiment	https://echinaceaproject.org/2022-update-nectar-experiment/
2022 Update: Pollinators on roadsides	https://echinaceaproject.org/2022-update-pollinators-on-roadsides/
Informal updates on research progress	https://echinaceaproject.org/category/experiments/enrtf/
The Burns and the Bees: A landscape-scale fire experiment on bee nesting (Poster)	https://echinaceaproject.org/wp-content/uploads/2024/11/EntSocPosterDraft3.png
Blog entries on Echinacea Project webpage	https://echinaceaproject.org/?s=enrtf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

1. Because we have so little time to plan for the 2022 season and hire personnel, we have scaled back expectations for fieldwork in 2022 and delayed the start of the post-doctoral researcher.
2. To keep the budget aligned with inflation (travel, housing, and wages), we have increased budgets in several categories.

3. We added a new category of personnel (Supervisor of field assistants - 1 FTE) to increase our capacity to conduct fieldwork during the summers of 2023 & 2024.
4. We updated the in kind contributions provided by the Chicago Botanic Garden and the US Fish & Wildlife Service.
5. We clarified that we will conduct prescribed burns prior to the 2023 and 2024 flowering seasons and made several minor changes based on recommendations by peer reviewers.

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 Commissioner's Plan 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?

No

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

Not acknowledged

Work Plan Amendments

Amendment ID	Request Type	Changes made on the following pages	Justification For Amendment Request (word limit 75)	Date Submitted	Approved	Date of LCCMR Action
1	Amendment Request	- Budget - Capital, Equipment, Tools, and Supplies - Budget - Professional / Technical Contracts	Shift \$14K from Supplies section to the Professional/Technical Contracts section to be included in a sub award to St Catherine's University. Professor Roy at St Catherine's will determine the assays and supplies needed to best measure nutrients.	December 20, 2022	Yes	December 22, 2022
2	Amendment Request	- Other - Budget - Personnel - Budget - Professional / Technical Contracts - Budget - Capital, Equipment, Tools, and Supplies	First, for field work, field supplies were more expensive than anticipated. We have personnel funded from another source to compensate for the reduced Personnel budget. Second, for sub-awarded labwork, processing samples is less expensive but more time-consuming than expected, so we want to keep employing one student who just graduated and hire one additional student. These changes will not alter the work to be completed.	January 12, 2024	Yes	January 16, 2024
3	Amendment Request	- Other - Budget - Professional / Technical Contracts - Budget - Capital, Equipment, Tools, and Supplies - Budget - Travel and Conferences - Budget - Printing and Publication - Attachments	1) Tools and Supplies: costs were lower than anticipated. 2) Travel or Conference: costs were higher than anticipated in all three categories: travel in MN, housing in MN, and travel to one conference. 3) printing and publication costs are substantially lower than expected. These changes will not alter the work to be completed. The previously reported \$27 for the contract with Dr. Portman was an error-- it was delivery of specimens, not professional services.	April 23, 2025	Yes	April 24, 2025
4	Amendment Request	Budget - Professional / Technical Contracts	Reduce funds to have student weigh pollen samples. Increase funds to send pollen samples to lab for weighing and analysis of nutrients. These changes will not alter the	June 25, 2025	Yes	June 30, 2025

			work to be completed by the team at St Catherine's University.			
5	Completion Date	Previous Completion Date: 06/30/2025 New Completion Date: 11/30/2025	We had major setbacks (see the update submitted June 25) and need extra time to complete publication and dissemination milestones.	June 30, 2025	Yes	June 30, 2025

Additional Status Update Reporting

Additional Status Update May 29, 2026

Date Submitted: May 29, 2026

Date Approved: June 4, 2026

Overall Update

We have produced useful guidelines and recommendations for conservation practitioners and policymakers about how to use prescribed fires to conserve ground-nesting bees, the most important group of pollinators in prairies. Our main experiment provided clear and strong evidence that prescribed fires are critically important for bees. Evidence also reveals that remnants are better habitat than restorations. Even small remnants support substantially greater abundance of bees and greater diversity of bee species compared to restorations. Other experiments provided further information and recommendations about how prescribed fires influence plants, bees, and pollination.

This project experienced unexpected major setbacks right before the scheduled end of project (see Status Update August 14). We were granted additional time to complete the project. During this additional time, budget problems led the Chicago Botanic Garden to lay off Project Manager Stuart Wagenius. In spite of these challenges, we produced recommendations. However, we have not yet submitted our three manuscripts for publication in peer-reviewed scientific journals. We intend to submit the first two during summer 2026 and the other in fall 2026. We also intend to continue disseminating our key recommendations.

Activity 1

This activity was previously marked complete.

(This activity marked as complete as of this status update)

Activity 2

This activity was previously marked complete.

(This activity marked as complete as of this status update)

Dissemination

We produced three non-technical reports with recommendations for conservation practitioners and policymakers. Each has recommendations about prescribed fires for land managers and a summary of the research findings, the experimental design, and background. Two of the three have recommendations for policymakers. They are posted online: echinaceaproject.org. Each report is based on a paper that will be published in a peer-reviewed scientific journals. We have shared results and recommendations with with local landowners, students, the interested public, land managers, and the scientific community via presentations at in person, at meetings, and in seminars. Throughout the award we posted on our blog about our progress and acknowledged the Environment and Natural Resources Trust Fund following guidelines.

We posted dissemination activities & dissemination products on the Attachments page (Tab 7). We will continue to disseminate results and recommendations to natural resource managers and policymakers and usher the manuscripts through publication with support from S. Wagenius, the Echinacea Project research group, and collaborators J. Beck, Z. Portman, and R. Roy.

Note: Wagenius gave four invited presentations about ENRTF-funded results with recommendations Dec. 2025-March 2026 (two were to land managers and two were at UMN). One slideshow is attached.

Status Update Reporting

Final Status Update January 14, 2026

Date Submitted: May 29, 2026

Date Approved: June 4, 2026

Overall Update

We have produced useful guidelines and recommendations for conservation practitioners and policymakers about how to use prescribed fires to conserve ground-nesting bees, the most important group of pollinators in prairies. Our main experiment provided clear and strong evidence that prescribed fires are critically important for bees. Evidence also reveals that remnants are better habitat than restorations. Even small remnants support substantially greater abundance of bees and greater diversity of bee species compared to restorations. Other experiments provided further information and recommendations about how prescribed fires influence plants, bees, and pollination.

This project experienced unexpected major setbacks right before the scheduled end of project (see Status Update August 14). We were granted additional time to complete the project. During this additional time, budget problems led the Chicago Botanic Garden to lay off Project Manager Stuart Wagenius. In spite of these challenges, we produced recommendations. However, we have not yet submitted our three manuscripts for publication in peer-reviewed scientific journals. We intend to submit the first two during summer 2026 and the other in fall 2026. We also intend to continue disseminating our key recommendations.

Activity 1

The results of the ground-nesting bee experiment (Activity 1) provided useful and strong evidence for making recommendations about prescribed fires in prairie remnants and restorations. Preservation of remnant habitat and management with fire is critically important for bee conservation. The benefits of prescribed burns in prairie remnants for bees exceed benefits of similar burns in restored prairie. We make two policy recommendations: 1) prioritize preservation of remnant prairies and 2) increase use of prescribed fire in both remnant and restored prairies. We also provide management guidelines about how to maintain and increase diversity and abundance of ground nesting bees. We have one paper that is almost ready for submission to a peer-reviewed scientific journals (milestone 6). The recommendations and guidelines are posted online (tab 7) and we will continue to disseminate them to land managers and policymakers (milestone 7).

(This activity marked as complete as of this status update)

Activity 2

Our investigations into effects of prescribed prairie fire on quality and quantity of floral resources (Activity 2) have yielded two one-page non-technical reports, each based on a manuscript in preparation for submission to a peer-reviewed journal. The first report includes 1) the management recommendation to use prescribed fires to increase flowering, pollination, and seed production in many prairie plants and 2) the policy recommendation encouraging prescribed burns of prairie remnants, even small remnants, because they can benefit greatly from fire. The second report has one management recommendation: conduct prescribed burns to increase flowering in prairie plants and pollen for bees. We have two papers almost ready for submission to peer-reviewed scientific journals (milestone 6). The recommendation and guidelines are posted online (tab 7) and we will continue to disseminate them to land managers (milestone 7).

(This activity marked as complete as of this status update)

Dissemination

We produced three non-technical reports with recommendations for conservation practitioners and policymakers. Each has recommendations about prescribed fires for land managers and a summary of the research findings, the experimental design, and background. Two of the three have recommendations for policymakers. They are posted

online: echinaceaproject.org. Each report is based on a paper that will be published in a peer-reviewed scientific journals. We have shared results and recommendations with with local landowners, students, the interested public, land managers, and the scientific community via presentations at in person, at meetings, and in seminars. Throughout the award we posted on our blog about our progress and acknowledged the Environment and Natural Resources Trust Fund following guidelines.

We posted dissemination activities & dissemination products on the Attachments page (Tab 7). We will continue to disseminate results and recommendations to natural resource managers and policymakers and usher the manuscripts through publication with support from S. Wagenius, the Echinacea Project research group, and collaborators J. Beck, Z. Portman, and R. Roy.

Note: Wagenius gave four invited presentations about ENRTF-funded results with recommendations Dec. 2025-March 2026 (two were to land managers and two were at UMN). One slideshow is attached.

Status Update Reporting

Status Update September 1, 2025

Date Submitted: May 29, 2026

Date Approved: June 4, 2026

Overall Update

Dr. Roy at St. Catherine's University finished assessing nutritional composition of nectar and pollen samples. We are writing papers for peer-reviewed scientific journals (milestone 6) and developing guidelines and recommendations for managing ground nesting bees (milestone 7). Due to budget problems at the Chicago Botanic Garden Project Manager Wagenius was laid off. Nonetheless, he will continue to work on the project and expects to deliver all project outcomes.

Activity 1

Dr. Portman at UMN finished identifying the bee specimens collected in emergence traps from 2024. We are writing papers for peer-reviewed scientific journals (milestone 6) and developing guidelines and recommendations for managing ground nesting bees (milestone 7).

Activity 2

Dr. Roy at St. Catherine's University finished assessing nutritional composition of nectar and pollen samples. We are writing papers for peer-reviewed scientific journals (milestone 6) and developing guidelines and recommendations for managing ground nesting bees (milestone 7).

Dissemination

No additional dissemination to report at this time.

Additional Status Update Reporting

Additional Status Update August 14, 2025

Date Submitted: June 25, 2025

Date Approved: June 30, 2025

Overall Update

We had major setbacks because key personnel unexpectedly couldn't contribute in the final months of the project. This means we won't be able to complete key milestones on time: milestones 6 & 7 for Activity 1 and milestones 5-7 for Activity 2. We requested additional time to complete these milestones and make a final report. With additional time, we will be able complete all milestones. The final activities will be completed by people who have been involved in the project and have jobs that allow them to continue on the project after June 30, when funding is done: Roy, Beck, and Wagenius. We will complete the final reporting during November 2025.

Activity 1

Preliminary analyses of the two-year bee nesting dataset are complete and are included in the thesis of Ian Roberts. We are writing papers for peer-reviewed scientific journals (milestone 6) and developing guidelines and recommendations for managing ground nesting bees (milestone 7).

Activity 2

We have just completed our second round of nutritional analysis of pollen and nectar (milestone 5). This involved conducting a lab assay of sugar content in Echinacea nectar collected in 2024 and sending pollen samples to a lab for CHN elemental analysis. We have begun to analyze data and write papers for publication in peer-reviewed scientific journals (milestone 6).

Dissemination

No additional dissemination to report at this time.

Status Update Reporting

Status Update March 1, 2025

Date Submitted: April 23, 2025

Date Approved: April 24, 2025

Overall Update

We wrapped up our second full field season of our two-season investigation of prescribed fire effects on the nesting habitat, food resources, and diversity of ground-nesting bees. We have now organized and entered almost all data gathered this summer. Dr. Roy at St. Catherine's University is assessing nutritional composition of nectar and pollen samples. Dr. Portman at UMN is almost done identifying the bee specimens collected in emergence traps from 2024. We have enlisted new collaborators to help complete the project and to magnify its impact. We have disseminated some preliminary results. We are on track to be able to submit papers to peer-reviewed journals and to make recommendations for prairie management by the end of the award period. In particular for Activity 2, we are in the process of analyzing data and writing papers for publication in peer-reviewed scientific journals (milestone 5) and we are on track to develop and disseminate management guidelines (milestone 6).

Activity 1

We completed our second season of trapping ground-nesting bees (milestone 5) in mid-September, including taking microhabitat measurements to characterize nesting habitat and taking surveys of foraging bees to compare with nesting bees. In November Ian Roberts presented preliminary results at the Entomological Society of America's annual meeting in Phoenix, AZ. Dr. Portman (UMN) has identified almost all bees collected in 2024. Once data are entered, we will begin analysis of the two-year dataset. We made progress on analysis of the broad-scale pan trap surveys our research team began in 2004 to reveal population trends and habitat requirements of numerous bee species. Because our local science teacher retired and we were not able to recruit another local science teacher to supervise local dissemination, we are developing a plan with the superintendent of Douglas County Parks to disseminate results via signs at Rune Stone County Park. This popular park is located within our study area and includes one of our research project's restored prairie sites. Overall, we are on track to write papers for peer-reviewed scientific journals (milestone 6) and develop and disseminate guidelines and recommendations for managing ground nesting bees (milestone 7).

Activity 2

We finished assessing floral resources and wrapped up pollard walks to assess foraging bees in September. We delivered Echinacea pollen and nectar collections to Dr Roy at St. Kate's. Almost all data entry and data quality control related to field collections of pollen and nectar is complete. We sent data about seed set (i.e. pollination success) of plants from 2024 pollinator observations to collaborator Dr. Ison at College of Wooster for analysis. We have finished milestone 4. We collaborated with post-doctoral researcher Grace Hirzel at North Dakota State University to try another method of quantifying the amount of pollen produce per Echinacea floret. Dr. Hirzel completed all lab activities and conducted a preliminary data analysis. We have begun writing a paper for publication in peer-reviewed scientific journal. We did not complete the second round of nutritional analyses (milestone 5) by Feb 28. This delay was caused mostly be the renovation of Dr. Roy's lab building. To compensate for this delay, we recruited an undergraduate student from University of Minnesota to conduct lab assay of sugar content in Echinacea nectar collected in 2024. This project is underway and will serve as the student's honor's thesis research project.

Dissemination

We acknowledged the Environment and Natural Resources Trust Fund through attribution language on communications and outreach, including five posts on the Echinacea Project website (<https://echinaceaproject.org/?s=enrtf>). Postdoctoral researcher Beck acknowledged ENRTF in two presentations to scientists and land managers: The Prairie Enthusiasts meeting (Feb 13 2025) Plant Biology and Conservation at Northwestern University (24 Jan 2025). Graduate student Ian

Roberts presented a poster with preliminary results at the Entomological Society of America's annual meeting in Phoenix, AZ (11 Nov 2024). Ian's poster is here: <https://echinaceaproject.org/live-from-entsoc/>. We will continue to post updates online and acknowledge the Environment and Natural Resources Trust Fund.

Status Update Reporting

Status Update September 1, 2024

Date Submitted: October 10, 2024

Date Approved: October 10, 2024

Overall Update

We completed our second round of spring burns (milestone 4) on time, in spite of challenging weather. We are on track to complete our second season of trapping ground-nesting bees (milestone 5) in mid-September. Dr. Portman identified all bees collected last year and is poised to do it again this fall in time for us to conduct analyses and present preliminary results at the Entomological Society of America's annual meeting in November. We will take soil and litter measurement to characterize nesting habitat in September. The summer we again collaborated with a researcher who is assessing ground-dwelling arthropods and insect predation at these same locations. We are on track to write papers for peer-reviewed scientific journals and develop and disseminate guidelines and recommendations for managing ground nesting bees.

Activity 1

We completed our second round of spring burns (milestone 4) on time, in spite of challenging weather. We are on track to complete our second season of trapping ground-nesting bees (milestone 5) in mid-September. Dr. Portman identified all bees collected last year and is poised to do it again this fall in time for us to conduct analyses and present preliminary results at the Entomological Society of America's annual meeting in November. We will take soil and litter measurement to characterize nesting habitat in September. The summer we again collaborated with a researcher who is assessing ground-dwelling arthropods and insect predation at these same locations. Overall, we are on track to write papers for peer-reviewed scientific journals and develop and disseminate guidelines and recommendations for managing ground nesting bees. We supported three high school interns who helped with all summer field research activities and they gained a great breadth of experience and knowledge about research and prairies. Each had a project, but no formal presentations were made after the summer. One student developed a webpage about common local prairie plants.

Activity 2

Dr. Roy and students at St. Catherine's University assayed nutritional characteristics of pollen and nectar that we collected in summer 2023, thus completing milestone 3. We have completed almost all activities of milestone 4: we finished our second season collecting pollen and nectar from Echinacea, we collected pollen and nectar from other species, we made pollinator observations, and we characterized floral resources at all of our sites. We still have a few more pollard walks to conduct and will finish those in September. We are in the process of entering data, doing quality control, and organizing pollen and nectar collections. We do not yet have any outputs yet. We are on track to reach milestone 5 and complete Activity 2 as scheduled.

Dissemination

We acknowledged the Environment and Natural Resources Trust Fund through attribution language on communications and outreach, including five posts on the Echinacea Project website (<https://echinaceaproject.org/?s=enrtf>) and one post at the Botanic Garden https://www.chicagobotanic.org/blog/plant_science_conservation/burning_garden. We stopped using Twitter (X). So far, post-doctoral researcher Beck gave four presentations that highlighted this project. He was an invited speaker to the Minnesota Master Naturalist program, a "Science Slam" for staff at The Nature Conservancy, and the annual virtual conference for The Prairie Enthusiasts. Beck also presented at the annual meeting of the Botanical Society of America. We will continue to post updates on research progress online and acknowledge the Environment and Natural Resources Trust Fund. Here's a link... <https://echinaceaproject.org/category/experiments/enrtf/>

Status Update Reporting

Status Update March 1, 2024

Date Submitted: March 1, 2024

Date Approved: March 18, 2024

Overall Update

We wrapped up a successful first full field season of our two-season investigation of prescribed fire effects on the nesting habitat, food resources, and diversity of ground-nesting bees. We are in the process of entering and analyzing data gathered this summer. Dr. Roy at St. Catherine's University is assessing nutritional composition of nectar and pollen samples. Dr. Portman at UMN is identifying the 461 bee specimens we collected in emergence traps. We are on track to be able to make recommendations for prairie management.

Activity 1

We completed milestone 3 on time. Last summer we established 1250 random points to place emergence traps across a suite of 20 prairie remnants and 15 prairie restorations to assess fire effects on nesting habitat of ground-nesting bees. We took detailed measurements of soil and litter to characterize nesting habitat. We captured 461 bees & delivered them to Dr. Portman for identification. We collaborated with researchers who are assessing soil, ground-dwelling arthropods, and insect predation at these same locations. Dr. Portman identified all bees collected in 2022 for the pan trap surveys and we are entering that data in preparation for analyses. We are preparing for the 2024 field season, which will start with prescribed burning (timing is weather-dependent)[milestone 4] and then the second round of summer surveys of solitary nesting habitat and diversity [milestone 5].

Activity 2

Milestone 2 is complete. This summer we collected pollen and nectar from 19 sites to measure quantity and quality of pollen and nectar from before and after prescribed burns. Collections were stored in a freezer at the field site and the last ones were delivered to the lab of Dr. Roy at St. Catherine's University in November. Data entry and quality control took longer than expected. Roy began assaying nutritional characteristics of pollen and nectar but we have not completed milestone 3.

Dissemination

We acknowledged the Environment and Natural Resources Trust Fund through attribution language on communications and outreach, including several posts on the Echinacea Project website (<https://echinaceaproject.org/?s=enrtf>) and one tweet on Twitter (X), which we have not been using much. Also, postdoctoral researcher Beck has acknowledged ENRTF in presentations to scientists, land managers, and prairie enthusiasts. We will continue to post updates online and acknowledge the Environment and Natural Resources Trust Fund.

Status Update Reporting

Status Update September 1, 2023

Date Submitted: September 1, 2023

Date Approved: September 28, 2023

Overall Update

We are close to wrapping up a successful first full field season of our two-season investigation of prescribed fire effects on the nesting habitat, food resources, and diversity of ground-nesting bees. This spring we completed prescribed burns in a select sample of remnant prairies and restorations. We are almost done characterizing bee nesting habitat and surveying solitary bees at burned and unburned sites this season, which will enable us to determine how fire affects nesting habitat and solitary bee diversity. We completed surveying flowering plant density at these sites to learn how fire influences the quantity of food resources for bees. To assess how fire affects the nutritional quality of flowers, we collected pollen and nectar from a suite of 19 prairie restorations and remnants, both burned and unburned. These nectar and pollen samples will be assayed in the lab of Dr. Roy. We are on track to be able to make recommendations for prairie management.

Activity 1

This spring we conducted four prescribed burns and coordinated with partners who conducted five prescribed burns, thereby reaching milestone 2. These strategically chosen burns enabled us to establish a suite of 20 prairie remnants and 15 prairie restorations for our assessment of fire effects on nesting habitat of ground-nesting bees. At all of these sites we established random points to place emergence traps and take detailed measures of soil and litter to characterize nesting habitat and diversity of native bees. We are on schedule to complete milestone 3 on time. We collaborated with researchers who will assess soil, ground-dwelling arthropods, and insect predation at these same locations. We finished pinning the bees collected in 2022 for the pan trap surveys that our research team began in 2004 to characterize the population trends and habitat requirements of numerous bee species. Dr. Portman at UMN is currently identifying these specimens.

Activity 2

We surveyed the abundance of flowers in over 30 species at 415 locations across all sites included in activity 1, thereby completing milestone 1. This summer we collected pollen and nectar from 19 sites to measure quantity and quality of pollen and nectar from before and after prescribed burns. To do this we conducted prescribed burns in three additional sites that were not included in activity 1. Collections were stored in a freezer at the field site and then transported to the lab of Dr. Roy at St. Catherine's University. We will soon begin assaying nutritional characteristics of pollen and nectar. We completed milestone 2 and we are on track to complete milestone 3. Data entry for summer field activities is currently in progress.

Dissemination

We acknowledged the Environment and Natural Resources Trust Fund through attribution language on communications and outreach, including several posts on the Echinacea Project website (<https://echinaceaproject.org/?s=enrtf> and several tweets on Twitter (X). Two summer interns from a local high school (West Central Area) conducted projects that will yield a poster and website about prairies and native pollinators that they will share with peers and research partners. We will post updates online and acknowledge the Environment and Natural Resources Trust Fund.

Status Update Reporting

Status Update March 1, 2023

Date Submitted: March 1, 2023

Date Approved: March 2, 2023

Overall Update

We completed fieldwork for the pan-trap survey, which was one of the main research tasks described in Activity 1. The experimental burns serve as the basis of all other activities. Weather conditions prevented us from conducting prescribed burns in Fall 2022. However, we laid the foundation for conducting prescribed burns this spring. We completed a pilot round of nectar collection and are in the process of analysis. This is an essential first step for completing Activity 2.

Activity 1

In summer 2022, we completed fieldwork for the pan-trap surveys that our research team began in 2004 to characterize long-term changes in the abundance, composition, and diversity of native bees as well as assess habitat requirements. Alex Carroll and field technician Geena Zebrasky placed 39 pan traps once per week from July 7 to August 17 for a total of 7 rounds of collection over the summer. We collected 7 coolers filled with vials of bees. Zebrasky also characterized the floral resources surrounding each pan trap. Volunteer Mike Humphrey is currently pinning bees and Carroll is curating the collection. So far, Humphrey has pinned 596 bees with 1.5 coolers remaining. We attempted to burn in fall 2022 but weather conditions were not favorable and we were unable to complete the planned prescribed burn. We are prepared to burn this spring and are in the process of developing burn plans and coordinating with landowners which will allow us to successfully implement burns during spring 2023.

Activity 2

During summer 2022, we surveyed the density of flowering plants of four focal plant species: *Asclepias viridiflora*, *Liatris aspera*, *Lilium philadelphicum*, and *Echinacea angustifolia* in a subset of sites. We also made nectar collections from *E. angustifolia* ($n = 106$) and *L. aspera* ($n = 8$) as part of a pilot study to develop sampling methods for assessing fire effects on nutrients in nectar. Analyses of these samples began in February 2023 in the lab of Dr. Roy at St. Catherine's University. This pilot study will allow us to efficiently scale up during summer 2023 and meet the objectives outlined in Activity 2.

Dissemination

We acknowledged the Environment and Natural Resources Trust Fund through attribution language on all communications and outreach, including a synopsis of the pan trap project (<https://echinaceaproject.org/2022-update-pollinators-on-roadsides/>) and nectar collection (<https://echinaceaproject.org/2022-update-nectar-experiment/>) on the Echinacea Project website and 7 tweets on Twitter. In February 2023, we shared our plans for experimentally burning prairies with other researchers via zoom. We explored possibilities of other researchers using the experimental design to learn about fire effects on other organisms and ecological processes. Such new knowledge could help us provide better recommendations for prairie management. We shared the video with potential collaborators.