Environment and Natural Resources Trust Fund

2026 Request for Proposal

General Information

Proposal ID: 2026-040

Proposal Title: A Restoration Dashboard for Seeding Better Prairies

Project Manager Information

Name: Daniel Larkin

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

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Project Basic Information

Project Summary: Create an online tool to help managers improve prairie restorations. The tool evaluates plant species in existing seed-mixes and restorations and offers guidance on cost-effective improvements to better meet goals.

ENRTF Funds Requested: $496,000

Proposed Project Completion: June 30, 2029

LCCMR Funding Category: Land (F)

Project Location

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

Statewide

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

Statewide

When will the work impact occur?

During the Project and In the Future

Narrative

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

Minnesota's a leader in ecological restoration. Prairies have been a particular focus: <1% of Minnesota's native prairie remains, making restoration essential. Each restoration is an opportunity to maximize the benefits prairies provide, and returns on investment by LCCMR/ENRTF and others.

The extent to which benefits are achieved hinges on factors managers can control (e.g., weed management) and others that they can't (e.g., post-seeding precipitation). A key factor—and one practitioners directly influence—is plant species composition: which species are established in a site. Many restoration decisions concern composition: What seeds should be in mixes? Are native-diversity targets being met? Should an older restoration be enhanced through "interseeding" (seeding in additional species)?

Minnesota's investments have produced excellent resources to support practitioners' decision-making, including BWSR seed mixes, restoration guidance from MNDNR, and cutting-edge research on how different species combinations contribute to ecological goals. However, this information is fragmented across multiple sources. Practitioners need user-friendly ways to leverage these resources.

Current seed-mix design is often based on simply increasing diversity, resulting in mixes with expensive or difficult-to-germinate species that don't succeed in restored prairies. This tool will help managers make purposeful species-level decisions to improve performance while controlling costs.

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 an online tool to help practitioners make better restoration decisions. We will bring together researchers and restoration experts from state/local government, not-for-profit organizations, and the private sector. Working with stakeholders serving on a technical advisory committee, we will prioritize tool features, identifying the features most critical to end-users that are needed to drive adoption.

The tool's backend will host rich ecological data for prairie plants, enabling flexible evaluation of user-supplied vegetation and seed-mix data. A dashboard will provide key measures that practitioners rely on, such as plant-diversity, floristic-quality, functional-group, and pollinator-support metrics. It will also offer information about factors shown to be influential in ecological research that are emerging as considerations in restoration practice, such as functional and phylogenetic diversity (respectively, variation in traits and branches of the 'tree of life' that plant species represent).

Managers seeking suggestions on species to add to mixes will be offered cost-effective, practical guidance. Considerations will include typical prices for species' seeds, which varies widely, and their habitat requirements. This will facilitate suggestions that are affordable and site-appropriate. Suggestions informed only by ecological criteria can be impractical because of ballooning costs. Our aim is the sweet spot where performance meets practicality.

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?

The project will produce an online tool that prairie restoration managers can use to improve their seed mixes by maximizing diversity and functionality while minimizing cost. This has applications to both new restorations and enhancement of existing restorations through interseeding: the tool can be used to evaluate the vegetation in existing restorations and recommend species to add. This will be a browser-based tool that is free to use. The principles and framework used in this project could be adapted to address additional priority habitats, such as wetlands or savannas.

Activities and Milestones

Activity 1: Leveraging a Technical Advisory Committee

Activity Budget: $99,200

Activity Description:
Even the best ideas can fail to catch on. We have worked on or seen decision-support tools for natural-resource managers that did not reach threshold levels of adoption. Thus, from the start of this project, we will focus on understanding and prioritizing end-user needs. We will move quickly to form a Technical Advisory Committee (TAC) and convene its first meeting to determine the top objectives for the tool and identify the key information needs. The TAC will be chaired by ecologists from a not-for-profit partner, the Friends of the Mississippi River (FMR), a leader in restoration in Minnesota. The chairs will be tasked with recruiting members of the TAC, recruiting additional participants to pilot the tool, and creating and administering a survey of pilot participants to identify areas for improvement. The membership of the TAC will include resource managers from state and local agencies and restoration consultants and seed vendors from the private sector. This will provide comprehensive feedback from those who guide how restoration operates, to those who grow the seed for restoration mixes, to those who seed prairies. The TAC will be engaged regularly throughout the duration of the project to ensure accountability to user-experience and practical considerations.

Activity Milestones:

Description	Approximate Completion Date
Finalize membership and hold first meeting of the Technical Advisory Committee	December 31, 2026
Identify user priorities and develop design plan for the online tool	July 31, 2027
Engage and survey pilot participants of the tool	July 31, 2028

Activity 2: Developing the restoration design and evaluation tool

Activity Budget: $297,600

Activity Description:
Developing a tool for seeding decisions requires substantial effort. Postdoctoral and doctoral researchers will develop the tool and assemble underlying datasets under the team's guidance.

The tool's backend will hold comprehensive data about Minnesota's prairie flora. Precisely which datasets will be shaped by Activity 1; however, likely features include plant species' costs; habitat requirements (sun, soil, and moisture needs); and the services they provide (e.g., supported pollinators, functional traits, and phylogenetic diversity).

The interface will allow users to interact with these datasets. Users will upload their own data (candidate seed mixes and/or surveys of vegetation in an enhancement site). The tool will report back key metrics on what they have, providing quick access to comprehensive ecological evaluation that, depending on the metric, ranges from cumbersome to impossible for users to calculate themselves with readily accessible tools like spreadsheets.

For users wanting to go further, the tool will offer suggestions of which species they could add to seed mixes for new restorations or for interseeding to get the biggest bang for their buck. Suggestions will be customized based on user objectives and filtered by habitat criteria and cost so that the species being suggested are appropriate and cost-effective.

Activity Milestones:

Description	Approximate Completion Date
Build out tool back-end of Minnesota prairie plant species data	July 31, 2027
Create first draft of tool for pilot participants to use	July 31, 2028
Revise tool based on pilot participants' feedback	June 30, 2029

Activity 3: Outreach to restoration practitioners

Activity Budget: $99,200

Activity Description:
Once we have built and refined the tool, we will engage with the broader community of restoration practitioners. We will give presentations on the tool at regional restoration-oriented conferences and through the Improving Restorations webinar series jointly hosted by the PI's restoration extension team and the MN DNR. We will leverage the TAC to promote the tool to colleagues and their professional networks. And we will offer training sessions to teach new users how to use the tool.

Activity Milestones:

Description	Approximate Completion Date
Presentations and training sessions to encourage adoption of the tool	June 30, 2029

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Rebecca Barak	Chicago Botanic Garden	Expertise in prairie restoration and plant ecology. Will consult on tool design and datasets; contribute to analysis, interpretation, and communication of findings; be available to help mentor postdoc and doctoral student; and bring a broader geographic perspective and insights to the project.	No
Chelsey Blanke	University of Minnesota College of Food, Agricultural and Natural Resources Sciences	Expertise in ecological restoration. Will help coordinate the project, will contribute to all activities, and will co-lead outreach and engagement.	Yes
Daniel Cariveau	University of Minnesota College of Food, Agricultural and Natural Resources Sciences	Expertise in pollinators and prairie restoration. Will consult on tool design and datasets; help leverage resources related to vegetation-wild bee relationships; contribute to analysis, interpretation, and communication of findings; be available to help mentor postdoc and doctoral student.	Yes
Andrew Hipp	The Morton Arboretum	Expertise in prairie flora, restoration, and phylogenetics. Will consult on tool design and datasets; contribute to analysis, interpretation, and communication of findings; be available to help mentor postdoc and doctoral student; and bring a broader geographic perspective and insights to the project.	No
Forest Isbell	University of Minnesota College of Biological Sciences	Expertise in plant biodiversity, ecology, and restoration. Will consult on tool design and datasets; help leverage resources related to biodiversity-ecosystem function relationships; contribute to analysis, interpretation, and communication of findings; be available to help mentor postdoc and doctoral student.	Yes
Jesús Pinto-Ledezma	University of Minnesota College of Biological Sciences	Expertise in biodiversity and analysis of ecological big data. Will advise graduate student researcher and help mentor postdoc. Will consult on tool design and datasets and contribute to analysis, interpretation, and communication of findings.	Yes
Alex Roth	Friends of the Mississippi River	Co-chairing the technical advisory committee, contributing subject matter expertise, recruiting members of the TAC, recruiting additional participants to pilot the tool, creating and administering a survey of pilot participants to identify areas for improvement, encouraging adoption of the tool through outreach and engagement	Yes
Julia Leone	Friends of the Mississippi River	Co-chairing the technical advisory committee, contributing subject matter expertise, recruiting members of the TAC, recruiting additional participants to pilot the tool, creating and administering a survey of pilot participants to identify areas for improvement, encouraging adoption of the tool through outreach and engagement	Yes
Daniel Shaw	Board of Water & Soil Resources	State lead on development of restoration seed mixes. Will contribute expertise in seed-mix design and restoration practice and ensure alignment with state guidance and relevant initiatives of BWSR and other agencies.	No

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If

additional work is needed, how will this work be funded?
The online tool will be created and we will begin outreach to Minnesota restoration professionals within the project timeline. Continued hosting, maintenance, and updating of the tool, and outreach/engagement with users, will be supported by the project manager as part of his ecological restoration research and extension program. Additional funding requests to LCCMR or other funding sources may be considered, for example, to extend the tool to additional habitat type(s). Initial investment in this tool would be recouped over time through future cost savings from spending state funding for prairie restoration more effectively and efficiently.

Project Manager and Organization Qualifications

Project Manager Name: Daniel Larkin

Job Title: Professor & Extension Specialist

Provide description of the project manager's qualifications to manage the proposed project.
Daniel Larkin is a Professor & Extension Specialist in the Department of Fisheries, Wildlife and Conservation Biology at the University of Minnesota-Twin Cities. He and his research team work on applied challenges in ecological restoration and invasive plant management in terrestrial, wetland, and aquatic habitats. Through extension, he trains volunteers and professionals to support ecological restoration and invasive species response efforts. Dan has a Ph.D. in Botany from the University of Wisconsin-Madison and studied Biology as an undergraduate at the University of California, Santa Cruz.

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

Organization Description:
The mission of the Department of Fisheries, Wildlife and Conservation Biology is to inspire and create solutions for biological conservation and management in a diverse and changing world.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Daniel Larkin/Professor		Project manager, research, supervision			36.6%	0.09		$22,473
Jesus Pinto Ledezma/Assistant Professor		Research, supervision			36.6%	0.09		$15,079
Daniel Cariveau/Associate Professor		Research, supervision			36.6%	0.09		$20,024
Forest Isbell/Associate Professor		Research, supervision			36.6%	0.09		$19,382
Chelsey Blanke/Research Fellow		Project coordination, co-lead outreach and engagement, contribute to all activities			36.6%	0.6		$60,801
Graduate Research Assistant		Graduate student contributing research to tool development and testing. Graduate student fringe is 23.2% + tuition at $23.08/hr, totaling $39,722			23.5%	1		$132,394
Postdoctoral researcher		Lead development of the tool and contribute to all activities			25.9%	2.25		$199,256
							Sub Total	**$469,409**
Contracts and Services								
Friends of the Mississippi River	Service Contract	Chairing the technical advisory committee (TAC), contributing subject matter expertise, recruiting members of the TAC, recruiting additional participants to pilot the tool, creating and administering a survey of pilot participants to identify areas for improvement, encouraging adoption of the tool through outreach and engagement				0.15		$17,860
							Sub Total	**$17,860**
Equipment, Tools, and Supplies								

	Tools and Supplies	General operating supplies	Office and other miscellaneous supplies needed to manage project, host meetings, etc.					$671
	Tools and Supplies	Software	Software needed to conduct research and develop tool					$800
							Sub Total	**$1,471**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	10 trips per year averaging 60 miles per trip	Travel within Minnesota for members of the project team to meet with stakeholders					$1,260
							Sub Total	**$1,260**
Travel Outside Minnesota								
	Conference Registration Miles/ Meals/ Lodging	Conference attendance and associated costs and fees for one person to present at one conference	For an early-career team member to present present project findings at a restoration-oriented regional or national conference	X				$2,000
							Sub Total	**$2,000**
Printing and Publication								
	Publication	Publication fees for project manuscript	To disseminate project findings to the broader ecological restoration community					$2,500
	Printing	Printing charges for outreach materials	Printing of materials for meetings and outreach/engagement with restoration practitioners					$1,500
							Sub Total	**$4,000**
Other Expenses								

							Sub Total	**-**
							Grand Total	**$496,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Travel Outside Minnesota	Conference Registration Miles/Meals/Lodging	Conference attendance and associated costs and fees for one person to present at one conference	These expenses would be to participate in formal presentation of project findings

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	**-**
Non-State				
			Non State Sub Total	**-**
			Funds Total	**-**

Total Project Cost: $496,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: ac89c6aa-b1f.pdf

Alternate Text for Visual Component

Visual illustration of how the restoration dashboard will work...

Supplemental Attachments

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

Title	File
UMN approval	41acd397-2be.pdf
BWSR Support Letter	82e693bc-031.docx

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I understand the UMN Policy on travel applies.

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

Yes

Does the organization have a fiscal agent for this project?

No

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing $10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

Rebecca Barak (Chicago Botanic Garden), Chelsey Blanke (UMN), Dan Cariveau (UMN), Andrew Hipp (Morton Arboretum), Forest Isbell (UMN), Julia Leone (Friends of the Mississippi River), Jesús Pinto Ledezma (UMN), Patrick McDonald (UMN), Alex Roth (FMR), Dan Shaw (Board of Water & Soil Resources)

Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements

Yes, I understand