Environment and Natural Resources Trust Fund

2024 Request for Proposal

General Information

Proposal ID: 2024-251

Proposal Title: Effects of Conservation Grazing on Solar Pollinator Habitat

Project Manager Information

Name: Daniel Tix

Organization: Minnesota Native Landscapes

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Project Basic Information

Project Summary: This research will analyze the effects of sheep grazing and mowing on the vegetation of solar sites that have been managed for pollinator habitat

Funds Requested: $88,000

Proposed Project Completion: December 31, 2028

LCCMR Funding Category: Small Projects (H)

Secondary Category: Foundational Natural Resource Data and Information (A)

Project Location

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

Region(s): Central, Metro,

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

Region(s): Central, Metro,

When will the work impact occur?

During the Project

Narrative

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

The state of Minnesota is promoting that solar facilities install and manage native, pollinator-friendly vegetation on their new site developments. This has been promoted as an option to generate low carbon solar energy while improving soil, enhancing pollinator habitat, and reducing run-off. However, vegetation under the solar panels requires maintenance to keep the plants below the panels, ensure access, and to prevent noxious and invasive species. Solar site managers have used mowing and sheep grazing to limit the height of the vegetation. Therefore, it is important to investigate if reintroducing vegetation and managed grazing at existing solar sites can successfully restore or maintain vegetation and other ecological and hydrological functions of the soil. Considering the costs of installing and maintaining native vegetation at solar sites, it is important to consider the implications of different management techniques on vegetation and soils. Furthermore, this study will investigate how sheep grazing can be used in association with solar developments and native vegetation while also supporting local agricultural producers, sustainable food production, and rural economies.

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.

To better understand the effects of management techniques on diverse native vegetation and soils under solar panels, we will investigate the changes in vegetation and in soil nutrient, physical, and hydrologic properties. Findings from these assessments can be used to optimize the environmental and financial outcomes of the co-location of solar, grazing, and native vegetation. This ultimately will determine whether the strategy is viable and will help guide the development of native seed mixes and management practices on solar sites.

Our study will compare vegetation and soils that are grazed by sheep to areas that are mown and an untreated control. In each of these treatments, we will analyze species diversity, biomass accumulation, and soil properties. Data will be used to assess the effects of treatments on native plants included in seed mixes and the impacts that biomass accumulation can have on mitigating wildfire risks. The study will also document grazing intensity and duration to understand the potential benefits to the sheep industry. The experimental design will be developed in collaboration with Temple University who will be focused on the soil physical and chemical properties.

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?

Findings from these assessments can be used to optimize the environmental and financial outcomes of the co-location of solar, grazing, and native vegetation. This ultimately will determine whether the strategy is viable and will help guide the development of native seed mixes and management practices on solar sites. In addition, this study will improve our understanding of native species, native seed mixes, and management practices in pollinator-friendly habitats. As the state continues to recommend these practices, this project will help to provide practical, scientific evidence to support future recommendations.

Activities and Milestones

Activity 1: Experimental Design, Set-up, and Mowing Operations

Activity Budget: $23,800

Activity Description:
Temple University scholars will provide their experimental design to MNL to review. MNL ecologists will develop a specific vegetation sampling protocol to collect biomass data, plant species composition, and species diversity. The intention will be to ensure that the soils data and the experimental design from Temple's research will be correlated with vegetation data collected by MNL ecologists and can be incorporated into the experiment. The design and logistics of the installation will also be coordinated with staff from Enel (the owners) to ensure that the study aligns with their management approach and does not interfere with solar generation operations.

The study plots will then be set-up in the field, as necessary. This will include planning the timing of the grazing and mowing and ensuring that fencing is in place around the ungrazed and mown plots. This activity includes the cost of the installation of fencing and the cost of annual mowing, which is not currently planned at the solar sites in this study.

Grazing will occur regardless of this experiment as part of Enel's standard maintenance, so it is not included as an activity or expense. The mowing activity will be completed in small enclosures.

Activity Milestones:

Description	Approximate Completion Date
Finalize site design and provide to fencing installation crew	July 31, 2024
Install all fencing at each site prior to grazing for the season.	July 31, 2024
Complete mowing at each site in mown experimental area each year	September 30, 2028

Activity 2: Annual Vegetation Monitoring

Activity Budget: $46,500

Activity Description:
Trained ecologists will complete vegetation monitoring each year within the designated treatment areas following the specific vegetation monitoring protocol. Vegetation monitoring will be completed by ecologists with plant identification skills that must be verified with voucher specimens or photographs and checked by the Senior Restoration Ecologist or other senior-level botanist.

Vegetation monitoring will be conducted before grazing or mowing operations, when feasible. If monitoring occurs after the treatment for that year, that location will be a priority for earlier analysis or later treatments the following year. No site will be treated before the monitoring in two consecutive years.

In addition, as part of the companion study with Temple University, this project includes soil sampling by the same ecologists that are completing the vegetation monitoring. Soil samples will be collected in transects perpendicular and under the solar arrays to better understand the impacts of the solar panels on the soil properties in addition to the impacts of grazing.

Activity Milestones:

Description	Approximate Completion Date

Annual vegetation monitoring in August each year	August 31, 2028
Processing annual vegetation monitoring data in each	December 31, 2028

Activity 3: Final Report and Presentations

Activity Budget: $17,700

Activity Description:
After the final year of monitoring, the data from each year will be compiled to show changes in plant communities over the course of the experiment. These data will be summarized in a final report. Scholars from Temple University will complete statistical analyses and incorporate the findings into scholarly journal articles. The findings will also be summarized in a series of presentations to be delivered to appropriate conferences and in written publications. The final report will also be made available to the Minnesota Vegetation Management Plan Working Group and other interested local officials.

It is expected that the ecologists at MNL will present findings from this study at two conferences, at a minimum. These may include industry trade shows or professional conferences that are attended by staff from state agencies, solar industry, consultants, and other contractors. The conferences are expected to occur within the state of Minnesota.

Activity Milestones:

Description	Approximate Completion Date
Conference presentations	December 31, 2028

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Sujith Ravi	Temple University	Collaborating Research, Principal Investigator	No
Jesse Puckett	Enel - North America, Inc.	Solar Array Land Manager and Owner Representative	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 results of our study will be shared with solar and energy industry groups; engineering and environmental consulting firms; native seed suppliers and installation contractors; land management contractors; sheep producers and grazing operations; and state and local agencies that regulate solar and energy development throughout the state. The project will include presentations at a minimum of two conferences. Our partner, Temple University, is expected to prepare peer-review research papers. Enel – North America, Inc., another partner, will utilize the recommendations from this study for their solar sites.

The proposed timeline is designed to allow adequate time for observable variations.

Project Manager and Organization Qualifications

Project Manager Name: Daniel Tix

Job Title: Senior Restoration Ecologist

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

Dan has PhD in ecological restoration with a research focus on plant community and nutrient dynamics in a restored prairie under different management methods. He has over 20 year of experience completing botanical assessments and monitoring on restoration sites; rare species surveys; calcareous fen identification; Floristic Quality Assessments (FQA); and plant community mapping. This experience includes monitoring potential indirect impacts of wetland plant communities and rare species populations due to effects of nearby groundwater drawdowns and due to other modifications or impacts to the wetlands. Dan is also experienced with management and maintenance of ecological restoration sites, which has included identification of seedlings and planning for management activities.

Organization: Minnesota Native Landscapes

Organization Description:

MNL is a full-service ecological restoration company. Our services include the installation of seeds and live plants into pollinator-friendly plantings and restorations of prairie, savanna, forest, and wetland. We manage native pollinator-friendly vegetation on many industrial solar sites and help them with planning for future plantings and management of native species on their sites. MNL complete industry leading research to help to develop the technologies to improve these plantings and to improve management strategies that help to restore our lands and heal the earth.

MNL has a goal to positively impact over 10 million acres of land by 2030 through our direct actions and through the actions of our Mission Partners. Our professional services and research is intended to help support that goal and extend the reach of our impact.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Senior Restoration Ecologist		Project manager and lead researcher			14%	0.2		$29,100
Staff Ecologist		Data collection, processing, summarizing, and drafting reports			17%	0.4		$34,600
Field laborer		Set-up grazing exclusions, mowing operations			20%	0.1		$6,200
							Sub Total	**$69,900**
Contracts and Services								
							Sub Total	-
Equipment, Tools, and Supplies								
	Equipment	Fencing	exclusion for grazing animals					$12,000
	Tools and Supplies	Field tablet rental; with GPS capabilities and data collection apps; $20/day; 40 days in field total	Monitoring data collection and processing					$800
							Sub Total	**$12,800**
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Conference Registration Miles/ Meals/ Lodging	4 conference registrations (2 people @ 2 confences) @ $400 ea; 200 miles each @$0.655/mi; 4 overnights total @ $182.5 meals/lodging	presentation of data					$2,900

	Miles/ Meals/ Lodging	Mileage to sites; 200 miles total per trip; @ $0.655; 18 total trips	study sites access each year for 5 years					$2,400
							Sub Total	**$5,300**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
							Sub Total	**-**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$88,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request

Non ENRTF Funds

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

Attachments

Required Attachments

Visual Component

File: 195237c6-45d.pdf

Alternate Text for Visual Component

Overview of Project Site Locations...

Optional Attachments

Support Letter, Photos, Media, Other

Title	File
Enel North America Letter of Support	492b9cec-097.pdf
Ravi Letter of Support	16d1768d-fdf.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

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

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 design, construction, or renovation of a building, trail, campground, or other capital asset costing $10,000 or more?

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?

No