



Environment and Natural Resources Trust Fund

M.L. 2020 Approved Work Plan

General Information

ID Number: 2020-023

Staff Lead: Michael Varien

Date this document submitted to LCCMR: August 13, 2021

Project Title: Expanding Minnesota Ecological Monitoring Network

Project Budget: \$800,000

Project Manager Information

Name: Erika Rowe

Organization: MN DNR - Ecological and Water Resources Division

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Project Reporting

Date Work Plan Approved by LCCMR: August 13, 2021

Reporting Schedule: April 1 / October 1 of each year.

Project Completion: June 30, 2024

Final Report Due Date: August 14, 2024

Legal Information

Legal Citation: M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 03b

Appropriation Language: \$800,000 the second year is from the trust fund to the commissioner of natural resources to improve conservation and management of Minnesota's native forests, wetlands, and grasslands by expanding the partially established long-term Ecological Monitoring Network that will provide critical knowledge of how ecosystem dynamics and conditions change through time.

Appropriation End Date: June 30, 2024

Narrative

Project Summary: This project proposes to expand the Ecological Monitoring Network by establishing an additional 250 plots to inform the conservation and management of Minnesota's native forests, wetlands, and grasslands.

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

Most of the information collected on Minnesota's native plant communities was from surveys done at a single point in time. Invaluable as this data is, it was not collected for the purpose of repeatable or comparative analysis. While this information establishes a critical foundation for an understanding of the types and amounts of native plant communities we have and where they occur, it does not provide information about how plant communities change through time. The information collected by this project will provide objective, ground-based data collected systematically over time across many different ownerships and native plant communities from randomly selected, permanently marked plot locations, including from the metropolitan area. Our statistically designed protocols, which have been tested during the first phase of this project, are intended to provide detailed information on all plant species present at plot locations, from the ground layer to the canopy; something that other similar projects are not doing. In addition, information on bees and butterflies will also be collected at a limited number of plots that use these native plant communities.

What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.

Information from the resurvey of these established monitoring plots can serve as an early warning system about the effects of invasive species, extreme weather effects, land use changes, and other stressors on native vegetation. Informed decisions about how to best manage and conserve native habitats rely on detailed vegetation data collected from these kinds of monitoring plots, something that is currently not available. This project will build on work begun by the Minnesota Biological Survey Program (MBS) with 2016 ENRTF funding to design a monitoring program to track status and trends in Minnesota's prairies, forests and wetlands, including additional metropolitan natural area plots. With the help of many collaborators, methods were developed and tested, and the first 100 of 600 monitoring plots were installed to begin building the Ecological Monitoring Network. This network of plots is designed to be available to others conducting ecological and related research in Minnesota. Already, collaborators at the University of Minnesota are sampling lichens and mosses on a subset of these plots, and efforts to attract additional collaborators will continue. The goal of this project is to provide detailed data on the health of Minnesota's native habitats in a variety of formats.

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 data gathered on vegetation and other metrics from monitoring plots in this network will be available to natural resource agencies, organizations, landowners, and the public. Examples of results from this project that could inform management and conservation decisions include the effects of warming temperatures on plant communities, effects of increased flooding on wetlands, impacts from earthworms and other invasives on forests, and documenting changes in dominant canopy trees in forests. We will install a minimum 250 plots to help reach the minimum number of plots needed to provide scientific, repeatable statewide data and deliver project results in several formats.

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

Activities and Milestones

Activity 1: Complete Installation of 250 New Plots

Activity Budget: \$750,000

Activity Description:

Install 250 new plots to the existing network of 125 plots established in the ML16 project. Data will be collected on all plant species, and depending on the vegetation type of each plot, variables such as deer browse, coarse woody debris, water chemistry, and grassland structure will be collected. A new database will be developed and added to the existing Natural Heritage Information System, so that data will be more easily accessible to the public. Data collected will be entered into the database at the end of each field season. Plant collections will be processed and delivered to the UMN for accession in permanent collections.

Activity Milestones:

Description	Completion Date
Database developed and incorporated into the Natural Heritage Information System	April 30, 2023
Data collected at 250 newly established monitoring plots (80-85 plots each summer)	September 30, 2023
Data entered into the Ecological Monitoring Network Database	April 30, 2024
Specimen preparation and delivery of specimens to museum collections	June 30, 2024

Activity 2: Data Distribution, Education and Outreach

Activity Budget: \$50,000

Activity Description:

Results will be published on the DNR Ecological Monitoring Network website. Report forms including Individual site data will be sent to the owners or managers of the land where each site is located. A written report summarizing all of the collected data will be available on the website. Presentations to nonprofit organizations, natural resource managers, and universities will be made to inform audiences of monitoring results and recruit other researchers to use the network.

Activity Milestones:

Description	Completion Date
Annual summary reports distributed to landowners or managers after each field season	February 28, 2024
Descriptions of the project's methods, initial findings posted on project website	June 30, 2024
Conduct public outreach and technical guidance activities.	June 30, 2024

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Division of Forestry	MN DNR	Help with initial project objectives, providing help with land access, staffing in the field.	No
Division of Parks and Trails	MN DNR	Help with initial project objectives and study design, providing help with land access, staffing in the field.	No
Division of Fish and Wildlife	MN DNR	Help with initial project objectives and study design, providing help with land access, staffing in the field.	No
The Nature Conservancy	The Nature Conservancy	Help with initial project objectives and study design, providing help with land access, staffing in the field, potential collaboration with additional research at plots on their land.	No
College of Food, Agricultural and Natural Resource Sciences	University of Minnesota	Staff, primarily within the Department of Forest Resources helped with original study design and objectives. We see potential for future research or statistical analysis collaboration on monitoring plots. Data collection on lichens and mosses has already begun at a select number of our plots by U of MN researchers.	No
U.S. Fish & Wildlife Service	Department of the Interior	Helped with initial study design and objectives, assistance with land access and permits, potential future partner for additional research on plots placed on their land.	No
U.S. Forest Service	Department of Agriculture	Helped with initial study design and objectives, assistance with land access and permits, potential collaborator on future additional research on plots within their ownership.	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.

All of the information on the web page for this project will be continually updated, including revised brochures, revisions to the Standard Operating Procedures, and

information from data analyses. The web site address is:

<https://www.dnr.state.mn.us/mbs/ecologicalmonitoring/index.html>

Reports summarizing data collected in each plot will continue to be sent to the respective landowner or land manager for each plot following each field season. PowerPoint presentations will be revised and presented at a number of venues to make natural resource managers, scientists, and the general public aware of project outcomes and its long term importance.

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

Long-Term Implementation and Funding

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

The DNR is actively developing long-term cooperative funding for sustaining this Ecological Monitoring Network over

time. Resampling plots will take considerably less time and resources compared to initial installation, and will be incorporated into the work of the DNR MBS Program.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Statewide Monitoring Network for Changing Habitats in Minnesota	M.L. 2016, Chp. 186, Sec. 2, Subd. 03d	\$500,000

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Plant Ecologist/Botanists		Field and Data Leads			28%	2.25		\$240,000
Plant Ecologist/Botanist		Field and Data Specialist			27%	4.5		\$270,000
Data/Specimen Manager		Data specialist			27%	0.03		\$8,000
Information Outreach Specialist		Data delivery and outreach manager			30%	0.03		\$8,000
Interns		Field assistants			0%	2.25		\$70,200
							Sub Total	\$596,200
Contracts and Services								
MN Information and Technology Services (MN IT)	Sub award	Service level agreements for project database development and enhancement, website development				0.9		\$35,000
							Sub Total	\$35,000
Equipment, Tools, and Supplies								
	Equipment	Field equipment will be reused from previous projects to the extent possible. Additional supplies needed include meter tapes, waterproof notebooks, insect/tick repellent, safety vests; plot marking supplies such as rebar, magnets and magnetized nails, witness tree tags; measuring tools such as tree calipers, rulers, water chemistry meters and calibration supplies, pvc pipes for marking plots in wetlands, compasses, GPS receivers; plant, insect, soil specimen collecting and preservation supplies.	Supplies needed for three 3-person crews for three field seasons to collect data and permanently mark 500 monitoring plots					\$10,000
							Sub Total	\$10,000

Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Travel for three 3-person crews for 1.5 field seasons to install and sample monitoring plots; 225 field days, 36,000 miles. Vehicles (\$19,000), lodging (\$76,838), and meals (\$2,500) in accordance with the Commissioner's Plan.	Each team will require one vehicle (3 total) for the summer to access plots across the state; Each team will need access to lodging/hotels while in transit during the week; and reimbursement for meals while in transit.					\$98,338
							Sub Total	\$98,338
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
							Sub Total	-
Other Expenses								
		Direct and necessary costs to cover HR support (\$13,908), Safety Support (\$2,517), Financial Support (\$8,429), Communication Support (\$1,388), IT Support (\$33,082), and Planning Support (\$1,138).	These funds are needed to pay other DNR personnel for things like HR and IT.	X				\$60,462
							Sub Total	\$60,462
							Grand Total	\$800,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Other Expenses		Direct and necessary costs to cover HR support (\$13,908), Safety Support (\$2,517), Financial Support (\$8,429), Communication Support (\$1,388), IT Support (\$33,082), and Planning Support (\$1,138).	Direct and necessary costs reflect the amounts directly related to and necessary for accomplishing the project outcomes that would not exist but for the receipt of the appropriation.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
Cash	Heritage Enhancement Fund	Funds the Research Scientist/Coordinator Lead for the project.	Pending	\$304,000
Cash	General Fund dollars	Supervision, project oversight, guidance	Pending	\$100,000
			State Sub Total	\$404,000
Non-State				
Cash	Federal State Wildlife Grant appropriations	Much of the proposed ENRTF funds qualify as State match these appropriations.	Pending	\$100,000
Cash	US Forest Service additional funds	Money to support the project and install additional plots on Superior National Forest lands.	Pending	\$15,000
			Non State Sub Total	\$115,000
			Funds Total	\$519,000

Attachments

Required Attachments

Visual Component

File: [6addd069-d21.pdf](#)

Alternate Text for Visual Component

Statewide map showing the location of plots already established with ML 2016 Appropriation and a depiction of what the plot layout looks like on the ground....

Optional Attachments

Support Letter or Other

Title	File
2021 ENTRF Background Check Certification Form FINAL	001cc2d9-73e.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

Amended budget from original proposed amount to recommended amount of \$800,000. We will also be including additional prairie plots and metro plots as well as ensuring that under-represented counties statewide also have 1 or more plots for the upcoming funding cycle, per LCCMR staff contingencies. Also, reduced the amount of proposed plots for the funding cycle from 500 to 250 to reflect reduced budget plan.

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 agree travel expenses must 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 agree to the Commissioner's Plan.

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?

No

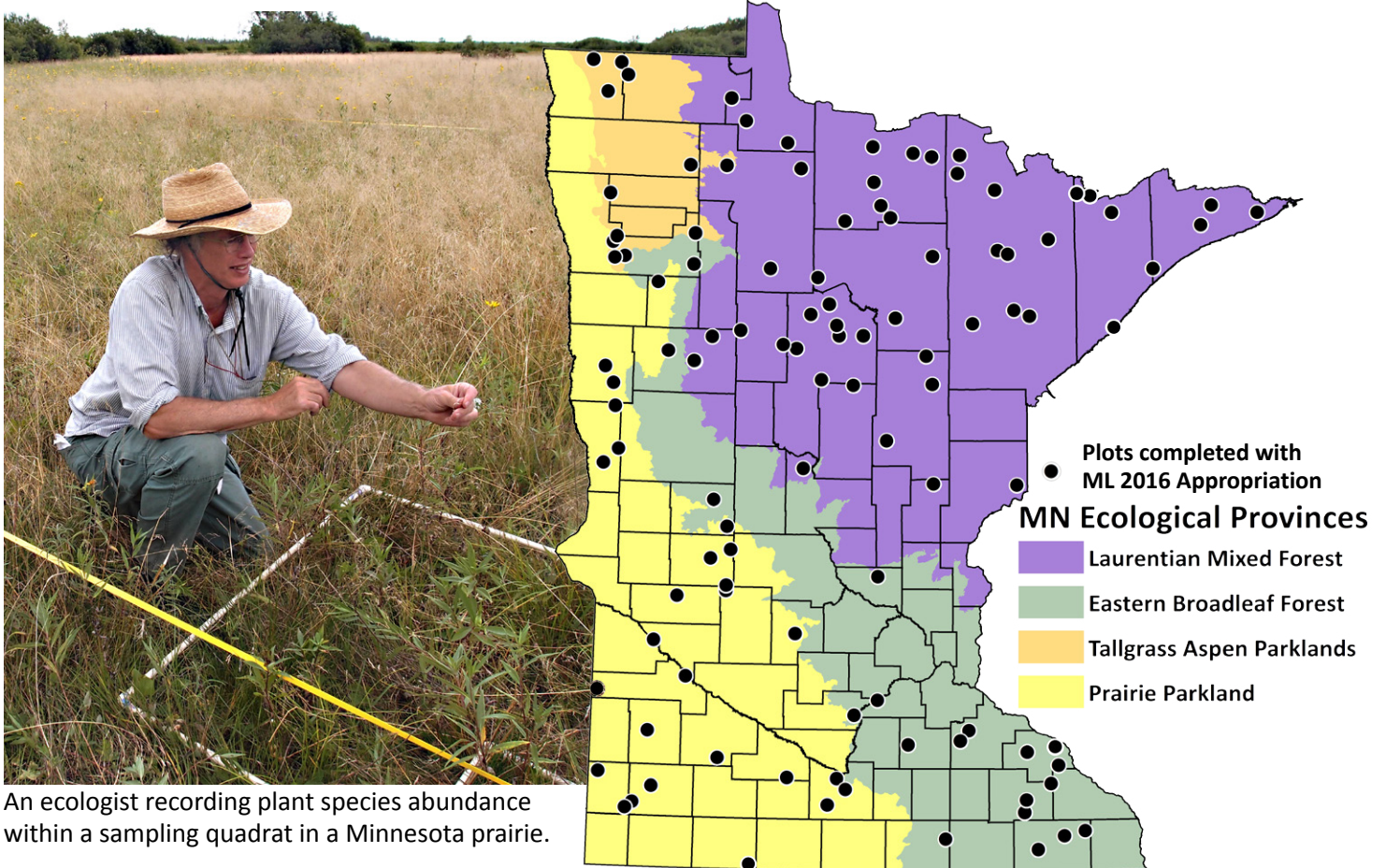
Does the organization have a fiscal agent for this project?

No

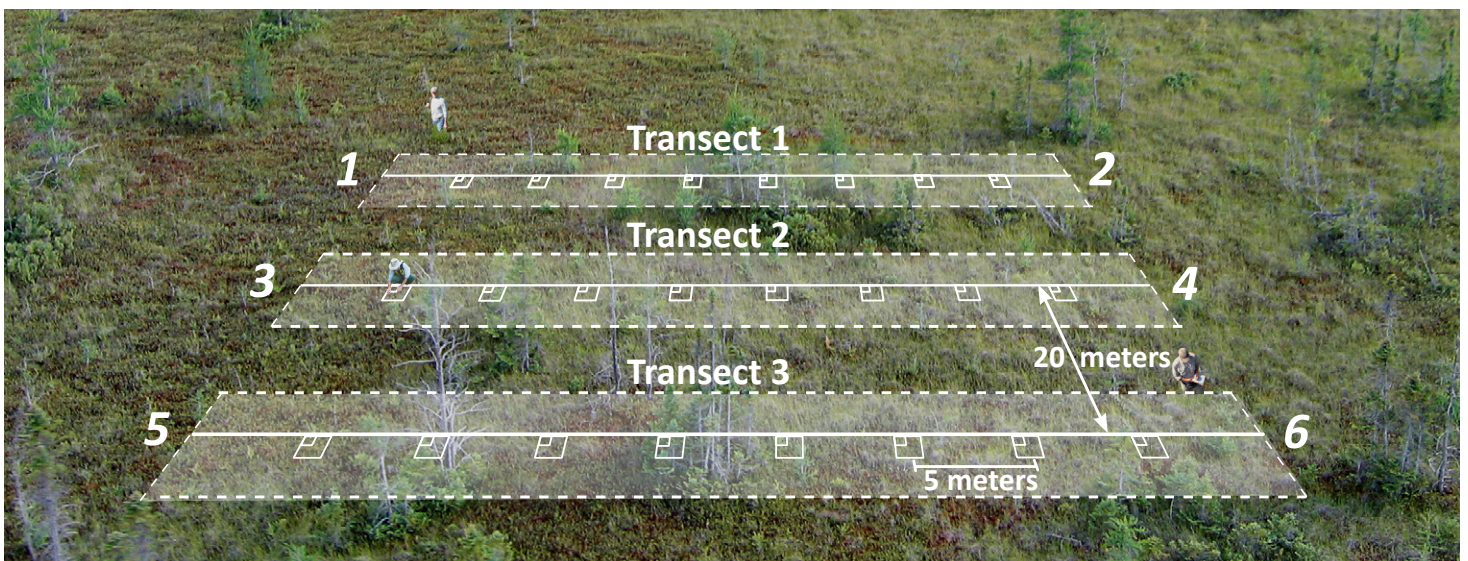


Expanding the Minnesota Ecological Monitoring Network

Improving land use decision making and sustainable resource management through greater reliance on scientific knowledge



An ecologist recording plant species abundance within a sampling quadrat in a Minnesota prairie.



A scale diagram of the plot, showing three 45-meter transects along which vegetation, soils, water chemistry, deer browse, and other measurements