UNIVERSITY OF MINNESOTA

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March 19, 2025

Dear Legislative-Citizen Commission on Minnesota Resources (LCCMR) staff and board members,

The urgent need to develop effective strategies for peatland restoration has never been more critical, as these ecosystems play a pivotal role in carbon sequestration. Peatlands store approximately 30% of terrestrial carbon while covering only 3% of the Earth's surface. Minnesota has more than any other state except Alaska. However, drainage and climate-induced disturbances threaten peatlands' ability to function as carbon sinks to carbon sources. To address these issues, several large peatland restoration projects are in the planning stages with state and federal government agencies (primarily BWSR, DNR and USFWS to help re-establish their functionality. However, there is a gap in our knowledge of how vegetation in restored peatlands affects their functionality and how to practically restore the mosses and other plants key to restoration success. We are requesting \$117,056 for our proposed project to address that need over the next one-two years.

Understanding how vegetation influences peatland greenhouse gas (GHG) fluxes and water quality downstream is essential for mitigating climate change, yet significant knowledge gaps remain. Our research directly addresses this issue by investigating how different plant functional groups– sedges, shrubs, and mosses—affect GHG emissions, with the goal of informing long-term management strategies for peatland conservation and restoration throughout Minnesota. The study will also assess the success of moss and peatland shrub transplants in our mesocosms from northern Minnesota, an important potential part of peatland restoration success.

Our team has been conducting experiments with peatland mesocosms on the St. Paul campus since 2023 This fall we planted three different native wetland plant functional groups and are setting up an automated irrigation system to maintain water levels. This will enable us to compare GHG fluxes at our experimental mesocosms and our natural field research sites in NE Minnesota (Sax-Zim Bog and vicinity). This funding through the emerging issues grant would provide critical understanding to vegetative restoration's effects on degraded peatlands, particularly the role of Sphagnum moss in reducing GHG emissions under flooded conditions. The results of this experiment will provide the necessary context to advise land management and restoration efforts on peatlands in MN, informing restoration design and site selection.

The proposed research is paired with our LCCMR-funded field research in the Sax-Zim bog of northeastern MN. With the integration of field data with the mesocosm experiments on the St. Paul campus, this study will provide needed ecological analysis for the MN DNR and USFWS on restoring peatlands effectively in the coming decades. By focusing on understanding the peatland vegetation ecosystem, insights for optimizing peatland restoration strategies may be immediately utilized by the state and non-profit agencies in MN such as The Nature Conservancy and BWSR. The findings will contribute to understanding peatland GHG cycling, wetland restoration policy and guidelines, and to the success of peatland restoration projects being done by the state over the next 1-3 years.

Thanks for your consideration,

Chris Lenhart, Research Associate Professor

Attachment A:

Environment and Natural Resources Trust Fund Budget M.L. 2023 Budget Addendum Spreadsheet

Legal Citation:

Project Manager: Chris Lenhart

Project Title: Accelerating the revegetation of peatland restoration projects to enhance successs

Organization: University of Minnesota

Project Budget:

Project Length and Completion Date: 1 1/2 years, 12/31/2026

Current Date:

				Justification for Generally Ineligible
BUDGET ITEM	Budget	Amount Spent	Balance	Expenses (if applicable)
Personnel (Wages and Benefits)			\$0	n/a
Gradudate student, \$55,000 Amount (81% salary, 19 %benefits), 50% FTE for 1	\$67,760		\$67,760	
vear				
professor summary salary - \$8,196 (73% salary, 27% benefits, 6% FTE	\$8,196		\$8,196	
undegraduate technician, \$5500, (91% salary, 9% benefits), 20% FTE	\$5,500	\$0	\$5,500	
Professional/Technical/Service Contracts & Subawards				
lab analysis for soil and water at Research Analytical Lab on campus	\$7,000	\$0	\$7,000	
Equipment/Tools/Supplies				
water monitoring equipment (water chemistry probe, 1 x \$4000; eight water	\$8,000	\$0	\$8,000	
level loggers at \$500 each = \$4000				
Capital Expenditures Over \$5,000	-			
rainwater harvesting system for supply mesocosms, this would involve metal	\$20,000	\$0	\$20,000	
roofing material, lumber to contruct the system and piping totaling \$20,000				
Printing and Publication	-			
printing costs	\$100	\$0	\$100	
Travel Expenses In Minnesota				
travel to buy equipment	\$500	\$0	\$500	
Travel Expenses Outside Minnesota	-			
	\$0	\$0	\$0	
Other				
	\$0	\$0	\$0	
COLUMN TOTAL	\$117,056	\$0	\$117,056	



Organization Description: Department of Bioproducts & Biosystems Engineering, College of Food, Agricultural and Natural Resources Sciences (CFANS) at the University of Minnesota

In the College of Food, Agricultural and Natural Resources Sciences (CFANS) at the University of Minnesota, we look at the bigger picture. When we envision a better tomorrow, it includes disease-resistant crops, products that protect our health, lakes free from invasive species, and much more. We use science to find answers to Minnesota and the world's challenges and solve tomorrow's problems. Almost 93 percent of students who earn CFANS undergraduate degrees find jobs in their career field or enter graduate school within six months of graduation.

The Department of Bioproducts and Biosystems Engineering, in CFANS, discovers and teaches solutions for the sustainable use of renewable resources and the enhancement of the environment. We discover innovative solutions to address challenges in the sustainable production and consumption of food, feed, fiber, materials, and chemicals by integrating engineering, science, technology, and management into all degree programs.

We have a public impact through community engagement and extension efforts. We develop and deliver high quality, regionally and nationally-recognized research-based programs to meet current and emerging needs of industry and communities. We also have a long-standing tradition of close partnerships with alumni, industry professionals, organizations, government agencies, donors, and community members.

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