Environment and Natural Resources Trust Fund

2026 Request for Proposal

General Information

Proposal ID: 2026-496

Proposal Title: It's-Not Funny! Minnesota's Trout Streams are at Risk

Project Manager Information

Name: Kui Hu

Organization: Science Museum of Minnesota

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Project Basic Information

Project Summary: Didymo, a nuisance alga in our pristine North Shore streams, is now a risk to invade other trout streams. Statewide surveys and community science lead to stream risk assessment.

ENRTF Funds Requested: $300,000

Proposed Project Completion: June 30, 2029

LCCMR Funding Category: Small Projects (G)

Secondary Category: Water (B)

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.

Didymosphenia geminata, hereafter referred to as didymo and also known as rocksnot, is a diatom — one type of microscope algae — that forms nuisance blooms of inch-thick goo coating every surface in pristine worldwide streams. The goo impacts both physical and ecological characteristics of rivers. A didymo bloom will shift normal algae growth, alter the important stream insect (i.e., fish food!) and fish communities, and reduce biodiversity. The first nuisance bloom of didymo in Minnesota was reported in the Poplar River, near Lutsen, in 2018. Since then, at least 9 rivers have been reported with nuisance blooms on the North Shore of Lake Superior. Unlike other algal blooms that occur in high-nutrient, impaired rivers, didymo can bloom in low-nutrient, high-water quality rivers–our state's best trout streams. The most efficient way to stop its spread is to identify our high-risk habitats and raise public awareness. However, no study has been done on statewide distribution of this nuisance alga nor the possible risk it poses to other high-quality, trout streams in Minnesota. The lack of both public awareness about nuisance didymo and knowledge about potential invasion hotspots puts our high-value freshwater habitats at high risk.

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.

In this project, we develop the Didymo Awareness Project (DAP), carry out a statewide survey and high-resolution monitoring of didymo dynamics and run a two-year community science data collection to create a program that will determine statewide potential habitats of didymo and its early detection. We will develop a DAP webpage for public access and hosted by angler groups. Statewide didymo presence/absence data will be collected by scientific surveys and by community scientists with our benthic algae sample kits. Additionally, weekly high-resolution monitoring of nuisance didymo will be conducted on Devil Track River to better understand the main drivers of didymo bloom and in-stream distribution in Minnesota. Combining statewide didymo presence/absence data with the main drivers, we will develop a risk assessment model to map the potential didymo habitat across Minnesota's trout streams. This project will build public awareness of the nuisance didymo issue in Minnesota water by engaging communities through data collection and a user-facing website. The outcome of this project will provide crucial information for natural resource managers, policymakers, and conservationists to allocate the limited resources for preserving critical trout-spawning rivers in Minnesota.

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: 1) An understanding of the current and potential distributions of didymo presence in Minnesota's trout streams, 2) an assessment of Minnesota trout streams most at risk for future didymo introduction, and 3) a program/protocol to continuously monitor for the presence of didymo into the future.
The outcomes of this research will inform and increase public awareness of didymo and provide vital information for the early detection of didymo to inform natural resource management in Minnesota. Ultimately, it ensures the long-term protection of Minnesota's critical high-quality freshwater habitats.

Activities and Milestones

Activity 1: Didymo awareness project, community science monitoring and data collection

Activity Budget: $190,415

Activity Description:
A dedicated Didymo Awareness Project (DAP) webpage on the Minnesota Steelheader (MNST letter) platform will be developed for educational resources, submission of community-collected data, and engagement opportunities for community scientists. This initiative will enhance public awareness of didymo, foster community involvement in monitoring efforts, and contribute valuable data to inform future management and conservation strategies. Around 500 benthic algae sampling kits with sampling instructions will be distributed to volunteers. The sample kit can be mailed to the volunteers, distributed through the SMM's Education programs, or handed out during outreach events with Minnesota Trout Unlimited and MNST. The samples will be returned to SMM/SCWRS scientists, scanned under the microscope, resulting in the presence/absence and relative abundance of didymo. Community scientists can track their sample results on iNaturalist. A statewide benthic algae and water chemistry sampling (minimum of 100 sites) will be conducted by SCWRS scientists to provide data for the risk assessment in Activity 2. In addition, a high resolution (weekly) didymo monitoring will be done at Devil Track River for two months to understand the main drivers of didymo blooms. The statewide algae sampling (with water chemistry) and high-resolution survey will ensure the selected drivers are appropriate for

Activity Milestones:

Description	Approximate Completion Date
Create Didymo Awareness Project (DAP) webpage	June 30, 2027
Community monitoring and data collection, Year 1	June 30, 2027
Statewide algae and water chemistry sampling	December 31, 2027
High resolution (weekly) didymo monitoring	December 31, 2027
Community monitoring and data collection, Year 2	June 30, 2028

Activity 2: Risk assessment of potential suitable nuisance didymo habitat

Activity Budget: $42,618

Activity Description:
We will compile existing stream survey datasets (MPCA/DNR/NRSA/USGS) for Minnesota trout streams corresponding to areas sampled for the presence/absence of didymo in Activity 1. Combined with our high-resolution North Shore and statewide samples, these main drivers datasets will be used to develop a risk assessment modeling framework enabling us to map the potential didymo habitats statewide. Four different risk modeling approaches will be selected (examples to include but not limited to: logistic regression, classification, regression tree [CART], maximum entropy model [Maxent], and genetic algorithm for rule-set production [GARP]) to predict potential high-risk didymo habitat. Additional drivers to include in the risk assessment will include fish population, biodiversity, Index of Biotic Integrity [IBI], stream accessibility (distance from the nearest driveway), and angler visitation data. Ultimately, the risk assessment will map the statewide likelihood of introduction, establishment, and ecosystem impact of nuisance didymo. This data-driven approach will provide valuable insights into the potential spread of nuisance didymo, inform mitigation strategies, and guide future monitoring efforts by both researchers and natural resource managers.

Activity Milestones:

Description	Approximate Completion Date
Compile water chemistry, physical, fish and geographic data from Minnesota streams	April 30, 2028

Develop risk assessment model and map potential habitats	December 31, 2028

Activity 3: Statewide outreach, networking: developing a long-term response protocol for the future

Activity Budget: $66,967

Activity Description:

Understanding the potential statewide didymo distribution and high-risk areas is important for the future trout stream preservation and management. Through partnerships with DNR, academic institutions, angler organizations (support letters MNTU/MNST), schools, and conservation groups, this project will establish a sustainable framework for didymo surveillance and rapid response. Public workshops, online engagement, and targeted training sessions will be done to empower stakeholders with the knowledge and tools to contribute effectively. Because didymo mats can vary significantly in shape and color throughout their bloom stages, visual identification alone can be challenging. The most reliable way to accurately identify this species is microscopic examination. The Didymo Awareness Project (DAP) aims to build a robust, long-term response protocol by fostering the submission of samples to identify at SCWRS. During the project, we will actively engage community volunteers, scientists, and environmental agencies to enhance awareness, data collection, and monitoring efforts. Moreover, the initiative will integrate scientific research, risk modeling, and adaptive management strategies to develop a comprehensive response protocol that ensures timely and effective action against didymo threats. This long-term benefit approach will strengthen Minnesota's ability to protect our precious freshwater ecosystems through collaboration of community scientists and environmental scientists.

Activity Milestones:

Description	Approximate Completion Date
Long-term response protocol development	April 30, 2029
Statewide outreach and networking	June 30, 2029

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Davin Brandt	Minnesota Steelheader (MNST)	Assist with the development and maintenance of the didymo awareness webpage. Serve as a community science liaison, facilitating communication, training, and data collection. Assist to engage the community, ensure scientific protocols are followed, provide resources, and translate findings into actionable insights, fostering collaboration to enhance research quality and public involvement.	No
Kristen Poppleton	MN Trout Unlimited (MTU)	Serve as a Community Science Liaison, fostering communication, engagement, and training. Support outreach efforts by distributing sample kits to the community during events, managing social media updates, and sharing news to enhance public participation.	Yes
Mark Edlund	SMM-SCWRS	Assist with field collection, laboratory, interpretation of data, and the creation of reports and materials. Share information about the project and project results with stakeholder groups, partners, and agency scientists and leadership.	Yes
Jason Ulrich	SMM-SCWRS	Compile existing water chemistry, geochemical characteristic data from MPCA/DNR//NRSA/USGS. Assist with potential habitat mapping and risk assessment modeling. Share information about the project and project results with stakeholder groups, partners, and agency scientists and leadership	Yes

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 findings from this research will be directly implemented with public awareness through us and our project partners, iNaturalist and the Minnesota Department of Natural Resources' EDDMapS, peer-reviewed publications, and Science Museum of Minnesota's (SMM) exhibit, virtual, and education programming. The DNR, watershed management organizations, and angler groups, can utilize the results to prioritize monitoring and mitigation efforts in high-risk trout streams. Additionally, long-term monitoring will be reinforced through community science initiatives and partnerships with local conservation organizations, ensuring early detection and rapid response to potential infestations.

Project Manager and Organization Qualifications

Project Manager Name: Kui Hu

Job Title: Postdoctoral Fellowship

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

Dr. Kui Hu is a freshwater ecologist with expertise in diatom identification, limnological sampling, and environmental research. Since January 2024, Dr. Hu has been a Postdoctoral Fellow at the St. Croix Watershed Research Station, leading field research, outreach events, and peer-reviewed publication for the LCCMR-funded didymo research project in the North Shore. Her expertise in limnology and community ecology directly aligns with the objectives of this project. Dr. Hu has successfully secured research funding, including fellowships from the North Dakota Water Resources Research Institute, demonstrating her ability to manage project resources efficiently. Beyond research, Dr. Hu is committed to public engagement and education. Overall, her expertise and experience make her well-equipped to lead this didymo community science and risk assessment project.

Organization: Science Museum of Minnesota

Organization Description:

The Science Museum of Minnesota (SMM) is a private, non-profit 501(c)3 institution dedicated to encouraging public

understanding of science through research and education. The St. Croix Watershed Research Station is the environmental research center of the SMM with the mission “we do the science that helps make our rivers and lakes clean” through research and outreach. The SCWRS supports an active year-round program in environmental research and graduate-student training, guided by a dedicated in-house research staff with direct ties to area universities and colleges. It collaborates closely with federal, state, and local agencies responsible for managing the St. Croix and upper Mississippi rivers and is a full partner with the National Park Service for resource management in parks of the western Great Lakes region. Its research has played a central role in setting management policy for the St. Croix and Mississippi rivers, for establishing water-quality standards for Minnesota lakes and for developing long-term monitoring plans for the National Park Service.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Dr. Kui Hu, Post Doc, Project Manager, SMM/SCWRS		Responsible for initiation, execution, and completion of the project, ensuring that it meets its objectives within the defined research scope, timeline, and budget. Coordinate team efforts, allocate resources efficiently, and monitor progress, while maintaining clear communication with collaboration partners and stakeholders. Assist with field collection, laboratory, interpretation of data, and the creation of reports and materials. Share information about the project and project results with stakeholder groups, partners, and agency scientists and leadership.			26%	1.5		$106,298
Dr. Mark Edlund, Senior Scientist, SMM/SCWRS		Assist with field collection, laboratory, interpretation of data, and the creation of reports and materials. Share information about the project and project results with stakeholder groups, partners, and agency scientists and leadership			26%	0.6		$75,810
Jason Ulrich, Assistant Scientist, SMM/SCWRS		Compile existing water chemistry, geochemical characteristic data from MPCA/DNR//NRSA/USGS. Assist with potential habitat mapping and risk assessment modeling. Share information about the project and project results with stakeholder groups, partners, and agency scientists and leadership			26%	0.33		$30,985
							Sub Total	**$213,093**
Contracts and Services								
SCWRS Analytical Lab	Service Contract	Professional or Technical Service Contract, Water Quality analytical costs, 130 samples, $250 per				0		$33,000
MN Trout Unlimited (MTU) community science liaison	Service Contract	Serve as a Community Science Liaison, fostering communication, engagement, and training. Support outreach efforts by distributing sample kits to the community during events, managing social media updates, and sharing news to enhance public participation.				0.3		$10,000

							Sub Total	**$43,000**
Equipment, Tools, and Supplies								
	Tools and Supplies	500 mailing community scientist sample kits, $22 per sample kit	sample kits supply					$11,000
	Tools and Supplies	laboratory supplies and expendables	water chemistry and lab supply					$5,000
							Sub Total	**$16,000**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	two 3-day trips to SE region with two people, stay at the hotel for 2 nights each trip. The total miles will be 400	Fieldwork sampling-SE region					$1,536
	Miles/ Meals/ Lodging	one 2-day trip to NW region with two people, and stay at the hotel for 1 night. the total miles will be 600; one 2-day trip to Central & SW region with two people, stay at the hotel for 1 night. The total miles will be 500	Fieldwork sampling SW, NW, Central regions					$2,026
	Miles/ Meals/ Lodging	one 3-day trip to NE region with two people, stay at the hotel for 2 nights. The total miles will be 800	Fieldwork sampling NE region					$1,676
	Miles/ Meals/ Lodging	eight overnight trips to Devil Track River with two people, daily driving from the Marine on St Croix to Devil Track river. The total miles will be 4,800	Fieldwork sampling-Devil Track River					$6,824
	Miles/ Meals/ Lodging	six 1-day trips to NE region with two people, daily driving from the Marine on St. Croix to Duluth. The total miles will be 3,600	Outreach events to NE region					$3,336
	Miles/ Meals/ Lodging	six 1-day trips to NE region with two people, daily driving from the Marine on St. Croix. The total miles will be 600	Outreach events to SE region					$1,236
	Conference Registration	three conference trips in total, i.e. once a year, for two people. The total miles will be 1800	Conference Registration Miles/ Meals/ Lodging					$2,736

	Miles/ Meals/ Lodging							
							Sub Total	**$19,370**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Publication	peer-review publication fee	peer-review Open Access publication fee					$4,000
	Printing	outreach printing materials, sample instruction printing, web coordination	outreach printing website materials					$4,537
							Sub Total	**$8,537**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$300,000**

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	**-**

Total Project Cost: $300,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: cb17824d-ed6.pdf

Alternate Text for Visual Component

The image delivers a warning about the increasing risk of Didymo (Didymosphenia geminata) blooms in Minnesota's trout streams and the proposal goals with community-led data collection: 1) Map current & potential didymo habitats; 2) Assess high-risk streams; 3) Develop a protocol for future monitoring...

Supplemental Attachments

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

Title	File
Support Letter from Minnesota Steelheader	97601fa0-876.pdf
Support Letter from Minnesota Trout Unlimited	56c7c7e0-b04.pdf
Evidence of good standing with the Secretary of State	7a3270b2-52d.pdf
Audit report performed by an independent third party	a7f3d09b-48d.pdf
Most recent IRS Form 990 filed with the IRS	0f0fe5d7-47e.pdf
Resolution or Letter Authorizing Proposal Submission from Non-state Entities	41aa92f8-6a0.pdf

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 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?

No

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:

Science Musuem of Minnesota

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