Environment and Natural Resources Trust Fund

2026 Request for Proposal

General Information

Proposal ID: 2026-531

Proposal Title: Integrating Lake Management through Information Synthesis and Engagement

Project Manager Information

Name: Jake Walsh

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

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Project Basic Information

Project Summary: Co-creation of scientific research and decision-support tools with state and local water quality, watershed, and fishery managers and MN citizens to advance integrated lake management in Minnesota.

ENRTF Funds Requested: $518,000

Proposed Project Completion: June 30, 2029

LCCMR Funding Category: Fish and Wildlife (D)

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.

Lakes are vital to Minnesota's identity, providing ecosystem services that support local economies and community well-being. While state agencies and citizen organizations invest heavily in lake monitoring and management (e.g., One Watershed, One Plan; Lake Vegetation and Fisheries management plans), efforts often operate in isolation and address separate ecosystem components without integration. Despite extensive data collection, we lack a coordinated approach linking these ecosystem components, or linking monitoring with stakeholder priorities to support effective adaptive Integrated Lake Management (ILM) statewide.

Without a system connecting ecological data, management actions, and stakeholder values, well-intended interventions can lead to unintended consequences, such as water clarity initiatives causing excessive plant growth or invasive plant treatments reducing fish habitat. To improve efficiency and promote long-term resilience, a unified framework is needed, one that integrates monitoring, data sharing, and collaborative decision-making.

While investments in individual lake management have improved our understanding of water quality, fish populations, and habitats, the lack of a structured, statewide approach limits the ability of managers and communities to make informed, coordinated decisions. A comprehensive tool that integrates data on water quality, fish, and aquatic plants, while reflecting diverse stakeholder goals, could support ILM by optimizing resource allocation and enhancing outcomes.

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 a collaborative approach that integrates scientific research, stakeholder engagement, and decision-support tools to advance ILM in Minnesota. This work will leverage state data and collaboration alongside lake management practitioners to improve conservation practices and deepen our understanding of ecological and social drivers of lake management. We have two main objectives:

1. Understanding statewide ILM activities, goals, perceptions, and values: Through meetings, surveys, and workshops with practitioners, local communities, and policymakers, we will co-develop a socio-ecological understanding of lake conservation. Social science surveys will capture stakeholder views on lake health, management practices, and goals, focusing on ecosystem components like water quality, aquatic vegetation, and fish communities.

2. Develop the decision-support tool: Using insights from stakeholder engagement, we will apply multivariate and predictive statistical techniques to create a tool that integrates data on lake characteristics, classifies lakes into ecological groups, and simulates the effects of various management actions. The tool will be grounded in stakeholder values to avoid unintended consequences and enhance decision-making.

To ensure effective adoption, we will conduct outreach and training to connect stakeholders, foster collaboration, and incorporate feedback for tool refinement. This approach will help refine management targets and support long-term conservation of Minnesota's lakes.

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?

Use of social science-based surveys and community engagement to understand stakeholder values, ensuring alignment with management priorities.

Co-development of an accessible, comprehensive lake classification system defining lake types based on physical, physicochemical, and ecological characteristics.

Development of a decision-support tool that integrates stakeholder insights and ecological data to guide conservation strategies. The tool will account for synergistic effects, ensuring management actions—such as water quality improvements or invasive species removal—consider their broader ecological impacts.

Active public engagement through workshops, reports, and data visualization tools to communicate best practices for lake conservation and empower stakeholders to make informed decisions.

Activities and Milestones

Activity 1: Understanding statewide ILM activities, goals, perceptions, and values

Activity Budget: $229,000

Activity Description:
We will iteratively engage with lake stakeholder communities and practitioners to 1) conduct social-science based surveys and facilitated workshops to better understand statewide ILM activities and goals, perceptions regarding distinct components of "lake health", and values regarding lake health and use; and 2) to co-develop hypotheses and research approaches that inform Activity 2. We will hire a full-time planner to design, administer and interpret surveys; plan, facilitate, and synthesize workshop discussions; and help facilitate engagement activities in Activity 2.

After preliminary one-on-one and small group meetings with a subset of stakeholders to inform the design of our engagement approach, we will focus early engagement on administering and interpreting the survey. Results of the survey will inform the workshops with practitioners from MPCA, BWSR, MNDNR, Tribes, Soil and Watershed Conservation Districts, and similar stakeholders. These activities will run concurrently with activities in Activity 2 as survey and workshop results will be synthesized to inform a research plan that supports ILM through accessible lake classification, relevant measures of interconnectedness of water quality and lake biological communities, and useful scenario and decision support tool development.

Activity Milestones:

Description	Approximate Completion Date
Early one-on-one informational and relationship building meetings	December 31, 2026
Survey designed, administered, and results interpreted	June 30, 2027
Regional and statewide workshops	December 31, 2027
Survey and workshop synthesis to design and refine research activities	June 30, 2028

Activity 2: Developing Targeted ILM Conservation Strategies

Activity Budget: $289,000

Activity Description:
Drawing on insights from Activity 1, we will build a lake classification system and analytically-based decision-support ILM tool (e.g., Shiny app) reflecting community goals and management priorities. Using multivariate statistics, valuable datasets already gathered by the research team, and State data, we will classify lakes into distinct ecological types based on physicochemical and biological data, including water quality, fish, and macrophytes.

Following this, the tool will be designed to simulate the interconnected impacts of management interventions—such as aquatic vegetation control or invasive fish removal—under different ecological classifications. The tool will be grounded in stakeholder input to reflect local priorities, values, and concerns. We will employ approaches such as structured decision-making techniques to systematically incorporate diverse stakeholder preferences and ecological data, helping prioritize actions and assess trade-offs between different management options. By doing so, the tool will offer a transparent, organized approach to decision-making that aids stakeholders in making informed and consistent management choices.

Broadly, results will allow resource managers and stakeholders to explore tailored conservation strategies for each lake, helping them prioritize actions that enhance ecosystem resilience. The final deliverables will include the lake classification system and decision-support tool that help facilitate actionable management guidelines.

Activity Milestones:

Description	Approximate Completion Date
Assemble and integrate lake-specific climate, watershed, fish community, and water quality data	December 31, 2026
Conduct multivariate classification to identify distinct lake types; informed by concurrent survey activity	December 31, 2028
Build the decision-support tool; informed by survey and concurrent workshop activities	December 31, 2028
Outreach workshops to instruct stakeholders on tool use, obtain user feedback for continuous refinement.	June 30, 2029

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Gretchen Hansen	University of Minnesota College of Food, Agricultural and Natural Resources Sciences	Expertise in freshwater systems and fisheries. Will consult on study design, data collection and analysis, interpretation and communication of results, and engagement with partners.	Yes
Christopher Sullivan	United States Geological Survey, Cornell University	Expertise in fisheries ecology and modeling. Will help assemble existing physicochemical, physical, and fisheries data, and will help conduct statistical analysis of data	No
Jon Hansen	Minnesota Department of Natural Resources, Ecological and Water Resources	Lake Ecology Unit supervisor; will help with connections to State data, staff, managers, and stakeholder partners.	No
Paul Radomski	Minnesota Department of Natural Resources, Ecological and Water Resources	Research scientist; will consult on use of State data for lake health and ILM research, especially as it relates to the MNDNR WHAF: Lakes Tool.	No
Heidi Rantala	Minnesota Department of Natural Resources, Fisheries and Wildlife	Provide expertise in freshwater ecology, contribute to and review publications, communicate results, and serve as a liaison between the project partners and MNDNR Fisheries.	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?

Because this project is conducted in partnership with state agencies and conservation organizations, our activities were designed to ensure that results are effectively implemented through existing conservation planning tools (e.g., collaboration with DNR staff who designed the State Watershed Health Assessment Framework: Lakes tool) and processes. To create research products that guide future research, this work will harmonize valuable statewide and regional datasets of fish abundance, growth, and management (federally funded, Dr. Hansen), aquatic plant abundance and management (MAISRC-funded, Dr. Walsh), and lake environmental conditions (federally funded, Dr. Hansen) alongside State water quality datasets.

Project Manager and Organization Qualifications

Project Manager Name: Jake Walsh

Job Title: Postdoctoral Associate

Provide description of the project manager's qualifications to manage the proposed project.
Dr. Jake Walsh is a postdoctoral associate in the President's Postdoctoral Fellowship Program in the UMN-TC Department of Fisheries, Wildlife, and Conservation Biology. As a PPFP fellow, Dr. Walsh has been evaluated for an assistant professorship in the department that would begin in Fall 2025. His research program focuses on lake ecology and stewardship and centers research partnerships with state, local and tribal governments as well as nonprofit and citizen organizations to co-create actionable science that also advances our understanding of lakes and how they support human well-being.

Over fifteen years of research, Dr. Walsh has published regularly (18 publications, 1003 citations) on lake water quality, aquatic invasive species (AIS) ecological and economic impacts and management, lake responses to environmental change, and fish ecology. This work has included research partnerships with state and local government, media communication, and outreach partnerships with practitioner and citizen management communities. Prior to joining UMN, Dr. Walsh was the AIS Research & Grants Coordinator for the MN Department of Natural Resources for three years where he addressed programmatic research needs and managed the State's invasive aquatic plant control grant program. In the past two years, Dr. Walsh has secured over $1M to partner with state and local government units to study the ecology and management of lakes, including understanding zooplankton provisioning of lake services, supporting innovative and adaptive invasive aquatic plant management, and evaluating lake ecosystem and biological community responses to common carp management. As a Fond du Lac Band of Lake Superior Chippewa descendant working to build partnerships with Tribes on lake research and stewardship, Dr. Walsh serves as the Vice President of the North Star American Indian Sciences and Engineering Society Alliance and Professional Chapter and is a member of the Native American Fish and Wildlife Society.

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

Organization Description:
The University of Minnesota Twin Cities is the state's land-grant university and one of the most prestigious public research universities in the nation. The research mission of the University is to seek new knowledge that can change how we all work and live. We apply our research and expertise to meet the needs of Minnesota, our nation, and the world through partnerships in addressing society's most pressing issues.

Within the University of Minnesota, faculty, staff, and students of the Department of Fisheries, Wildlife, and Conservation Biology work on applied and fundamental problems related to natural resource management and conservation. 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. Our goals are to respond to societal needs for information and education pertaining to the conservation of our natural resources and to ensure excellent teaching, research, and outreach programs.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Jake Walsh (Project Manager)		Lead all aspects of project, including study design, supervision of staff and students, data collection and analysis, interpretation and communication of results, and engagement with partners. (1 summer month per year for three years)			36.6%	0.24		$42,975
Gretchen Hansen (Co-PI)		Consult on study design, data collection and analysis, interpretation and communication of results, and engagement with partners. (2 summer weeks per year for three years)			36.6%	0.12		$26,090
Postdoctoral Research Associate		To conduct statistical analyses and coordinate with partners on implementation and integration of research (1 FTE per year for 3 years)			25.9%	3		$245,892
Project Planner		Conduct partner and community engagement, design and administer surveys, plan and facilitate meetings and workshops (1 FTE per year for 2 years)			32.3%	2		$188,693
							Sub Total	**$503,650**
Contracts and Services								
							Sub Total	**-**
Equipment, Tools, and Supplies								
	Tools and Supplies	Workshop and meeting facilitation materials	Facilitation materials including individual notepads and pens, large notepads and markers, stickers ($50 per meeting, 6 meetings per year, 3 years = $900)					$900
							Sub Total	**$900**
Capital Expenditures								
							Sub Total	**-**

Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	Travel for up to 2 people to attend 1-2 in-person outreach and stakeholder meetings. Costs estimated per meeting as 400 miles@$0.70/mi + 2 lodging nights@$165/night per person + 3 days of meals @$51/1st&last day & $68/day full day for 2 people (meal estimate based on University per diem rate; actual costs will be reimbursed)	Travel for 1-2 people to attend two outreach and stakeholder coordination and integration meetings to conduct structured decision making and work with conservation partners to co-develop research and integrate project results into conservation planning tools.					$1,560
	Conference Registration Miles/ Meals/ Lodging	Travel for in-state meetings and conferences 1 person attending 1 per year. Costs estimated as $250 registration fee, 400 miles@$0.70/mi + 2 lodging nights@$165/night + 3 days of meals @$51/first and last day, $68/full day (meal estimate based on University per diem rate; actual costs will be reimbursed)	Travel for one person to travel to an in state conference (e.g., the Minnesota chapter of the American Fisheries Society or the Water Resources Conference) to present and communicate results					$3,090
							Sub Total	**$4,650**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Publication	Hosting services for online decision support tool (e.g., an R Shiny App at $50 per month for 36 months = $1800) and domain name ($30 per month for 36 months = $1,080)	Provide a public-facing decision support tool for stakeholders, managers, and researchers.					$2,880
	Publication	Open-access publication costs for 2 publications (one for ecological modeling, one for co-creation of science) at $2,960 each (e.g., Limnology & Oceanography Letters)	Disseminate ecology and social science results in open access, peer-reviewed journals.					$5,920
							Sub Total	**$8,800**

Other Expenses								
							Sub Total	**-**
							Grand Total	**$518,000**

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				
In-Kind	Game and Fish Fund	Fisheries Research Scientist Dr. Heidi Rantala will provide her expertise in freshwater ecology, contribute to and review publications, communicate results, and serve as a liaison between the project partners and MNDNR Fisheries. In this role, Dr. Rantala will provide $10,000 in match (salary and fringe) over the 3-year duration of the project totaling 186 hours.	Secured	$10,000
In-Kind	General Fund (Hansen 65%, Radomski 50%), Clean Water Fund (Hansen 25%, Radomski 50%), Game and Fish Fund (Hansen 10%)	Minnesota DNR Lake Ecology Unit Supervisor, Jon Hansen, and Research Scientist Paul Radomski will provide 240 hours of in-kind support (80 hours each year for each staff) for a value of $33,570. They will help coordinate State data collation, collaboration with State staff, consult on project activities, and help with activities where relevant.	Secured	$33,570
			State Sub Total	**$43,570**
Non-State				
In-Kind	University of Minnesota foregone indirect costs (54% MTDC)	Administrative costs associated with support of research activities including payroll and human resources, finance, facilities, and IT. If this award is reduced from the requested amount, the proposed cost sharing will be reduced proportionately.	Secured	$272,248
			Non State Sub Total	**$272,248**
			Funds Total	**$315,818**

Total Project Cost: $833,818

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: 6f07d6b9-a03.pdf

Alternate Text for Visual Component

The visual component presents a screen shot of the MNDNR Watershed Health Assessment Framework: Lakes web tool, which provides data regarding lake health in Minnesota. The text explains how the project will leverage these and project team data to iteratively and collaboratively co-create science alongside MN citizens and managers....

Supplemental Attachments

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

Title	File
UMN SPA Endorsement Letter	50c10f27-4cc.pdf
Signed MNDNR EWR Support Form for Jon Hansen and Paul Radomski	3c578d47-917.docx
Signed MNDNR FAW Support Letter for Heidi Rantala	1e887838-ac3.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 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:

Patrick McDonald (UMN), Danielle Thomas (UMN), Gretchen Hansen (UMN), Christopher Sullivan (USGS, Cornell U), Jon Hansen (MNDNR), Paul Radomski (MNDNR), Heidi Rantala (MNDNR)

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

N/A