Environment and Natural Resources Trust Fund

2023 Request for Proposal

General Information

Proposal ID: 2023-176

Proposal Title: Developing Research-Based Solutions to Minnesota's AIS Problems

Project Manager Information

Name: Nicholas Phelps

Organization: U of MN - MAISRC

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Project Basic Information

Project Summary: MAISRC will launch 18-24 high-priority projects aimed at solving Minnesota's AIS problems using a rigorous, prioritized, and collaborative process. Results will be delivered to end-users through strategic communication and outreach.

Funds Requested: $5,500,000

Proposed Project Completion: June 30, 2027

LCCMR Funding Category: Aquatic and Terrestrial Invasive Species (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.

Aquatic invasive species (AIS) are a real and growing threat to Minnesota's lakes, rivers, and wetlands. From our docks to state budgets, damaging AIS, such as zebra mussels, common carp, Eurasian watermilfoil, and many others have degraded the State's ecosystem, economy, and way of life. For example, we recently found that in zebra mussel-infested lakes, young-of-the-year walleye are significantly smaller and catchable walleyes have higher mercury concentrations than in uninvaded lakes. In response to AIS impacts, Minnesotans invest millions of dollars each year to prevent and control infestations. These necessary investments have no doubt resulted in positive outcomes, but have fallen short of solving the long-term problem.

Minnesota became a national leader with the creation of the Minnesota Aquatic Invasive Species Research Center (MAISRC) in 2012. Meaningful progress is being made – we have advanced our fundamental understanding of many AIS, provided new tools for managers, informed decisions with research-based recommendations, and built capacity at all levels by translating science into action. Solutions to Minnesota's AIS problems are within reach. It is imperative that we remain committed to a long-term vision for AIS response in Minnesota, one that is informed by ground-breaking science that supports proven and efficient management action.

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.

MAISRC was established with a game-changing investment from the ENRTF, creating a one-of-a-kind program focused on solutions-oriented research and outreach. We are driven to solve problems through innovative, rigorous and collaborative science. We have brought together ~25 different project managers (UMN, UMD/NRRI, MN DNR, USGS, etc.) and their experienced/diverse teams to pursue ~35 ENRTF-funded research projects (some multi-phase) on a range of high-priority species and strategies for AIS prevention, control, and management. Notable highlights are included in the infographic and much more is available here: www.maisrc.umn.edu. We are perfectly positioned to build on past success and continue to make advancements.

We propose to continue forward momentum by launching additional projects through our competitive RFP process, informed by our extensive research needs assessment and stakeholder engagement. All research will be vetted by internal and external peer-reviewers to ensure both scientific rigor and practical application. We will continue to prioritize communication and outreach to ensure results are effectively delivered to managers, practitioners, and the public to build our State's response capacity. Led by a 10-year strategic plan, we will continue to consult our external Advisory Board, Technical Advisory Board, and our Fellows Group to keep us mission-oriented.

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 continue to advance scientific understanding and build capacity aimed at solving Minnesota's AIS problems. Through workshops and direct communication, we will translate our science and deliver tools directly to local, state, and federal AIS managers. We will share research findings with diverse audiences and formats, including media interviews, local presentations, webinars, published manuscripts, and much more. Through hands-on experience, this work will train the next generation of AIS professionals. Ultimately, we will be empowering more educated and active stakeholders, who are an essential part of the State's solution to improve and protect Minnesota's natural resources.

Activities and Milestones

Activity 1: Creating knowledge and capacity to solve Minnesota's AIS problems by supporting innovative solutions-oriented research

Activity Budget: $4,758,730

Activity Description:
We will offer a competitive RFP in years one and two of this project, launching 18-24 new and continuation subprojects (approximately $200k-250k each, with two-year durations) addressing Minnesota's highest priority research needs on emerging and existing AIS threats. New lines of research will be focused on needs identified by our comprehensive research needs assessment. These new subprojects will provide a pipeline of innovation and collaboration. Concurrently, existing projects with high potential will be evaluated through the competitive peer-review process and continued. By providing a long-term strategy to build upon promising research, we are better positioned to realize the value of previous research investments. We have demonstrated the rigor and success of this process by launching both new and continuation subprojects in previous RFP cycles (2017-2022; new projects only 2015-2016).

Our RFP is open to all Minnesota-based researchers and we encourage collaboration and the creation of multi-disciplinary teams. As a result, we have brought together new teams and agency partnerships from across the state and world, adding much-needed expertise and leveraging significant non-ENRTF funds. This coordinated process has also avoided duplication of research efforts and identified gaps where we have successfully recruited new research expertise to complement our current capacity.

Activity Milestones:

Description	Completion Date
Internal and external review of 2023 RFP proposals	September 30, 2023
Award subproject funding to 9-12 proposals from 2023 RFP, subprojects begin on January 1, 2024	September 30, 2023
Issue 2024 RFP on high priority research needs	March 31, 2024
Internal and external review of 2024 RFP proposals	September 30, 2024
Award subproject funding to 9-12 proposals from 2024 RFP, subprojects begin on January 1, 2025	September 30, 2024
Issue 2025 RFP on high priority research needs	March 31, 2025

Activity 2: Leadership to facilitate AIS research, collaboration and outreach

Activity Budget: $741,270

Activity Description:
The value of a Center-based approach to AIS research is invaluable and reaches far beyond what a fragmented effort could accomplish. MAISRC provides leadership for AIS research by establishing priorities, facilitating coordination, evaluating research progress in real-time, and being a trusted go-to resource for countless individuals, groups, and advisory committees. We also provide physical infrastructure, shared equipment, and lab support in ways that maximize resource efficiency and effectiveness. One core researcher is included in Activity 2 focused on common carp (0.5 FTE) - this position is considered essential to MAISRC's mission and not otherwise supported by the UMN.

The successful implementation of our science into management action and public engagement has demonstrated the value of MAISRC. For example, since inception, we have been featured in ~560 media stories, published ~125 manuscripts and ~20 factsheets, trained ~350 community science volunteers, and presented our work countless times to end-users in in-person and virtual formats. Our Research Outreach Specialist (non-ENRTF funds) and MAISRC researchers meet regularly with managers, practitioners, lake associations, etc. to ensure the translation of technical science into meaningful real-world action.

With 2023 ENRTF funding, these essential functions will be extended for two more years (July 2025 - June 2027).

Activity Milestones:

Description	Completion Date
Prioritize 2026 research needs through research needs assessment process	December 31, 2025
Initial dissemination of results and next steps identified for projects completed December 31, 2025	June 30, 2026
Prioritize 2027 research needs through research needs assessment process	December 31, 2026
Initial dissemination of results and next steps identified for projects completed December 31, 2026	June 30, 2027
Continued dissemination of research results from past MAISRC subprojects and provide science-based recommendations.	June 30, 2027

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?

MAISRC has a demonstrated track record of not only conducting high-quality research, but also providing the public and managers with research tools and science-based information in understandable formats. We are committed to research transparency and long-term public accessibility of data and related products. ENRTF funding would ensure that these activities will continue until 2027. We have, and will continue to, leverage the ENRTF investment with significant UMN support (faculty positions, foregone ICR, etc.), direct legislative funding, and external grant support from 'Partnership Projects'. However, to ensure MAISRC remains focused on Minnesota's priorities and solutions-oriented research, additional ENRTF support remains crucial.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Aquatic Invasive Species Research Center - Phase II	M.L. 2017, Chp. 96, Sec. 2, Subd. 06a	$2,700,000
Building Knowledge and Capacity to Solve AIS Problems	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 06a	$4,000,000
Building Knowledge And Capacity For AIS Solutions	M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 06e	$3,750,000

Project Manager and Organization Qualifications

Project Manager Name: Nicholas Phelps

Job Title: Director and Associate Professor

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

Dr. Nick Phelps has been the Director of the Minnesota Aquatic Invasive Species Research Center (MAISRC) since 2016 and was an original MAISRC faculty member when the Center was created in 2012. In addition, Dr. Phelps is an Associate Professor in the Department of Fisheries, Wildlife, and Conservation Biology at the University of Minnesota. His research focuses on emerging threats to the health and sustainability of aquatic ecosystems, which lie at the intersection of animals, humans and the environment. Dr. Phelps has managed ~$30M in competitive grant funding, led large international collaborations, held numerous outreach and public engagement events, and published ~60 peer-reviewed manuscripts and book chapters. Under his leadership, MAISRC has become a national leader in solutions-oriented research on AIS and a go-to source for science-based information for AIS managers, practitioners, and the public.

Organization: U of MN - MAISRC

Organization Description:

The Minnesota Aquatic Invasive Species Research Center (MAISRC) uses innovative science to develop solutions to Minnesota's AIS problems. Our mission is to develop research-based solutions that can reduce the impacts of AIS in Minnesota by preventing spread, controlling populations, and managing ecosystems; and to advance knowledge of AIS to inspire action by others. MAISRC was created in 2012 with broad bipartisan, public, agency, and University support thanks to funding from the Environment and Natural Resources Trust Fund.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Project Manager		Lead MAISRC research activities and coordinate with local, state, and national agencies and AIS professionals.			33.5%	1		$221,635
Co-Project Manager		Coordinate MAISRC research program, outreach to stakeholders, and dissemination of research findings.			33.5%	1		$113,285
Communications Manager		Maintain MAISRC communications platforms to effectively disseminate research findings and connect MAISRC research with the public.			33.5%	1		$109,155
Contract Faculty		Perform dedicated research on control and management of common carp in Minnesota.			33.5%	1		$134,880
Co-PIs		18 Co-PIs to perform research on the prevention, control and management on AIS in Minnesota. Positions will be funded through research projects that are funded by MAISRC RFPs.			33.5%	1.44		$231,800
Post-Doctoral Associates		12 Post-docs to perform research on the prevention, control and management on AIS in Minnesota. Position will be funded through research projects that are funded by MAISRC RFPs.			20.9%	24		$2,015,000
Graduate Students		12 Graduate students to perform research on the prevention, control and management on AIS in Minnesota. Position will be funded through research projects that are funded by MAISRC RFPs. Fringe rate includes cost of tuition.			87.9%	12		$1,300,620
Undergraduate Students		15 Undergraduate students to perform research on the prevention, control and management on AIS in Minnesota. Position will be funded through research projects that are funded by MAISRC RFPs.			0%	7.5		$193,125
							Sub Total	**$4,319,500**
Contracts and Services								
Private Contractors	Professional or Technical Service Contract	Equipment, mailing, communications services, etc. More detail provided as specific research projects are proposed.				0		$150,000

Co-PIs	Professional or Technical Service Contract	Subawards to Co-PIs outside of the UMN (e.g. USGS, other colleges/universities). More detail provided as specific research projects are proposed.				0		$150,000
University of Minnesota	Internal services or fees (uncommon)	UMN contract research services (e.g. genetic analysis, supercomputing). More detail provided as specific research projects are proposed.				0		$125,000
							Sub Total	**$425,000**
Equipment, Tools, and Supplies								
	Tools and Supplies	Field/Lab Supplies	Supplies for research in the field and lab (e.g. Piping, fish food, gas for boats, tanks, reagents, sampling supplies, and other consumables). More detail provided as specific research projects are proposed.					$275,000
	Equipment	Field/Lab Equipment	Equipment for research in the field and lab (e.g. storage containers, software, nets, and other equipment). More detail provided as specific research projects are proposed.					$275,000
	Tools and Supplies	General Operating Supplies	Supplies for research coordination (e.g. paper, office supplies, ink/toner).	X				$4,000
							Sub Total	**$554,000**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								

	Miles/ Meals/ Lodging	Travel for MAISRC staff and researchers. More detail provided as specific research projects are proposed.	Conduct research, AIS coordination meetings, and dissemination of research results.					$90,000
	Conference Registration Miles/ Meals/ Lodging	Project Manager travel to one conference per year. Co-PIs travel to one in-state conference per project. More detail provided as specific research projects are proposed.	Presentation of research findings.					$40,000
							Sub Total	**$130,000**
Travel Outside Minnesota								
	Miles/ Meals/ Lodging	Project Manager travel to four regional AIS meetings.	Coordination of AIS research with regional managers and researchers.	X				$4,500
	Conference Registration Miles/ Meals/ Lodging	Co-PIs travel to national conferences, with prior approval.	Presentation of research findings to strategic audiences and expanding AIS research for Minnesota.	X				$42,000
							Sub Total	**$46,500**
Printing and Publication								
	Printing	Research support materials, mailed surveys, research reports, etc. More detail provided as specific research projects are proposed.	Dissemination of research findings and support for research activities.					$25,000
							Sub Total	**$25,000**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$5,500,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Equipment, Tools, and Supplies		General Operating Supplies	MAISRC's core work is to prioritize and facilitate AIS research that advances AIS solutions for Minnesota. In order to do this work effectively, MAISRC staff need office supplies such as paper, pens, ink/toner, file folders, etc. Office materials like these are not provided by the UMN.
Travel Outside Minnesota	Miles/Meals/Lodging	Project Manager travel to four regional AIS meetings.	Working with regional AIS managers and researchers is essential to advancing AIS solutions for Minnesota by sharing knowledge and coordinating control/management efforts that are rooted in the latest science. Participating in regional meetings allows MAISRC to engage in AIS prevention and management efforts that will have direct impacts on Minnesota waters.
Travel Outside Minnesota	Conference Registration Miles/Meals/Lodging	Co-PIs travel to national conferences, with prior approval.	Sharing research findings at regional and national conferences allows MAISRC researchers to connect with others in the field and advance knowledge and AIS solutions. Shared research findings directly impact Minnesota by bringing new ideas and information into the state that can further AIS prevention, control, and management efforts.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
In-Kind	University of Minnesota foregone indirect costs	Administrative support of MAISRC activities including payroll and human resources, finance, facilities, and IT.	Secured	$2,538,568
Cash	Heritage Enhancement Act (2021 Direct appropriation)	Prioritize, support, and develop research-based solutions that can reduce the effects of aquatic invasive species in Minnesota by preventing spread, controlling populations, and managing ecosystems and to advance knowledge to inspire action by others.	Pending	$820,000
Cash	General Fund (2021 Direct Appropriation)	Prioritize, support, and develop research-based solutions that can reduce the effects of aquatic invasive species in Minnesota by preventing spread, controlling populations, and managing ecosystems and to advance knowledge to inspire action by others.	Pending	$1,000,000
			State Sub Total	**$4,358,568**
Non-State				
			Non State Sub Total	**-**
			Funds Total	**$4,358,568**

Attachments

Required Attachments

Visual Component

File: 33f7c267-309.pdf

Alternate Text for Visual Component

The visual component includes a description of a three-step process for MAISRC research: 1. Ideas and needs, 2. Research, 3. Real-world solutions. A timeline depicts the MAISRC funding cycle, with overlapping RFPs and 2-year projects. A map of Minnesota depicts research activities throughout the state and highlights notable accomplishments....

Optional Attachments

Support Letter or Other

Title	File
Full description of visual component	7b4e0302-860.docx

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?

Yes

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

Yes

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

No

Does your project include original, hypothesis-driven research?

Yes

Does the organization have a fiscal agent for this project?

No

MAISRC

Minnesota Aquatic Invasive Species Research Center:

Developing research–based solutions to Minnesotan's AIS problems

1 IDEAS & NEEDS

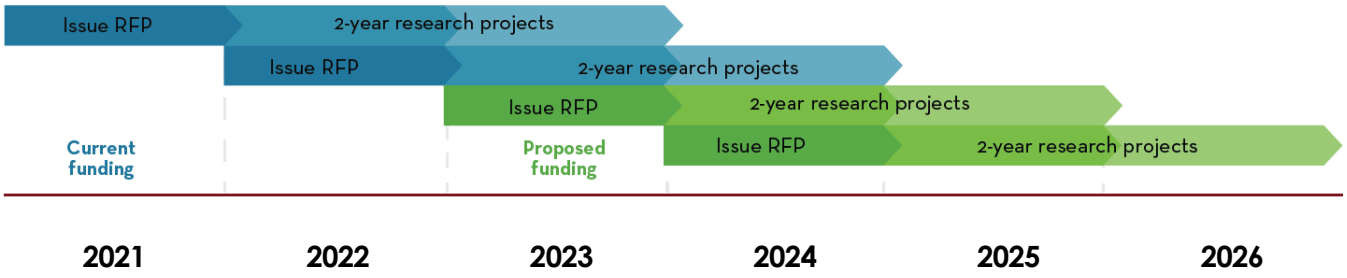
- Inclusive prioritization process to identify most pressing needs
- Annual RFPs allow for agile response to emerging issues

2 RESEARCH

- Two-year projects take testing from the lab to the lake
- International collaboration, Minnesota-focused

3 REAL WORLD SOLUTIONS

- Proven tactics and recommendations
- Findings shared with decision makers
- Support and advise on-the-ground implementation



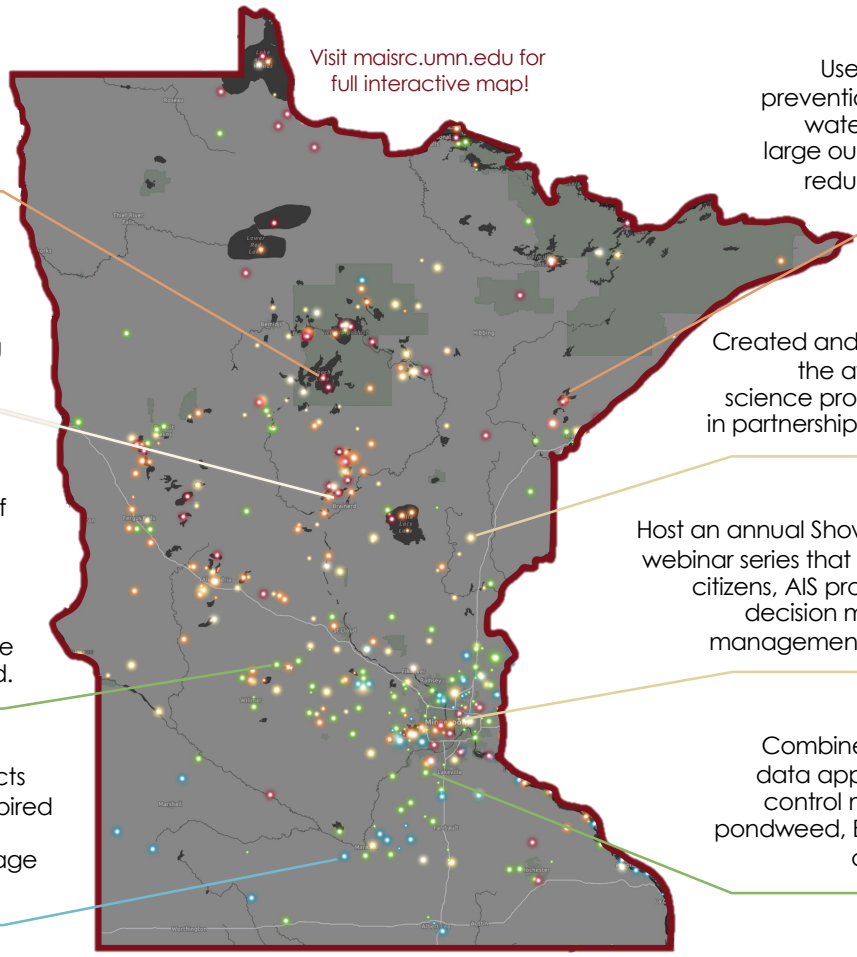
MAISRC Research & Accomplishments

First in the world to map the zebra mussel genome, which is now being used to develop high-precision control methods.

Developed first-of-its-kind online decision support tool to inform surveillance and watercraft inspection planning for all lakes in MN.

Mobilized volunteers and partners to identify hundreds of populations of invasive *Phragmites* across MN. Conducted research and developed a statewide management plan for response that is now being implemented.

Common carp research projects have proven effective and inspired the launch of an independent company to successfully manage carp populations.



Used research to inform prevention methods for spiny water flea and launched large outreach campaign to reduce risk: stopspiny.org

Created and continue to support the award-winning citizen science program, AIS Detectors, in partnership with UMN Extension.

Host an annual Showcase and a regular webinar series that provides concerned citizens, AIS professionals, and local decision makers with the latest management recommendations.

Combined field, lab, and big data approaches to optimize control methods for curlyleaf pondweed, Eurasian watermilfoil, and starry stonewort.

Invasive plants | Invasive fish | Invasive invertebrates | Harmful microbes | Cross-cutting | Citizen science/ outreach

maisrc.umn.edu