



Environment and Natural Resources Trust Fund

M.L. 2021 Approved Work Plan

General Information

ID Number: 2021-188

Staff Lead: Michael Varien

Date this document submitted to LCCMR: July 21, 2021

Project Title: Building Knowledge And Capacity For AIS Solutions

Project Budget: \$3,750,000

Project Manager Information

Name: Nicholas Phelps

Organization: U of MN - MAISRC

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Project Reporting

Date Work Plan Approved by LCCMR: July 20, 2021

Reporting Schedule: December 1 / June 1 of each year.

Project Completion: June 30, 2025

Final Report Due Date: August 14, 2025

Legal Information

Legal Citation: M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 06e

Appropriation Language: \$3,750,000 the first year is from the trust fund to the Board of Regents of the University of Minnesota for the Minnesota Aquatic Invasive Species Research Center to conduct high-priority projects aimed at solving Minnesota's aquatic invasive species problems using rigorous science and a collaborative process. Additionally, the appropriation may be spent to deliver research findings to end users through strategic communication and outreach. This appropriation is available until June 30, 2025, by which time the project must be completed and final products delivered.

Appropriation End Date: June 30, 2025

Narrative

Project Summary: MAISRC will launch 10-14 high-priority projects aimed at solving Minnesota's AIS problems using a rigorous and collaborative process. The science will be delivered to end-users through strategic communication and outreach.

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 young-of-the-year walleye are significantly smaller in our large lakes infested with zebra mussels, exacerbating already strained fisheries and local communities. 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 fall 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 – already providing new tools for managers, research-based answers available for real-world decisions, and partners at all levels, locally and around the world, working in the same direction. Solutions to Minnesota's AIS problems are within reach. It is imperative that we remain committed to a long-term vision for AIS control 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? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and 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 23 different project managers (UMN, UMD/NRRI, MN DNR, USGS, etc.) and their experienced teams to pursue 29 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.

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

Activities and Milestones

Activity 1: MAISRC Core Operations

Activity Budget: \$3,750,000

Activity Description:

As a part of core operations, MAISRC will continue to provide leadership for AIS research that establishes priorities, facilitates coordination, evaluates research progress in real-time, and be a go-to resource for individuals, groups, and advisory committees. We will also provide physical infrastructure, shared equipment, and lab support.

MAISRC will leverage past and future legislative appropriations to continue offering an annual, competitive RFP that is open to all Minnesota-based researchers. We will launch 10-14 subprojects (~\$200k-250k each, with two-year durations) addressing Minnesota’s highest priority AIS research needs. New lines of research will be focused on needs identified by our comprehensive research needs assessment. 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.

To ensure that we continue to move the needle on two of Minnesota’s most problematic AIS, MAISRC core operations includes two research positions, focused on zebra mussels (1.0FTE) and common carp (0.5 FTE). These positions are considered central to core operations and provide a foundation for which research can be done, not otherwise supported by the UMN.

Activity Milestones:

Description	Completion Date
Internal and external review of 2021 RFP proposals	September 30, 2021
Award subproject funding to 5-7 proposals from 2021 RFP, subprojects begin on January 1, 2022	September 30, 2021
Issue 2022 RFP on high priority research needs	March 31, 2022
Internal and external review of 2022 RFP proposals	September 30, 2022
Award subproject funding to 5-7 proposals from 2022 RFP, subprojects begin on January 1, 2023	September 30, 2022
Issue 2023 RFP on high priority research needs	March 31, 2023
Prioritize 2024 research needs through research needs assessment process	December 31, 2023
Initial dissemination of results and next steps identified for projects completed December 31, 2023	June 30, 2024
Prioritize 2025 research needs through research needs assessment process	December 31, 2024
Initial dissemination of results and next steps identified for projects completed December 31, 2024	June 30, 2025
Continued dissemination of research results from past MAISRC subprojects to provide science-based recommendations and resources to individuals, groups, and advisory committees (as needed)	June 30, 2025

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.

The translation of AIS science into public and management action is a central part of MAISRC's work and we provide a platform for information and new research findings about AIS to be widely disseminated. This is accomplished by providing rich opportunities for stakeholder engagement through the annual public Research and Management Showcase event and ongoing outreach efforts, as well as making research progress and results accessible to the public and AIS managers through reports, brochures, the MAISRC website, Facebook and Twitter, Extension programming, seminars, talks, and via peer reviewed publications and student theses. Additionally, MAISRC organizes a publicly available and indefinite data repository ("MAISRC-DRUM") in partnership with the UM Libraries for data related to ongoing and completed MAISRC projects.

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?

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. This ENRTF funding would ensure that these activities will continue until 2025. We have, and will continue to, leverage the ENRTF investment with significant UMN support (faculty positions, foregone ICR, etc.) and external grant support from 'Partnership Projects'. However, to ensure MAISRC remains focused on Minnesota's priorities and solutions-oriented research, additional ENRTF support is 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

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Graduate Student		Perform research on the prevention, control and management on AIS in Minnesota. Fringe rate includes cost of tuition.			87.9%	1		\$103,714
Undergraduate Students		2 Undergraduate students to support MAISRC research program, outreach to stakeholders, and dissemination of research findings.			0%	1		\$15,600
Research Associate		Perform dedicated research on the control and management of zebra mussels in Minnesota.			36.5%	2		\$218,400
Contract Faculty		Perform dedicated research on control and management of common carp in Minnesota.			36.5%	1		\$128,251
Laboratory Manager		Maintain MAISRC Containment Lab to ensure efficiency and accessibility for MAISRC projects.			31.8%	0.1		\$8,486
Communications Specialist		Maintain MAISRC communications platforms to effectively disseminate research findings and connect MAISRC research with the public.			31.8%	1.98		\$188,136
Co-Project Manager		Coordinate MAISRC research program, outreach to stakeholders, and dissemination of research findings.			36.5%	1.88		\$203,718
Project Manager		Lead MAISRC research activities and coordinate with local, state, and national agencies and AIS professionals.			36.5%	1		\$198,842
							Sub Total	\$1,065,147
Contracts and Services								
Co-PIs	Sub award	Reserves for allocation of subawards through MAISRC RFPs in 2021 and 2022. Subproject budget details described in attachment.				0		\$2,623,353
Private Contractors	Professional or Technical Service Contract	General Operating Services: Mailing outreach materials, audio/visual associated with seminars and conferences, email newsletter platform, dissemination of research results through social media, etc.		X		0		\$6,000
Private Contractors	Professional or Technical	Rentals: Space and facilities for conferences and events (e.g. annual Showcase).				0		\$10,000

	Service Contract							
							Sub Total	\$2,639,353
Equipment, Tools, and Supplies								
	Tools and Supplies	General Operating Supplies	Supplies for research coordination (e.g. paper, office supplies, ink/toner).	X				\$7,500
	Equipment	Field/Lab Equipment	Equipment for research in the field and lab (e.g. storage containers, software, nets, and other equipment).					\$8,000
	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).					\$6,000
							Sub Total	\$21,500
Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Travel for MAISRC staff.	AIS coordination meetings, support of MAISRC research, and dissemination of research results.					\$6,000
	Conference Registration Miles/ Meals/ Lodging	Project Manager travel to two conferences.	Presentation of research findings.					\$4,000
							Sub Total	\$10,000
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	Project Manager travel to one national conference.	Presentation of research findings to strategic audiences and expanding AIS research for Minnesota.	X				\$3,500
							Sub Total	\$8,000
Printing and Publication								
	Printing	Annual research report, fact sheets, training materials, white papers, etc.	Dissemination of research findings and support for research activities.					\$6,000
							Sub Total	\$6,000
Other Expenses								
							Sub Total	-
							Grand Total	\$3,750,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Contracts and Services - Private Contractors	Professional or Technical Service Contract	General Operating Services: Mailing outreach materials, audio/visual associated with seminars and conferences, email newsletter platform, dissemination of research results through social media, etc.	Part of MAISRC's core work is to disseminate research results and serve as a resource for individuals, groups, and advisory committees on AIS and science-based prevention and management recommendations. This is done in large part through mailings, seminars/conferences, email, and social media to reach as many people as possible through various platforms. These expenses benefit Minnesota's environment by making MAISRC research accessible and more likely to be implemented in communities around the state.
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 like 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	Project Manager travel to one national conference.	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	\$2,750,000
Cash	Environment and Natural Resources Appropriation M.L. 2019, Art. 1, Sec. 3, Subd. 3(j)	Appropriation language: 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.	Secured	\$1,020,000
			State Sub Total	\$3,770,000
Non-State				
			Non State Sub Total	-
			Funds Total	\$3,770,000

Attachments

Required Attachments

Visual Component

File: [b2c15f35-48c.pdf](#)

Alternate Text for Visual Component

Minnesota Aquatic Invasive Species Research Center: Building knowledge and capacity for AIS solutions.

A three-step process is outlined:

1. Ideas & Needs
 - a. Inclusive prioritization process to identify most pressing needs
 - b. Annual RFPs allow for agile response to emerging issues
2. Research
 - a. Two-year projects take testing from the lab to the lake
 - b. International collaboration, Minnesota-focused
3. Real World Solutions
 - a. Proven tactics and recommendations
 - b. Findings shared with decisio...

Optional Attachments

Support Letter or Other

Title	File
MAISRC Letters of Support	a29058ec-5b9.pdf
Subproject Overall Status Update Table Template	10835890-631.pdf
Background Check Cert.	27b1d423-54c.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

Due to the budget reduction of 25%, we have reduced the number of expected sub-projects we can support through our RFP accordingly.

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 UMN Policy.

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?

Yes, Sponsored Projects Administration



MAISRC

Minnesota Aquatic Invasive Species Research Center:

Building knowledge and capacity for AIS solutions

IDEAS & NEEDS

1

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

RESEARCH

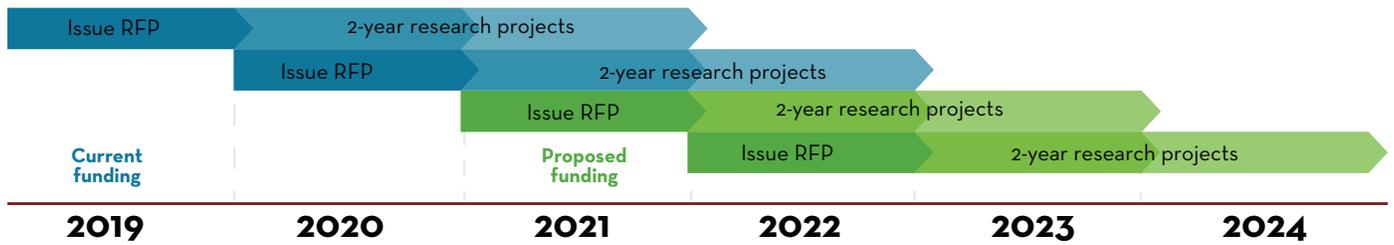
2

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

REAL WORLD SOLUTIONS

3

- 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. We then released the data publicly, providing a road map to develop high-precision control methods.

Mobilized 70+ volunteers and partners to survey and map invasive *Phragmites* across the entire state of Minnesota. Identified 470+ populations, developed a management plan, and supported local level implementation efforts.

Moved promising research from the lab to the lake and conducted the largest-ever experimental treatment to suppress established zebra mussel populations.

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

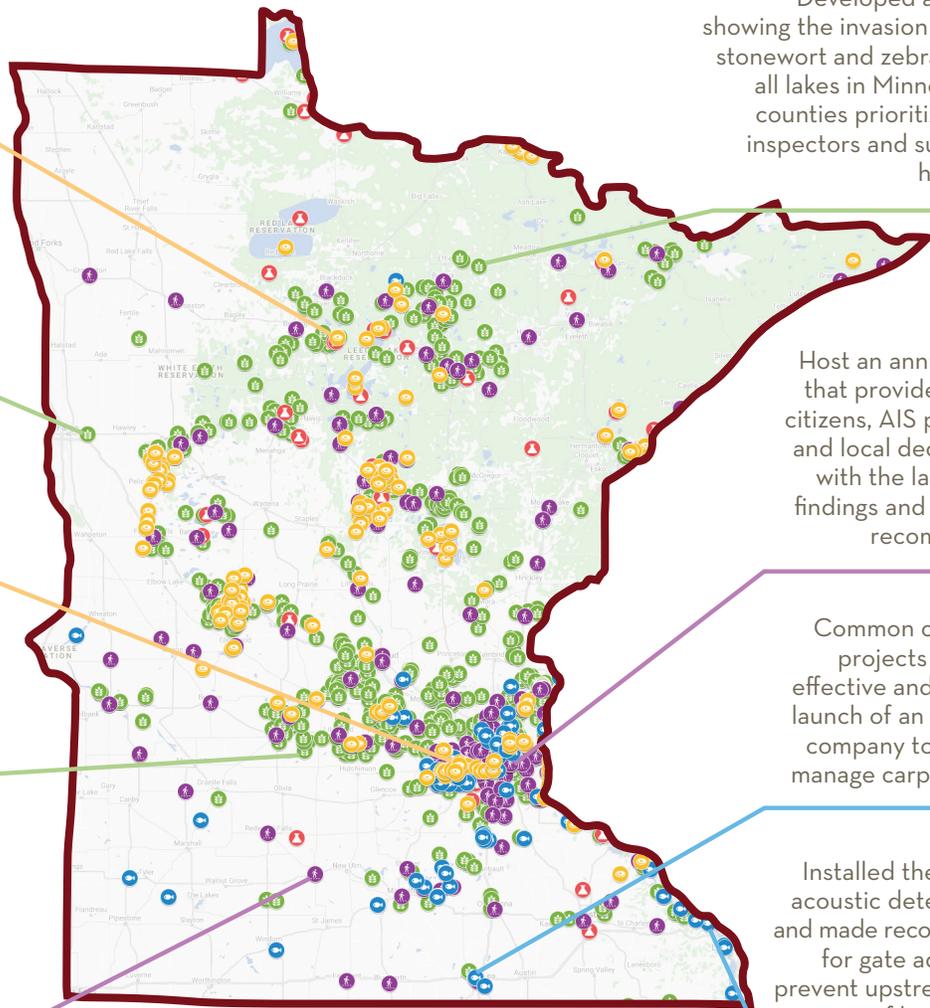
Created and continue to support the award-winning Aquatic Invasive Species Detectors program and certified ~300 citizen scientists. Participants at an affiliated event found two early infestations of starry stonewort, which allowed for rapid removal in the lake.

Developed an online tool showing the invasion risk of starry stonewort and zebra mussels for all lakes in Minnesota to help counties prioritize watercraft inspectors and surveillance at high-risk sites.

Host an annual showcase that provides concerned citizens, AIS professionals, and local decision makers with the latest research findings and management recommendations.

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

Installed the nation's first acoustic deterrent system and made recommendations for gate adjustments to prevent upstream migration of bigheaded carp.



Invasive plants



Invasive invertebrates



Invasive fish



Pathogens and harmful microbes



Citizen scientists and outreach