



Environment and Natural Resources Trust Fund (ENRTF)

M.L. 2020 ENRTF Work Plan (Main Document)

Today's Date: August 23, 2019

Date of Next Status Update Report: April 1, 2021.

Date of Work Plan Approval:

Project Completion Date: June 30, 2022

Does this submission include an amendment request? No

PROJECT TITLE: How Effective and Protective are AIS Removal Methods?

Project Manager: Dr. Valerie Brady

Organization: Regents of the University of Minnesota- Duluth

College, Department, or Division: Natural Resources Research Institute

Mailing Address: 5013 Miller Trunk Highway

City, State, Zip Code: Duluth, MN, 55811-1442

Project Manager Direct Telephone Number: 218-788-2753

Email Address: vbrady@d.umn.edu

Web Address: <https://www.nrri.umn.edu/about-nrri/Valerie-Brady>

Location: Statewide

Total Project Budget: \$110,000.00

Amount Spent: \$0

Balance: \$0

Legal Citation: M.L. 2020, Chp. xx, Sec. xx, Subd. xx

Appropriation Language:

PROJECT STATEMENT:

The best way to prevent AIS spread in Minnesota is to stop the transfer of water and living material between lakes. We will test how well boat cleaning methods work, provide DNR with a risk assessment, and provide recommendations for boat launch cleaning station improvement to prevent AIS spread.

The problem: Boat launch inspections and cleaning campaigns focus largely on the exteriors of boats and trailers with only minimal attention paid to boat interiors and other gear. But even small amounts of water moved between lakes may transfer spiny water fleas or zebra mussel larvae. Similarly, mud, **debris and water inside the boat could transport seeds, spiny water flea eggs, small snails or bits of invasive vegetation.** When we power-washed 5 boats used in our wetland research, we captured 4,498 total organisms and plant parts from them, including more than 24 invertebrate species such as the invasive zebra mussels and faucet snails. Faucet snails can carry a parasite that has caused waterfowl die-offs in MN; they are tiny, easily transported, reproduce abundantly, and can survive many days out of water. Anglers (1.4 million MN licenses in 2018) and other boating enthusiasts typically get water, zooplankton, and bits of plant material in their boats. Duck hunters and others going to more shallow, wetland areas may get their boats much dirtier and transport different AIS.

The solution: In an ideal world, all boats and gear transported between water bodies would be completely squeaky-clean and dry. Unfortunately, this is not feasible. **While drying kills all aquatic invasives, it can take 5+ days to get boats and gear completely dry in cool, humid weather.** Not surprisingly, many people do not wait 5 days and instead try to clean their boats. How well do these cleanings work? The unmanned (non-DNR) cleaning tools and stations being purchased and placed at boat launches range from no tools (e.g., hand removal) to waterless tools (e.g., brushes, tongs, vacuums) to low-pressure garden hoses. Previous assessments of their effectiveness have focused on boat and trailer exteriors, not on the contamination inside boats. **The worst-case scenario is a false sense of security created by poorly-performing cleaning methods.** The boat owner thinks all is clean enough and is unconcerned about moving to another lake, when in reality there are spiny water fleas stuck in the live well, invasive milfoil on the floor, or faucet snails on their boots.

We will test the effectiveness of the self-service (non-DNR) AIS removal methods at cleaning boat interiors against the DNR standard for cleaning, which is to use a high-pressure water spray (a.k.a., power wash) as the best way to remove AIS from boats. Our results will help boat launch and lake managers choose the best cleaning tools for lake protection; help AIS personnel and agency managers customize AIS removal strategies for particular user groups and water bodies; and help cleaning station manufacturers improve their tools.

II. OVERALL PROJECT STATUS UPDATES:

First Update April 1, 2021

Second Update October 1, 2021

Third Update April 1, 2022

Final Report between project end (June 30) and August 15, 2022

III. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1 Title: Assess how well AIS removal methods clean boat interiors and gear

Description: We will use a controlled experiment to determine the effectiveness of various removal methods at cleaning both a) recreational angler boat interiors and b) duck hunter boat interiors and gear.

Specifically, we will quantify the biotic material removed by these cleaning methods available at boat launches:

1) visual inspection and hand removal	3) low-pressure water rinse from a garden hose
2) waterless tools from a cleaning station	4) using all of these methods

Each of these cleaning methods will be compared to the DNR standard of power washing to determine what was missed. This design allows us to determine how much biotic material was removed by each method, and how much was missed (by comparison to what is removed by power washing). Our results will be unbiased and not influenced by cleaning station manufacturers.

We will ensure that our tests are standardized and repeatable by creating a standardized test mixture containing a set number of dead spiny water fleas and vegetation bits in 3 gallons of water for each test and spread this mixture throughout a standard small fishing boat. We will then clean the boat on a large wash mat using one of the 4 cleaning methods and collect and preserve all material washed from the boat. This will be followed by a power wash (our control), and all this additional material washed from the boat will be collected and preserved to create a control sample to match the test sample. We will repeat this sequence 9 times for a total of ten replicates. We will then test the next cleaning method (10 times) against the power wash control. Ten replicates for each cleaning method will allow for statistical testing. The preserved samples will be counted and identified using microscopy. **We will then compare the counts from each cleaning method to their control from the power washing, allowing us to calculate a “percent missed” amount for each test** (4 cleaning methods x ten replicates = 40 separate tests, each paired with a power wash cleaning [40 power washes]).

We will also test how well the same four AIS removal methods work on the muddy boats and gear of waterfowl hunters. The experimental design will be the same: 4 cleaning methods x ten replicates, each paired with a power wash cleaning. For this test, we will collect mud, snails and vegetation from a local waterfowl hunting hotspot and use that to muddy the interior of a duck hunting boat, duck decoys, waders and boots.

ACTIVITY 1 ENRTF BUDGET: \$ 99,450

Outcome	Completion Date
1. Cleaning efficiency assessment of 4 AIS removal methods for angler-type boats.	November 2020
2. Living material removed from angler boat tests counted and identified.	February 2021
3. Cleaning efficiency assessment of 4 AIS removal methods for duck hunting-type boats.	November 2021
4. Living material removed from duck boat tests counted and identified.	February 2022
5. Statistical assessment of cleaning efficiencies for each type of use: angling and duck hunting.	March 2022

Activity 1 First Update April 1, 2021

Activity 1 Second Update October 1, 2021

Activity 1 Third Update April 1, 2022

Activity 1 Final Report between project end (June 30) and August 15, 2022

ACTIVITY 2 Title: Information transfer to lake managers, agencies, and policy makers

Description: Outreach to AIS and lake managers, inspectors and educators; agencies (e.g., MNDNR); cleaning station manufacturers; policy makers and the public about our findings.

ACTIVITY 2 ENRTF BUDGET: \$10,550

Outcome	Completion Date
1. Provide recommendations for a) cleaning method effectiveness at removing different types of AIS; b) the best AIS removal methods and messaging for various user groups, equipment types, and AIS; and c) improving cleaning station tools and options.	May 2022
2. Outreach messages about gear cleaning to help reduce the spread of AIS.	May 2022
3. Presentation at MN Aquatic Invaders Summit, which is well attended by managers.	May 2022
4. Risk assessment webinar for agency AIS and lake management personnel.	May 2022
5. Yearly and final reports to LCCMR with recommendations and outreach messages.	June 2022

Activity 2 First Update April 1, 2021

Activity 2 Second Update October 1, 2021

Activity 2 Third Update April 1, 2022

Activity 2 Final Report between project end (June 30) and August 15, 2022

IV. DISSEMINATION:

Description: As described in Activity 2, we will use results generated from the project to create outreach messages for the public that convey the cleaning methods most effective for removing different types of AIS from boat interiors and gear used for various recreational purposes. We will design these messages to specifically target user groups that may differ in their use of boats and gear or be more likely to spread different types of AIS. We will present results, messages and recommendations from this project to managers and researchers at the Minnesota Aquatic Invaders Summit. This summit is well attended by AIS researchers, managers and inspectors from throughout the state. To reach a broader audience, we will conduct a risk assessment webinar targeting regional, state and federal agency personnel; AIS inspectors and managers; and lake associations. Importantly, we will make recommendations to cleaning station manufacturers on upgrades or changes that may improve the design and efficiency of these stations.

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](#).

First Update April 1, 2021

Second Update October 1, 2021

Third Update April 1, 2022

Final Report between project end (June 30) and August 15, 2022

V. ADDITIONAL BUDGET INFORMATION:

A. Personnel and Capital Expenditures

Explanation of Capital Expenditures Greater Than \$5,000: N/A

Explanation of Use of Classified Staff: N/A

Total Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation:

Enter Total Estimated Personnel Hours for entire duration of project: 3,465	Divide total personnel hours by 2,080 hours in 1 yr = TOTAL FTE:1.67
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Total Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: N/A

Enter Total Estimated Contract Personnel Hours for entire duration of project:	Divide total contract hours by 2,080 hours in 1 yr = TOTAL FTE:
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VI. PROJECT PARTNERS:

- A. Partners outside of project manager's organization receiving ENRTF funding:
- B. **Partners outside of project manager's organization NOT receiving ENRTF funding:** The CD3 Company is collaborating with us and providing in-kind match. They will provide a cleaning station and an engineer to assist us in configuring the cleaning station for optimal sample collection at no cost; match value \$12,000.

VII. LONG-TERM- IMPLEMENTATION AND FUNDING: This project will assess the effectiveness of 4 AIS removal methods to clean the interiors of angling and duck hunting boats. Managers across MN can use our results to determine what cleaning tools and methods will work best depending on lake usage and types of AIS present. Because this is an independent assessment of a typical non-DNR cleaning station, station manufacturers can use these results to increase the effectiveness of their cleaning stations. Long term, reduction in the transportation of water and biotic materials will slow the spread of AIS in Minnesota.

VIII. REPORTING REQUIREMENTS:

- Project status update reports will be submitted no later than April 1, 2021, October 1, 2021, and April 1, 2022.
- A final report and associated products will be submitted between June 30 and August 15, 2022.

IX. SEE ADDITIONAL WORK PLAN COMPONENTS:

A. Budget Spreadsheet

Attachment A: Project Budget Spreadsheet

Environment and Natural Resources Trust Fund

M.L. 2020 Budget Spreadsheet

Legal Citation:

Project Manager: Valerie Brady

Project Title: How Effective and Protective are
AIS Removal Methods?

Organization: Natural Resources Research Institute,
University of Minnesota Duluth

Project Budget: \$110,000.00

Project Length and Completion Date: 2 years,
June 30, 2022

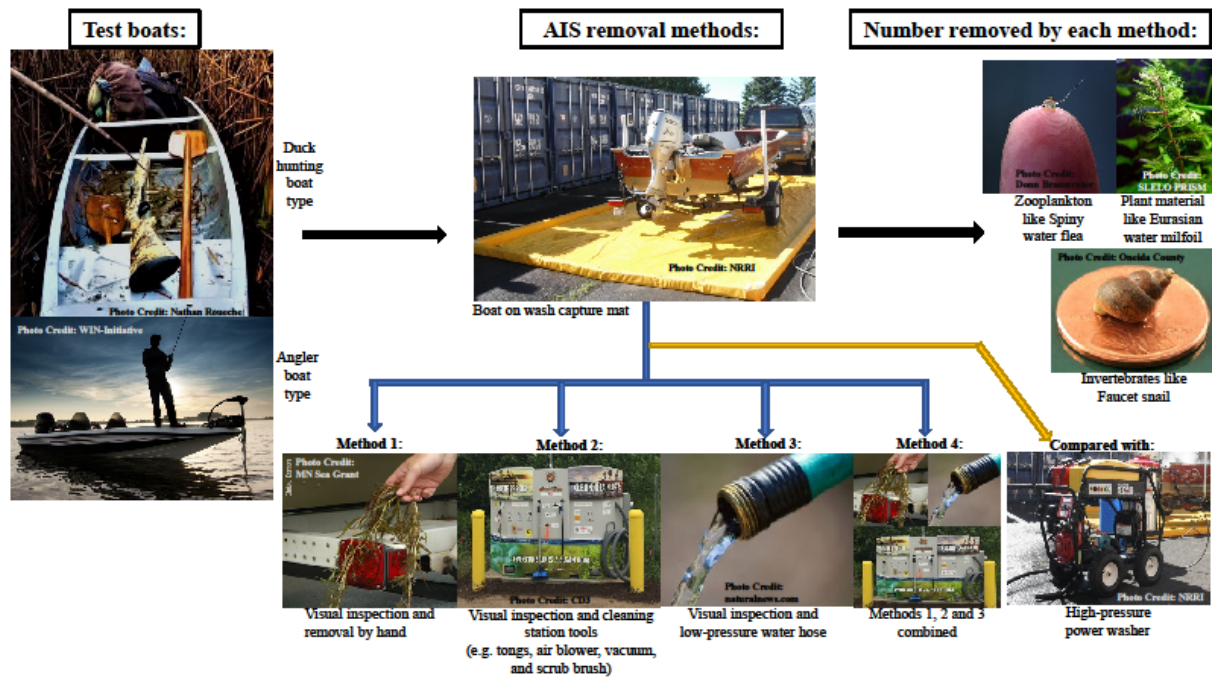
Today's Date: August 23, 2019



ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits)*	\$ 105,694	\$ -	\$ 105,694
V Brady, principal investigator; \$8,241 (74.0% salary, 26.0% benefits); 3.0% Yr 1, 4.5% Yr 2			
J Dumke, co-investigator; \$35,492 (74.0% salary, 26.0% benefits); 18% Yr 1, 23% Yr 2			
H Wellard Kelly, co-investigator; \$25,246 (77% salary, 23% benefits); 21% Yr 1, 22.5% Yr 2			
R Hell, lead taxonomist; \$14,734 (77% salary, 23% benefits); 10% Yr 1, 12.5% Yr 2			
1 technician; \$11,402 (77% salary, 23% benefits); 10% Yr 1, 13.75% Yr 2			
1 temp + 1 student; \$10,579, 1 temp @(91.8%effort, 8.2% salary); 1 student @(100%salary); 12.23% Yr 1, 16.11% Yr 2			
*Note: NRRI research staff salaries are largely paid from external (non-University) sources.			
Equipment/Tools/Supplies			
Field Support Supplies: Containers for water test mixture=\$123, Tubs for mud test mixture=\$42, Live well=\$200, Duck decoys = \$120, Extra Nitex mesh material =\$144, Filters =\$300, Supplies for pressure washer=\$100, Nitrile Gloves \$22, Sample vials=\$290, Ethanol preservative =\$90, Large capture mat for pressure washing =\$1,000. Total =\$2,431.0	\$ 2,431	\$ -	\$ 2,431
Lab supplies: Durable field pencils \$5, Waterproof markers \$5, Waterproof paper (100 sheets) \$15, 5-gallon pails \$50.00. Total=\$75.00.	\$ 75		\$ 75
Travel expenses in Minnesota			
Field work: Travel to wetland site 20 miles x 0.58/mile x 2 trucks x 15 trips = \$348.00, plus NRRI truck fee \$10/day and trailer fee \$5/day for 15 days = \$225.00. Total =\$573.0	\$ 573	\$ -	\$ 573

Outreach travel: Mileage=200 x0.58x 1 trip + NRRI truck fee of \$10/day for 2 days=\$136.0; per diem travel day=41.25*2=\$82.5. Outreach Total=\$218.5 Minnesota Aquatic Invaders Summit (TC): Mileage=320x0.58 + NRRI truck fee \$10/day for 2 days=\$205.6. 2 people overnight TC = Two hotel rooms @ \$94.00/night=\$188.00. Per diem for 2 travel days= \$41.25 x 2 days x 2 people= \$165. Registration x 2 people x \$225.00=\$450.00. Summit costs total =\$1,008.6. Grand total= \$1,227.1		\$ 1,227		\$ 1,227
COLUMN TOTAL		\$ 110,000	\$ -	\$ 110,000
SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State:		\$ -	\$ -	\$ -
State:		\$ -	\$ -	\$ -
In kind:		\$ -	\$ -	\$ -
In-kind Services To Be Applied To Project During Project Period: unrecovered indirect, calculated as base \$110,00 x 54%=\$59,400	Secured	\$ 59,400	\$ -	\$ 59,400
In-kind Services To Be Applied To Project During Project Period: Match from CD3 company: includes free use of CD3 trailer and tools for 4 weeks, monthly lease rate=\$2,000. Time donation of the CEO (40 hrs) and company engineer (40 hrs) to assist in altering the station for sample collection, in-kind contribution = \$10,000. See attached letter.	Promise d	\$ 12,000	\$ -	\$ 12,000
Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
M.L. 2013, Ch. 52, Sec 2, Subd 06a: UMN-MAISRC: Aquatic Invasive Species Research Center (PI N Phelps). Subproject : Determining Highest-Risk Vectors of Spiny Waterflea Spread. PI V Brady. 2017 (project has ended)	\$0	92,932	\$ 92,756	\$ 0
M.L. 2017, Ch. 96, Sec 2, Subd 06a, F817AIS: UMN-MAISRC: Aquatic Invasive Species Research Center Phase II (PI N Phelps). Subproject 15: Determining Highest-Risk Vectors of Spiny Waterflea Spread, cont. PI V Brady. 2019	\$ 26,581	26,581	\$ -	\$ 26,581

B. Visual Component or Map:



Also see full sized attachment titled: Brady_Visual_LCCMR-2020_AIS Removal Methods.pdf

C. Parcel List Spreadsheet N/A

D. Acquisition, Easements, and Restoration Requirements N/A

E. Research Addendum: Due September 13, 2019