



# Environment and Natural Resources Trust Fund (ENRTF)

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

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**Today's Date:** February 14, 2020

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

**Date of Work Plan Approval:**

**Project Completion Date:** June 30, 2024

**Does this submission include an amendment request?** No

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**PROJECT TITLE:** Expanding restoration and promoting awareness of native mussels

**Project Manager:** Seth Stapleton

**Organization:** Minnesota Zoo

**College, Department, or Division:** Conservation

**Mailing Address:** 13000 Zoo Blvd

**City, State, Zip Code:** Apple Valley, MN 55124

**Project Manager Direct Telephone Number:** 952 431-9443

**Email Address:** seth.stapleton@state.mn.us

**Web Address:** www.mnzoo.org

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**Location:** Statewide

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**Total Project Budget:** \$489,000

**Amount Spent:** \$0

**Balance:** \$489,000

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

**Appropriation Language:**

## **PROJECT STATEMENT:**

To improve the conservation of mussels and benefit water quality, the Minnesota Zoo is rearing juvenile mussels produced by the DNR until they are large enough for reintroduction and researching husbandry methods that will best support restoration efforts. Native mussels serve as critical ecosystem engineers, creating habitat for fish and other aquatic wildlife and helping to keep Minnesota’s waterways clean by filtering algae, sediment, and pollutants. Today, however, freshwater mussels are the most at-risk group of species in the nation. Minnesota is no exception, as mussel populations in many of our waterways have been significantly depleted.

With this project, the Zoo proposes to build upon previous investments. ENRTF funds have enabled the Zoo to increase its capacity for holding and rearing juvenile mussels to 10,000 individuals and have supported the construction of a research and rearing facility. To date, more than 1,000 mussels have been returned to the DNR for reintroduction. Trials to assess rearing methods are targeting black sandshell and mucket mussels. The Zoo also has provided on-site conservation and educational programs and supported teachers throughout the state in mussel conservation. Launched in 2017, the Show Us Your Mussels Challenge promotes awareness about Minnesota’s water resources and encourages public action through student-created digital campaigns. Projects created by some 1,300 students from 20 schools have reached >75,000 members of the public.

We will leverage our unique site, expertise in aquatic systems, and high-quality water resources to expand upon the Zoo’s mussel conservation initiative. We will continue to rear mussels provided by the DNR for eventual reintroduction, develop our on-site capacity to improve growth and survivorship for new target species, and use our educational expertise and high annual visitation – some 1.3 million visitors per year – to further promote public awareness and inspire action. This program specifically addresses the DNR’s need for additional space for rearing juvenile mussels, thereby supporting long-term restoration goals. Specific objectives of the project are:

- Rear native mussels to support reintroduction efforts led by the DNR and better position the Zoo to complement restorations
- Advance our understanding of mussel rearing and propagation to maximize growth and survival
- Promote awareness and encourage public action on behalf of healthy waterways and aquatic wildlife by expanding our digital media initiative

## **II. OVERALL PROJECT STATUS UPDATES:**

**First Update April 1, 2021**

**Second Update October 1, 2021**

**Third Update April 1, 2022**

**Fourth Update October 1, 2022**

**Fifth Update April 1, 2023**

**Sixth Update October 1, 2023**

**Seventh Update April 1, 2024**

**Final Report between project end (June 30) and August 15, 2024**

## **III. PROJECT ACTIVITIES AND OUTCOMES:**

**ACTIVITY 1 Title:** Rearing native mussels at the Zoo and improving husbandry practices

**Description:**

We will use the Zoo’s increased capacity for rearing juvenile mussels – we can now hold up to 10,000 individuals – to continue to promote mussel restoration by growing mussels provided by the DNR from small juveniles until they are large enough for reintroduction. To further support the DNR’s activities, we will construct new systems to breed host fish that are needed for mussels to reproduce. We also will build quarantine systems for new acquisitions to evaluate protocols for minimizing the potential transfer of disease and zebra mussels to uninfested waters. Using the Zoo’s recently constructed research and rearing lab, we will examine factors that may improve mussel survival and growth in captivity, such as sediment size, flow rates, and supplemental feed, to improve husbandry practices and accelerate the return of mussels to native waterways. This research will build upon studies conducted during 2019. Activities will focus on species identified by DNR and USFWS as priorities in the Cedar, Cannon, and Mississippi watersheds.

**ACTIVITY 1 ENRTF BUDGET: \$367,980**

<b>Outcome</b>	<b>Completion Date</b>
1. Construct fish host breeding and quarantine systems.	March, 2021
2. Rear juvenile mussels provided by DNR to a releasable size. Up to 1,000 reared to releasable size per species. (Annual outcome beginning in 2021.)	June, 2024
3. Complete experiments to evaluate rearing methods that maximize mussel growth and survival. Complete data analysis and prepare reports and manuscripts.	June, 2024

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**ACTIVITY 2 Title:** Expanding the *Show Us Your Mussels* digital media challenge and promoting public awareness

**Description:**

The Minnesota Zoo will expand the *Show Us your Mussels (SUYM)* Challenge to serve both middle and high school students and provide teachers multiple levels of support for implementation. Students will develop and deliver digital media campaigns — such as online videos, websites, and social media outreach — promoting mussel conservation, water quality, and personal or community action. We will leverage our educational expertise to engage teachers and students through on-site Zoo classes, site visits to schools, professional development for teachers, and educational resources updated to reflect current state and national standards. We will strengthen our partnership with local schools and evaluate the impact on knowledge, attitudes, and behaviors of participants and the public.

**ACTIVITY 2 ENRTF BUDGET: \$121,020**

<b>Outcome</b>	<b>Completion Date</b>
1. Recruitment of new schools to participate in the SUYM challenge annually.	December (annual)
2. Analysis of surveys to evaluate changes in knowledge, attitudes, and behavior.	March (annual)
3. Top schools visit the Zoo to participate in on-site mussel conservation programs (maximum of 600 students per year).	June (annual)
4. Professional development, site visits and other support provided to teachers.	April (annual)
5. Mussel educational resources updated to meet new state science standards.	June, 2023

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#### **IV. DISSEMINATION:**

##### **Description:**

Updates on activities and progress will be shared with collaborators via regular reports, and information about this work will be disseminated to the general public by the Zoo's Conservation, Education and Nature division, as well our Marketing and Communication team, as frequently as possible. These communications may include presentations by staff to school groups, summer camps and other public venues and sharing information on the Minnesota Zoo's web page and social media outlets. In addition, Zoo staff and volunteers will be instructed in speaking with the public about mussels, the Zoo's rearing and research program, our partnerships with the DNR and other organizations, and the benefits of mussels for a healthy ecosystem and improved water quality. Results of research evaluating optimal conditions for maximizing mussel growth and survival in captivity will be submitted for publication in peer-reviewed scientific journals and presented at professional conferences.

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

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**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:**

Several staff positions that will be supported by these ENRTF funds are classified. Current personnel have the necessary expertise to successfully implement Activities 1 and 2, but without the support of the ENRTF funding, they would not have the support and ability to work on this project and instead would need to focus on other responsibilities. Incorporating the existing expertise from across departments at the Zoo will be essential for the completion of this project.

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

Enter Total Estimated Personnel Hours for entire duration of project: 8,554	Divide total personnel hours by 2,080 hours in 1 yr = TOTAL FTE: 4.11
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**Total Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation:**

Enter Total Estimated Contract Personnel Hours for entire duration of project: 175	Divide total contract hours by 2,080 hours in 1 yr = TOTAL FTE: 0.08
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**VI. PROJECT PARTNERS:**

A. Partners outside of project manager’s organization receiving ENRTF funding

Organization	Contact Name	Title	Role
Minnesota Department of Natural Resources	Madeline Pletta	Freshwater Mussel Propagation Biologist	Rearing and provisioning of mussels; technical support; reintroductions

B. Partners outside of project manager’s organization NOT receiving ENRTF funding

Organization	Contact Name	Title	Role
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US Fish and Wildlife Service, MN and WI Field Office	Tamara Smith	Biologist	Conservation planning and permitting
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Other collaborators for this work will include the US Fish and Wildlife Service - Genoa National Fish Hatchery, US Army Corps of Engineers, National Park Service, and teachers at selected schools.

**VII. LONG-TERM- IMPLEMENTATION AND FUNDING:**

This proposal is part of a larger multi-partner effort to restore threatened and endangered mussel populations across the upper Midwest to historic levels. Given the significant filtration performed by healthy mussel communities, we anticipate that these restoration efforts will play an important role in achieving Minnesota’s clean water goals. The combined efforts of the Zoo, DNR and other partners will also advance the recovery of imperiled mussels in Minnesota. Public awareness about mussel conservation and actions to improve water quality will be increased via our activities. We expect that the mussel rearing activities will need to continue beyond the scope of this proposal; the Zoo will continue to seek other sources of support for this initiative.

**VIII. REPORTING REQUIREMENTS:**

- Project status update reports will be submitted April 1 and October 1 each year of the project
- A final report and associated products will be submitted between June 30 and August 15, 2024

**IX. SEE ADDITIONAL WORK PLAN COMPONENTS:**

**A. Budget Spreadsheet**

**B. Visual Component or Map**

**C. Parcel List Spreadsheet: N/A**

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

**E. Research Addendum**

Attachment A: Project Budget Spreadsheet  
 Environment and Natural Resources Trust Fund  
 M.L. 2020 Budget Spreadsheet



Legal Citation:

Project Manager: Seth Stapleton

Project Title: Expanding restoration and promoting awareness of native mussels

Organization: Minnesota Zoo

Project Budget: \$489,000

Project Length and Completion Date: 4 years; June 30, 2024

Today's Date: February 14, 2020

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
<b>BUDGET ITEM</b>			
<b>Personnel (Wages and Benefits)</b>	\$ 391,150	\$ -	\$ 391,150
B. Minerich, Mussel Conservation Specialist (1 person, 65% salary / 35% benefits), 0.8 FTE for 4 years - \$302,650			
S. Stapleton, Principal Investigator / Project Manager. (1 person, 71% salary / 29% benefits), 0.05 FTE for 4 years - \$25,400			
L. Gilles, Education Project Coordinator (1 person, 72% salary / 28% benefits), 0.1 FTE for 4 years - \$32,000			
Intermittent Mussel Educator (100 hours per year for 4 years), \$14,000			
E. Kalnicky, Evaluation and Research Specialist (1 person, 67% salary / 33% benefits), 0.03 FTE for 4 years: \$17,100			
<b>Professional/Technical/Service Contracts</b>			
TBD (competitive bid): Contract with consultant to copy edit and redesign educational resources for teachers- \$2,000.	\$ 2,000	\$ -	\$ 2,000
TBD (competitive bid): Teacher contracts for updating school materials to meet new state standards (5 teachers x \$1,000 ea x 1 summer)-\$5,000. Teachers selected through a competitive application process; this project is beyond the scope of their existing teaching contracts and will occur during summer when teachers are off-contract with school districts.	\$ 5,000	\$ -	\$ 5,000
<b>Equipment/Tools/Supplies</b>			
Mussel rearing and propagation supplies, including supplies for the construction of systems to breed fish hosts and newly acquired mussels for quarantine. Supplies also include consumables and recurring costs associated with systems' maintenance and continued expansion of the Zoo's holding capacity.	\$ 34,230	\$ -	\$ 34,230
Research supplies, including tags, substrate, supplemental feed, and water quality testing kits, to assess the rearing conditions which accelerate the growth and maximize the survival of select mussel species	\$ 4,500	\$ -	\$ 4,500
<b>Printing</b>			
Printing mussel conservation educational resources (\$30 / copy x 100 copies)	\$ 3,000	\$ -	\$ 3,000
Promotional materials for conferences (1,000 half pages \$0.40 x 2 years; 750 full pages x \$0.80 x 2 years)	\$ 2,000	\$ -	\$ 2,000
<b>Travel expenses in Minnesota</b>			
Travel to field sites in southern and central Minnesota and conduct site visits with project partners (\$300 / year x 4 years)	\$ 1,200	\$ -	\$ 1,200
Zoo Education staff will present and provide information at professional development opportunities for teachers in order to share materials developed and recruit more teachers to participate in Show Us Your Mussels. Potential conferences, their purpose and associated costs include: <ul style="list-style-type: none"> <li>• Impact Education Conference (formerly known as TIES), the state's largest conference for teacher and administrators focusing on technology use in the classroom. Cost: Presentation, if accepted \$150.</li> <li>• MnSTA Conference on Science Education (MNCOSE), the Minnesota Science Teacher Association's Annual Conference. Cost: Presentation, if accepted \$150 ; informational booth \$250.</li> <li>• Minnesota Independent School Forum (MISF) STEM Conference STEM Conference. MISF is an organization serving Independent schools in the state of Minnesota. MISF STEM Program encourages and supports MISF member schools in their efforts to introduce and enhance STEM education in their schools. Cost: Presentation, if accepted \$200.</li> <li>• Minnesota Educator Academy Conference (MEA), a union-sponsored professional development for educators, by educators and traditionally the largest annual conference for educators in the state. Cost: Booth \$450</li> </ul> Total costs: ~\$1,200 / year x 4 years	\$ 4,800	\$ -	\$ 4,800
<b>Other</b>			
Online promotion for "Show Us Your Mussels" digital media challenge (average \$5-\$20 per boost; est. \$200 / year x 4 years)	\$ 800		\$ 800
Promotional post card mailing to recruit teachers to participate ( 6,000 post cards x \$0.18 / piece x 4 years)	\$ 4,320		\$ 4,320
Transportation (bussing) costs for participating schools to attend "Show Us Your Mussels" - \$1,500/school x 6 schools x 4 years	\$ 36,000	\$ -	\$ 36,000
<b>COLUMN TOTAL</b>	\$ 489,000	\$ -	\$ 489,000

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
<b>Non-State:</b>				
Minnesota Zoo Foundation: Additional supplies and travel (est. at \$7,500 / year x 4 years)	pending	\$ 30,000	\$ -	\$ 30,000
<b>State:</b>				
The Zoo's general operating fund to provide additional support to the project, including utilities and administrative costs (est. at 15% of project budget).	pending	\$ 73,391	\$ -	\$ 73,391
Clean Water, Land and Legacy Fund appropriation to Minnesota Zoo to support additional staffing costs associated with the Project Manager / Principal Investigator and Mussel Conservation Specialist, as well as supplies and travel (est. at \$30,000 / year x 4 years).	pending	\$ 120,000	\$ -	\$ 120,000
<b>In kind: N/A</b>				
<b>Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS</b>	<b>Amount legally obligated but not yet spent</b>	<b>Budget</b>	<b>Spent</b>	<b>Balance</b>
Rearing native mussels for reintroduction and expanding water quality awareness; M.L. 2017, Chp. 96, Sec. 2, Subd. 04c; Budget and expenditures through August 15, 2019.	\$ 163,414	\$ 591,000	\$ 427,586	\$ 163,414

