

**Environment and Natural Resources Trust Fund
2020 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 016-A

Expanding Restoration and Promoting Awareness of Native Mussels

Category: A. Foundational Natural Resource Data and Information

Sub-Category:

Total Project Budget: \$ 489,270

Proposed Project Time Period for the Funding Requested: June 30, 2024 (4 yrs)

Summary:

The Minnesota Zoo will promote mussel conservation by rearing juvenile mussels for reintroduction, researching methods to improve growth and survival in captivity, and encouraging public action to benefit water quality.

Name: Seth Stapleton

Sponsoring Organization: Minnesota Zoo

Job Title: Dr.

Department: _____

Address: 13000 Zoo Blvd
Apple Valley MN 55124

Telephone Number: (952) 431- 9443

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Web Address: mnzoo.org

Location:

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

We will grow juvenile mussels produced by the DNR to a releasable size. We will conduct research to improve mussel husbandry and engage the public via student-created digital campaigns.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____ %



PROJECT TITLE: Expanding restoration and promoting awareness of native mussels

I. 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. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Rearing native mussels at the Zoo and improving husbandry practices

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.

ENRTF BUDGET: \$368,250

Outcome	Completion Date
1. Construct fish host breeding and quarantine systems.	March, 2021



**Environment and Natural Resources Trust Fund (ENRTF)
2020 Main Proposal Template**

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

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

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.

ENRTF BUDGET: \$121,020

Outcome	Completion Date
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

III. PROJECT PARTNERS AND COLLABORATORS:

Organization	Contact Name	Title	Role
Minnesota Department of Natural Resources	Madeline Pletta	Freshwater Mussel Propagation Biologist	Rearing and provisioning of mussels; technical support; reintroductions
US Fish and Wildlife Service, MN and WI Field Office	Tamara Smith	Biologist	Conservation planning and permitting

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.

IV. 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.

V. SEE ADDITIONAL PROPOSAL COMPONENTS:

- A. Proposal Budget Spreadsheet
- B. Visual Component or Map
- F. Project Manager Qualifications and Organization Description

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: \$489,270

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

Today's Date: April 15, 2019

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits)	\$ 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			
Professional/Technical/Service Contracts			
TBD (competitive bid): Contract with consultant to copy edit and redesign educational resources for teachers- \$2,000. Selection through a competitive bid process.	\$ 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
Equipment/Tools/Supplies			
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.	\$ 34,500	\$ -	\$ 34,500
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
Printing			
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
Travel expenses in Minnesota			
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 to present and table at conferences specifically related to the digital media challenge and / or mussel conservation. Conferences include TIES Education Technology Conference, MnSTA Conference on Science Education (MNCOSE), Minnesota Independent School Forum STEM Conference, and Minnesota Educator Academy Conference (\$1,200 / year x 4 years)	\$ 4,800	\$ -	\$ 4,800
Other			
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
COLUMN TOTAL	\$ 489,270	\$ -	\$ 489,270

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State:				
Minnesota Zoo Foundation: Additional supplies and travel (est. at \$7,500 / year x 4 years)	pending	\$ 30,000	\$ -	\$ 30,000
State:				
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
In kind: N/A				
Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
Rearing native mussels for reintroduction and expanding water quality awareness; M.L. 2017, Chp. 96, Sec. 2, Subd. 04c; Budget and expenditures through April 1, 2019.	\$ 249,587	\$ 591,000	\$ 341,413	\$ 249,587



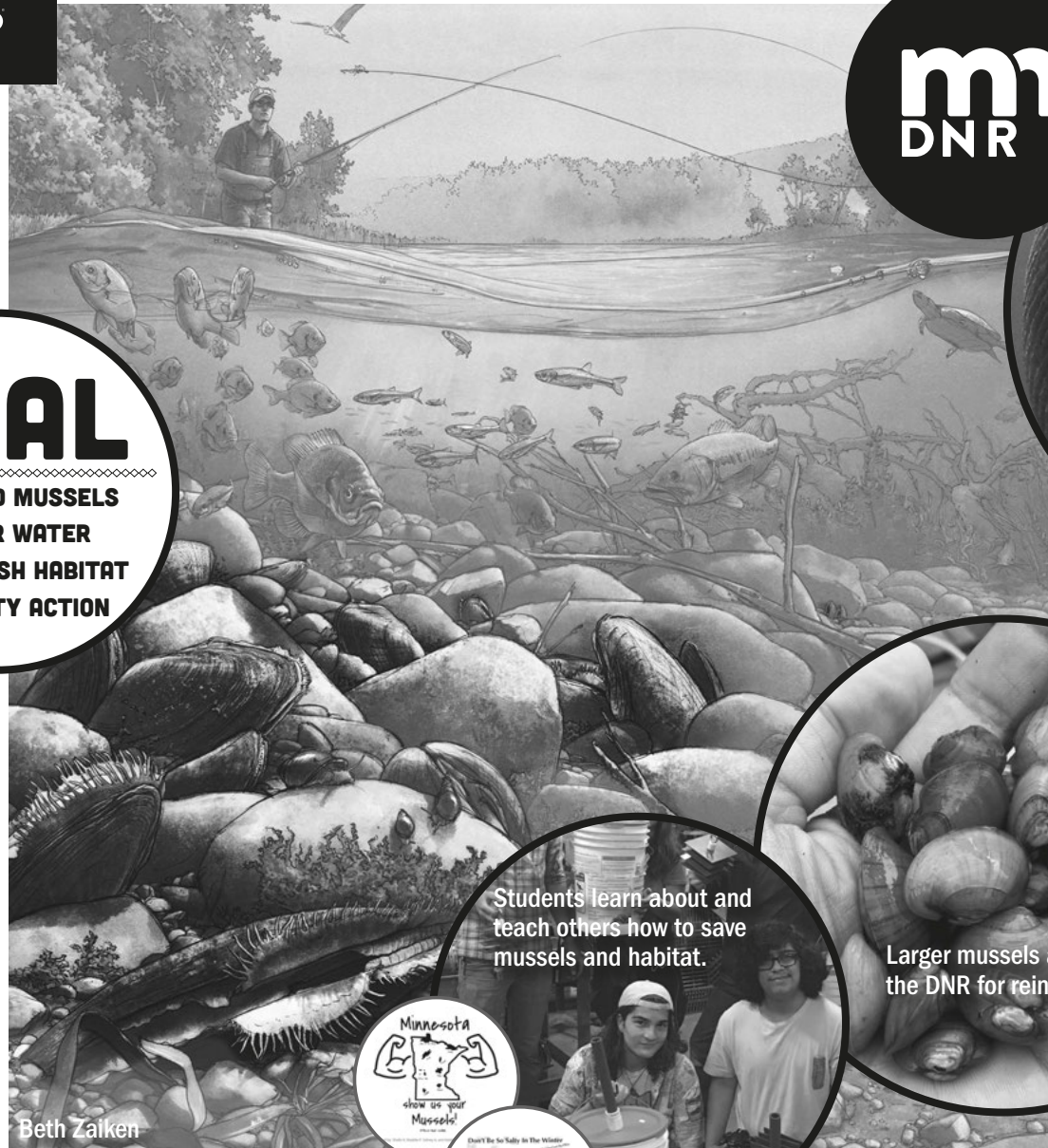
MINNESOTA ZOO

EXPANDING RESTORATION AND PROMOTING AWARENESS OF NATIVE MUSSELS

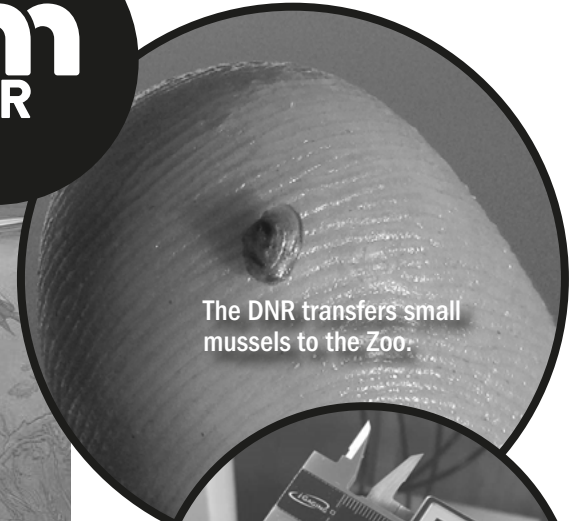


GOAL

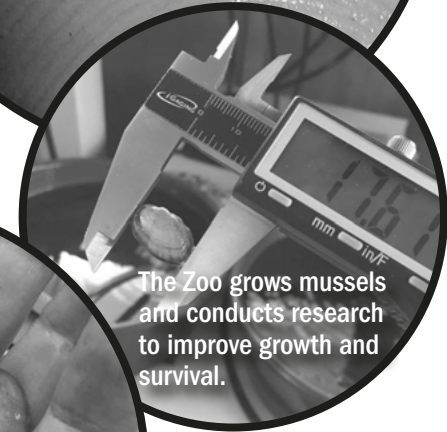
- RECOVERED MUSSELS
- CLEANER WATER
- HEALTHY FISH HABITAT
- COMMUNITY ACTION



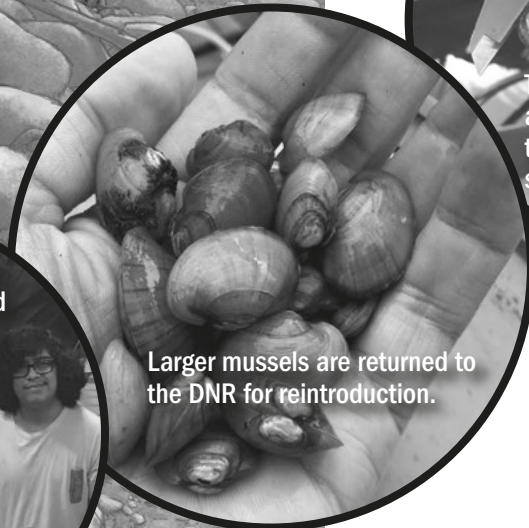
Beth Zalken



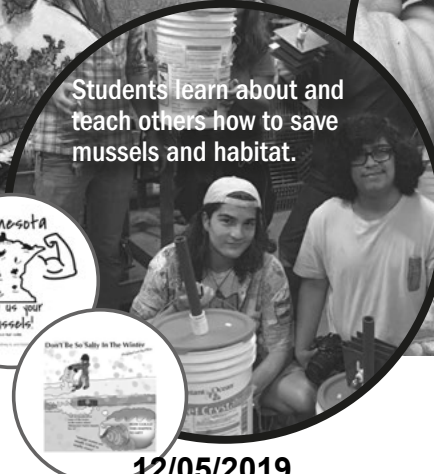
The DNR transfers small mussels to the Zoo.



The Zoo grows mussels and conducts research to improve growth and survival.



Larger mussels are returned to the DNR for reintroduction.



Students learn about and teach others how to save mussels and habitat.



12/05/2019

PROJECT MANAGER QUALIFICATIONS

Dr. Seth Stapleton, Minnesota Zoo’s Field Conservation Supervisor, will serve as project manager for the proposed work. He has built a diverse professional portfolio in wildlife research and conservation over the past 19 years, with work spanning a variety of species and geographic regions. Stapleton has particular expertise with aquatic ecosystems. He has conducted research on native freshwater turtles in Minnesota for past 2 years and serves as project manager for ENRTF grants supporting the conservation of turtles and native mussels. Stapleton also has studied the critically endangered hawksbill sea turtle since 2004 and has served as the principal investigator and director of a monitoring program in the eastern Caribbean since 2009. Stapleton has a proven track-record of fund-raising and managing large budgets, obtaining more than \$3 million to support his research, and he has been successful in initiating and expanding collaborative studies among government agencies, NGOs, academic institutions and community groups.

For the proposed project, Stapleton will oversee project planning, implementation, and coordination with project partners, provide scientific guidance for the research elements of this work, supervise Zoo staff implementing rearing activities and associated conservation programs, manage budgets, and prepare reports and resultant peer-reviewed publications.

ORGANIZATION DESCRIPTION: Minnesota Zoological Garden

The Minnesota Zoo is a unique state agency. Established in 1978 to provide Minnesota residents and guests with an opportunity to experience animals from the exotic to the familiar in natural habitats, today the Zoo is one of the State’s premier cultural, educational and conservation institutions.

The Minnesota Zoo’s mission is ***to connect people, animals and the natural world to save wildlife***. With 1.3 million guests a year, over 2.7 million website hits annually and state-wide outreach programs reaching thousands more, the Zoo is in an excellent position to strengthen Minnesotans’ awareness and understanding of our State’s commitment to wildlife, science and conservation. The Zoo is the State’s largest environmental educator with more than 500,000 participants in Zoo education programs.

The Minnesota Zoo is also a leader in conservation – directing efforts and partnering with others on a variety of conservation programs at the Zoo, in Minnesota and across the globe. Over the past seven years, the Zoo has enhanced its efforts to focus on Minnesota wildlife and habitats, including projects to conserve Minnesota’s native moose, bison, mussels, turtles, and prairie butterflies. Advancing the science of wildlife conservation is an important part of the Zoo’s work, as evidenced by the Zoo’s research on wildlife behavior, ecology, genetics, disease, and conservation techniques.

The Zoo has a proven record of using its resources efficiently and effectively, ***matching*** the State’s investment with private funds and earned income.