

**Environment and Natural Resources Trust Fund**

# 2023 Request for Proposal

## **General Information**

**Proposal ID:** 2023-060

**Proposal Title:** Restoring Mussels in Streams and Lakes - Continuation

## **Project Manager Information**

**Name:** Madeline Pletta

**Organization:** MN DNR - Ecological and Water Resources Division

**Office Telephone:** (651) 314-6306

**Email:** madeline.pletta@state.mn.us

## **Project Basic Information**

**Project Summary:** Restoring native mussel assemblages can improve water quality and ecological health of rivers. Mussel filter water, purifying and improving water clarity by removing particles and contaminants like E. coli bacteria.

**Funds Requested:** $825,000

**Proposed Project Completion:** June 30, 2025

**LCCMR Funding Category:** Methods to Protect, Restore, and Enhance Land, Water, and Habitat (F)

## **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.**

Minnesota’s native mussels are a critically important component of aquatic ecosystems, but have been lost or diminished in many Minnesota water bodies. Historical accounts speak of mussels literally paving the bottom of rivers. Harvest for pearls and buttons, pollution, dams and destabilized waterways have caused mussel populations to decline dramatically in North America including Minnesota where 80% of our species have been affected. This drastic decline of mussels over the last century has diminished the filtering capacity and other benefits mussels provide. Today, Clean Water Act implementation and advances in mussel culture and restoration offer opportunities to mitigate this trend. A single mussel can filter 10 gallons of water a day, over years to decades of its life, and a 6-mile stretch of mussel beds can filter out over 25 tons of particulates per year while filtering the entire volume of a river many times over at base flows.

**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.**

We propose to restore native mussel assemblages in the Cedar, Cannon, and Mississippi rivers by continuing to propagate, rear, release and monitor mussels in these watersheds.

**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?**

Reintroducing up to six species of mussels historically present in the Cedar River downstream of Austin, MN, up to two species historically present in the Cannon River system upstream of Northfield, MN, and up to six species historically present in the Mississippi River upstream of its confluence with the Minnesota River. Reestablishing the water cleansing and nutrient processing capacity that mussel populations provide will improve water quality and restore the biotic communities that mussels support and that fish and wildlife depend on while helping delist endangered and threatened species.

## **Activities and Milestones**

### **Activity 1: Monitoring mussels released into streams**

**Activity Budget:** $200,000

**Activity Description:**Mussels released at each site in each stream will be monitored for survival, growth and eventually reproductive status annually. Additionally, environmental variables (e.g., flow, water temp, water depth, ammonia, etc.) will be monitored to determine potential reasons we see the survival and growth response.

**Activity Milestones:**

|  |  |
| --- | --- |
| **Description** | **Completion Date** |
| Quantify environmental parameters at mussel release sites | June 30, 2025 |
| Recapture at least 10 tagged mussels at restoration sites annually. | June 30, 2025 |
| Document reproductive status | June 30, 2025 |
| Quantify growth and survival for site (per river). | June 30, 2025 |

### **Activity 2: Propagate and rear mussels for reintroduction in rivers**

**Activity Budget:** $400,000

**Activity Description:**Up to ten brooding female mussels of each target species will be collected by wading, snorkeling or with SCUBA. Broodstock are collected from early spring to late fall depending on the targeted species' life history. Host fish will be inoculated with larvae harvested from female mussels by combining them in an aerated water bath. Post inoculation, fish will be moved into holding tanks specifically designed for mussel propagation, placed into cages within their watershed or released at selected mussel restoration sites. Juveniles will be collected from the host fish retained at our facility for 2-12 weeks after inoculation. All juveniles collected will be counted and placed into mussel rearing systems and monitored for growth and survival. Juvenile mussels may be reared at our Center for Aquatic Mollusk Programs (CAMP) for up to 18-months before moving them to a natural system for continued growth.

**Activity Milestones:**

|  |  |
| --- | --- |
| **Description** | **Completion Date** |
| Yearly collection of host fish; 10-200 host fish per mussel species. | May 31, 2024 |
| Yearly collection of gravid females (broodstock); 2-10 mussels per species. | September 30, 2024 |
| Juvenile mussels (50-1,000) will be collected from each host fish per mussel species. | October 31, 2024 |
| Rear juvenile mussels to releasable size (10-1,000 per species). | June 30, 2025 |

### **Activity 3: Reintroduce mussels into to selected restoration sites**

**Activity Budget:** $150,000

**Activity Description:**Once mussels reach a releasable size (minimum size 1.5 cm), each mussel is marked with a unique identifier (PIT tag, Hallprint tag, colored glue dot) to provide growth and survival information upon recapture. Mussels will be released into 1-3 selected restoration sites per river. Site selection is determined by flow, depth, water quality, and presence of current mussel population. Additionally, Monkeyface, a state threatened species, has only been documented as empty shells in the Cedar River in Minnesota. However, a stable population remains in northern Iowa. Although Monkeyface has been at the forefront of propagation efforts, difficulties with host fish have resulted in unsuccessful cohort years. With permitting by the Iowa DNR, 50 Monkeyface will be collected, tagged with passive integrated transponders (PIT), and transported to the Cedar River in Minnesota for two consecutive years. Monkeyface will be monitored for survival and gravidity annually.

**Activity Milestones:**

|  |  |
| --- | --- |
| **Description** | **Completion Date** |
| Place unique identifiers and measure mussel prior to release. | June 30, 2025 |
| Select additional release sites based on prior data collection. | June 30, 2025 |
| Reintroduce juvenile mussels to selected restoration sites (1-3 sites per river of each species). | June 30, 2025 |
| Collect, tag, and relocate up to 50 Monkeyface annually | June 30, 2025 |

### **Activity 4: Outreach to citizens**

**Activity Budget:** $75,000

**Activity Description:**Inform the public and media about our program and the importance of mussels. We will update and publish a digital field guide of the Freshwater Mussels of Minnesota. Species names and distribution have been revised since the original publication (Sietman 2003). The updated guide will be available for download on the DNR webpage. Also, we will staff a booth at the MN State Fair each year. Here, citizens can acquire the new ENRTF mussel ID app, see demonstrations on its use, and try it out with native mussel shells on display. Additionally, we will have posters available for handout and a collection of shells that people can see and handle. Quarterly posts to the DNR Facebook page and our CAMP newsletter will update citizens on our activities funded by the ENRTF and will feature results of our milestones for propagation, releases and monitoring.

**Activity Milestones:**

|  |  |
| --- | --- |
| **Description** | **Completion Date** |
| Yearly staff presentations at various platforms (State Fair, Water Festival, Nature Centers) | March 31, 2025 |
| Newsletter reaching greater than 3,000 recipients | June 30, 2025 |
| Greater than 250 downloads of the Mussel Phone App | June 30, 2025 |
| Update and publish Digital Field Guide | June 30, 2025 |

## **Project Partners and Collaborators**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Organization** | **Role** | **Receiving Funds** |
| Joe Walton | Dakota County Parks Natural Resources | Monitor mussel cage site location for disturbances | No |
| Tim Ruzek | Cedar Watershed District | Assist with mussel release locations in the Cedar River, and monitor East Side Lake cage location | No |
| Kelly Poole | Iowa DNR, Threatened and Endangered Species Coordinator | Access to female mussels in Iowa's Cedar River | No |
| Alison Holdhusen | National Park Service, Mississippi National River and Recreation Area | Assists with monitoring and collection of donor mussels | No |
| Byron Karns | National Park Service, St. Croix National Riverway | Assists with monitoring and collection of donor mussels | No |
| Tam Smith | US Fish and Wildlife Service, Twin Cities Field Office | Permitting and planning for reintroduction of federally listed species | No |
| Doug Aloisi | US Fish and Wildlife Service, Genoa National Fish Hatchery | Assists with obtaining host fish and female mussels | No |
| Dan Kelner | US Army Corps of Engineers | Coordinates and pays for monitoring of reintroduction sites on the Mississippi River | No |
| Ben Meinrich | MN Zoo | Assist with growing juvenile mussels to release size at Zoo lake | No |
| Scott Gritters | IA DNR | Fisheries Biologist and Malacologist; assist with Monkeyface permitting | No |
| Luke Reese | Hormel Nature Center | Director and project advocate for mussel in Austin and at HNC | No |
| Andrew Scholten | MN DNR Waterville Fish Hatchery | Primary contact for secondary culture in ponds at Waterville Fish Hatchery | No |

## **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?**This will be our fourth grant from the ENRTF and part of a long-term effort to reestablish mussels in these streams. As we seek funding from other sources to expand our work to other rivers and lakes it is crucial to be able to retain our staff and facility that makes this work possible.

## **Other ENRTF Appropriations Awarded in the Last Six Years**

|  |  |  |
| --- | --- | --- |
| **Name** | **Appropriation** | **Amount Awarded** |
| Restoring Native Mussels in Streams and Lakes | M.L. 2016, Chp. 186, Sec. 2, Subd. 04c | $600,000 |
| Restoring Native Mussels in Streams and Lakes | M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03b | $500,000 |
| Restoring Mussels In Streams And Lakes - Continuation | M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 08b | $619,000 |

## **Project Manager and Organization Qualifications**

**Project Manager Name:** Madeline Pletta

**Job Title:** Natural Resources Specialist Senior, Lead Propagation Biologist

**Provide description of the project manager’s qualifications to manage the proposed project.**Madeline Pletta (NR Senior) is the lead propagation biologist at CAMP. She spearheaded the growth of our facility and propagation efforts statewide. Madeline has over 10 years of experience with mussels, and a master’s degree focusing on propagation and feeding requirements of juvenile mussels. Additionally, she has been an integral part of previous ENRTF reporting and proposals (2016, 2019, 2021).

**Organization:** MN DNR - Ecological and Water Resources Division

**Organization Description:**MN DNR EWR, River Ecology Unit, Center for Aquatic Mollusk Programs (CAMP).  
   
CAMP specializes in freshwater mussel conservation statewide. This includes surveys to determine species distributions, abundance and population health of mussel assemblages that began in 1987 and was expanded in 1999 with two years of funding from the Environment and Natural Resources Trust Fund. These surveys have collected mussel data from about 4,000 sites around the state and inform our reintroduction program, determine impacts to listed mussels at sites of disturbance such as bridge replacements, pipeline crossings etc. We conduct monitoring of known mussel communities at sixteen long-term sites in twelve rivers in Minnesota and and at six reintroduction sites in the Mississippi River in Minnesota for the federally endangered Higgins' Eye mussel. We have contracted with the USACE St. Paul District to monitor Essential Habitat Areas for Higgins' Eye in the Mississippi and St. Croix Rivers each year since 2001. Having acquired extensive knowledge of our mussel resources over these years and with documented success in reintroducing Higgins' Eye mussels, we began a long-term project to reintroduce select state listed mussel species to the Cedar, Cannon and Mississippi Rivers in 2016 with funding from the ENRTF.

## **Budget Summary**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Category / Name** | **Subcategory or Type** | **Description** | **Purpose** | **Gen. Ineli gible** | **% Bene fits** | **# FTE** | **Class ified Staff?** | **$ Amount** |
| **Personnel** |  |  |  |  |  |  |  |  |
| Madeline Hayden, NR Spec Sr |  | Lead Mussel Propagation Biologist |  |  | 50% | 2 |  | $229,441 |
| NR Spec Intermediate |  | Fish husbandry, lab management/maintenance, monitoring release sites |  |  | 62% | 1.2 | X | $104,823 |
| Zeb Secrist, NR Spec |  | Database manager, IT support, dive survey expert |  |  | 14.3% | 0.3 | X | $23,155 |
| Lindsay Ohlman, NR Spec Int |  | Mussel Propagation and Rearing Biologist |  |  | 33% | 2 | X | $165,714 |
| Bernard Sietman, Research Scientist |  | Lends expertise in mussel distribution, taxonomy and biology helping to improve results and design monitoring plans |  |  | 23% | 0.4 | X | $46,084 |
| Kathryn Holcomb |  | Mussel Program Supervisor |  |  | 50% | 0.3 | X | $35,476 |
| NR Spec Intermediate |  | Juvenile mussel culture/fish husbandry/monitoring release sites |  |  | 80% | 1.2 | X | $101,510 |
|  |  |  |  |  |  |  | **Sub Total** | **$706,203** |
| **Contracts and Services** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **Sub Total** | **-** |
| **Equipment, Tools, and Supplies** |  |  |  |  |  |  |  |  |
|  | Tools and Supplies | Temperature loggers and water quality instruments | Track temperature and WQ at monitoring sites, ponds, and all other mussel culture systems |  |  |  |  | $7,000 |
|  | Tools and Supplies | PVC parts and pumps for juvenile culture systems | Expand or update juvenile capture and culture systems |  |  |  |  | $8,000 |
|  | Tools and Supplies | Mussel culture supplies | Food for mussels and fish, purchase host fish |  |  |  |  | $20,000 |
|  | Tools and Supplies | SCUBA equipment maintenance | SCUBA equipment require yearly maintenance (regulators and BCDs), and air tanks refills |  |  |  |  | $1,069 |
|  |  |  |  |  |  |  | **Sub Total** | **$36,069** |
| **Capital Expenditures** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **Sub Total** | **-** |
| **Acquisitions and Stewardship** |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **Sub Total** | **-** |
| **Travel In Minnesota** |  |  |  |  |  |  |  |  |
|  | Miles/ Meals/ Lodging | Fleet charges and expenses for staff | Collect brooding mussels and host fish, place juveniles in growing baskets, collect juveniles for tagging and release, monitoring reintroduction sites. Outreach events. |  |  |  |  | $15,000 |
|  |  |  |  |  |  |  | **Sub Total** | **$15,000** |
| **Travel Outside Minnesota** |  |  |  |  |  |  |  |  |
|  | Miles/ Meals/ Lodging | Fleet charges and staff expenses, no lodging | Trips to Iowa to collect female mussels needed for propagation | X |  |  |  | $4,000 |
|  |  |  |  |  |  |  | **Sub Total** | **$4,000** |
| **Printing and Publication** |  |  |  |  |  |  |  |  |
|  | Publication | Mussel phone app annual cost of maintenance | To keep the phone app supported requires and annual expenditure to the vendor |  |  |  |  | $4,000 |
|  |  |  |  |  |  |  | **Sub Total** | **$4,000** |
| **Other Expenses** |  |  |  |  |  |  |  |  |
|  |  | Direct and necessary expenses includes all department support services. | To support the costs related to the program administration \*Direct and Necessary expenses: People Support ($13,490), Safety Support ($2,718), Financial Support ($10,269), Communication Support ($1,811), IT Support ($30,420), and Planning Support ($1,020) necessary to accomplish funded programs/projects. |  |  |  |  | $59,728 |
|  |  |  |  |  |  |  | **Sub Total** | **$59,728** |
|  |  |  |  |  |  |  | **Grand Total** | **$825,000** |

### **Classified Staff or Generally Ineligible Expenses**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category/Name** | **Subcategory or Type** | **Description** | **Justification Ineligible Expense or Classified Staff Request** |
| **Personnel** - NR Spec Intermediate |  | Fish husbandry, lab management/maintenance, monitoring release sites | **Classified :** This position does not have a permanent dedicated funding base and so the MN DNR cannot backfill the ENRTF portion of their salaries. Classified staff manage this program but they may not be retained to work on mussels without the support of this ENTRF grant. Retaining these positions is essential for implementing this project. |
| **Personnel** - Zeb Secrist, NR Spec |  | Database manager, IT support, dive survey expert | **Classified :** This position does not have a permanent dedicated funding base and so the MN DNR cannot backfill the ENRTF portion of their salaries. Classified staff manage this program but they may not be retained to work on mussels without the support of this ENTRF grant. Retaining these positions is essential for implementing this project. |
| **Personnel** - Lindsay Ohlman, NR Spec Int |  | Mussel Propagation and Rearing Biologist | **Classified :** This position does not have a permanent dedicated funding base and so the MN DNR cannot backfill the ENRTF portion of their salaries. Classified staff manage this program but they may not be retained to work on mussels without the support of this ENTRF grant. Retaining these positions is essential for implementing this project. |
| **Personnel** - Bernard Sietman, Research Scientist |  | Lends expertise in mussel distribution, taxonomy and biology helping to improve results and design monitoring plans | **Classified :** This position does not have a permanent dedicated funding base and so the MN DNR cannot backfill the ENRTF portion of their salaries. Classified staff manage this program but they may not be retained to work on mussels without the support of this ENTRF grant. Retaining these positions is essential for implementing this project. |
| **Personnel** - Kathryn Holcomb |  | Mussel Program Supervisor | **Classified :** This position does not have a permanent dedicated funding base and so the MN DNR cannot backfill the ENRTF portion of their salaries. Classified staff manage this program but they may not be retained to work on mussels without the support of this ENTRF grant. Retaining these positions is essential for implementing this project. |
| **Personnel** - NR Spec Intermediate |  | Juvenile mussel culture/fish husbandry/monitoring release sites | **Classified :** This position does not have a permanent dedicated funding base and so the MN DNR cannot backfill the ENRTF portion of their salaries. Classified staff manage this program but they may not be retained to work on mussels without the support of this ENTRF grant. Retaining these positions is essential for implementing this project. |
| **Travel Outside Minnesota** | Miles/Meals/Lodging | Fleet charges and staff expenses, no lodging | Out of state travel is required to collect female mussels needed for propagation. |

### **Non ENRTF Funds**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **Specific Source** | **Use** | **Status** | **Amount** |
| **State** |  |  |  |  |
|  |  |  | **State Sub Total** | **-** |
| **Non-State** |  |  |  |  |
|  |  |  | **Non State Sub Total** | **-** |
|  |  |  | **Funds Total** | **-** |

## **Attachments**

### **Required Attachments**

#### ***Visual Component***

File: [f40255a9-f48.pdf](https://lccmrprojectmgmt.leg.mn/media/map/f40255a9-f48.pdf)

#### ***Alternate Text for Visual Component***

Top: a collection of photos from our program, starting at upper left: 6-month old Mucket mussels, brooding female displaying her mantle lure, tagging propagated Black Sandshell, reintroducing mussels, public outreach, juvenile mussel collection system, and mussels recovered during monitoring (center). Bottom: depiction of CAMP’s objectives relating to the mussel lifecycle....

## **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?**   
 No

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

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

**Does your project include original, hypothesis-driven research?**   
 No

**Does the organization have a fiscal agent for this project?**   
 No