



# Environment and Natural Resources Trust Fund

M.L. 2021 Approved Work Plan

## General Information

**ID Number:** 2021-039

**Staff Lead:** Corrie Layfield

**Date this document submitted to LCCMR:** July 21, 2021

**Project Title:** Restoring Mussels In Streams And Lakes - Continuation

**Project Budget:** \$619,000

## Project Manager Information

**Name:** Mike Davis

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

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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, 2024

**Final Report Due Date:** August 14, 2024

## Legal Information

**Legal Citation:** M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 08b

**Appropriation Language:** \$619,000 the first year is from the trust fund to the commissioner of natural resources to restore native freshwater mussel assemblages and the ecosystem services they provide in the Mississippi, Cedar, and Cannon Rivers and to inform the public on mussels and mussel conservation.

**Appropriation End Date:** June 30, 2024

## Narrative

**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.

**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 has 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? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and 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.

## 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: Monitoring mussels released into streams

**Activity Budget:** \$130,000

**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. Physical attributes of two release sites on the Cannon River and two sites on the Cedar River will be characterized.

**Activity Milestones:**

| Description   | Completion Date |
|---|-----------------|
| Physical characterization of monitoring sites on the Cedar River and Cannon River | June 30, 2023   |
| Quantifying environmental parameters at mussel release sites                      | June 30, 2023   |
| Recapture at least 10 tagged mussels at restoration sites annually (per river).   | June 30, 2023   |

### Activity 2: Outreach to citizens

**Activity Budget:** \$39,000

**Activity Description:**

Inform the public and media about our program and the importance of mussels. 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. We will host an annual Open House where citizens can tour our lab; and see juvenile mussels of various sizes and the fish that host them.

**Activity Milestones:**

| Description  | Completion Date |
|--|-----------------|
| Host open house for citizens   | March 31, 2023  |
| Yearly staff present at various platforms (State Fair, Water Festival, Nature Centers) | March 31, 2023  |
| Newsletter reaching greater than 3,000 recipients                                      | June 30, 2023   |
| Greater than 250 downloads of the Mussel Phone App                                     | June 30, 2023   |

### Activity 3: Propagate, grow and release mussels for reintroduction in rivers

**Activity Budget:** \$450,000

**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. Mussels will be released into selected rivers at 2-years or once they reach a releasable size.

**Activity Milestones:**

| Description   | Completion Date    |
|---|--------------------|
| Yearly collection of host fish; 10-200 host fish per mussel species.                              | May 31, 2022       |
| Yearly collection of gravid females (broodstock); 2-10 mussels per species.                       | September 30, 2022 |
| Juvenile mussels (50-1,000) will be collected from each host fish per mussel species.             | October 31, 2022   |
| Reintroduce juvenile mussels to selected restoration sites (1-3 sites per river of each species). | June 30, 2023      |
| Rear juvenile mussels to releasable size (10-1,000 per species).                                  | June 30, 2023      |

## 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              |

## 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.**

Mussel ID application will include information obtained via our ENRTF grant. We will be disseminating our work results via the State Fair each year, and are involving public organizations such as the Hormel Nature Center in Austin, MN, Soil and Water Conservation Districts where mussel restoration is taking place. We produce a mussel newsletter via the DNR that has hundreds of subscribers as of this year. All project communication and outreach will acknowledge ENRTF by ENRTF logo, and attribution language.

## 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?**

This will be our third 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      |

## Budget Summary

| Category / Name                                  | Subcategory or Type | Description   | Purpose   | Gen. Ineligible | % Benefits | # FTE | Classified Staff? | \$ Amount        |
|--|---------------------|---|---|-----------------|------------|-------|-------------------|------------------|
| <b>Personnel</b>                                 |                     |   |   |                 |            |       |                   |                  |
| Madeline Hayden, NR Spec Sr                      |                     | Lead Mussel Propagation Biologist   |   |                 | 24%        | 2     |                   | \$169,000        |
| Mike Davis, Natural Resources Program Consultant |                     | Project management, provides institutional knowledge and context  |   |                 | 8%         | 0.24  |                   | \$28,000         |
| NR Spec  |                     | Fish husbandry, lab management/maintenance, monitoring release sites  |   |                 | 31%        | 0.7   |                   | \$44,000         |
| Zeb Secrist, NR Spec                             |                     | Database manager, IT support, dive survey expert  |   |                 | 31%        | 0.24  | X                 | \$19,500         |
| Lindsay Ohlman, NR Spec Int                      |                     | Mussel Propagation and rearing biologist  |   |                 | 33%        | 2     | X                 | \$175,000        |
| Bernard Sietman, Research Scientist              |                     | Lends expertise in mussel distribution, taxonomy and biology helping to improve results and design monitoring plans |   |                 | 24%        | 0.24  | X                 | \$27,000         |
|  |                     |   |   |                 |            |       | <b>Sub Total</b>  | <b>\$462,500</b> |
| <b>Contracts and Services</b>                    |                     |   |   |                 |            |       |                   |                  |
|  |                     |   |   |                 |            |       | <b>Sub Total</b>  | <b>-</b>         |
| <b>Equipment, Tools, and Supplies</b>            |                     |   |   |                 |            |       |                   |                  |
|  | Tools and Supplies  | Temperature Loggers and Water Quality instruments   | Track temperature and WQ at monitoring sites, ponds, and all other mussel culture systems   |                 |            |       |                   | \$4,000          |
|  | Tools and Supplies  | Heated Shirts   | Spring and fall water temperatures are often below 50 degrees, heated shirts will prevent hypothermia while collecting broodstock. We wish to |                 |            |       |                   | \$2,000          |

|                                     |                       |   |  |  |  |  |                  |                 |
|-------------------------------------|-----------------------|---|--|--|--|--|------------------|-----------------|
|                                     |                       |   | purchase at least 4 shirts for our divers (~450\$/per shirt plus shipping and tax)   |  |  |  |                  |                 |
|                                     | Equipment             | Tagging Supplies: Pit Tags, Hallprint Tags, Laser Engraver Unit | Mark each mussel with identifier for monitoring, laser permanently marks mussel shell  |  |  |  |                  | \$14,000        |
|                                     | Tools and Supplies    | PVC parts and pumps for juvenile culture systems                | Expand current juvenile capture and culture systems  |  |  |  |                  | \$10,121        |
|                                     | Equipment             | Docks   | Docks for pond culture of juvenile mussels at Waterville Fish Hatchery and Lake City   |  |  |  |                  | \$19,318        |
|                                     | Equipment             | mussel rearing baskets and aeration equipment                   | For containing and supporting juvenile mussels growing in ponds or rivers. Aeration for continuous water movement within the ponds.                    |  |  |  |                  | \$14,893        |
|                                     | Tools and Supplies    | Lab supplies  | Food for mussels and fish, purchase host fish  |  |  |  |                  | \$19,500        |
|                                     |                       |   |  |  |  |  | <b>Sub Total</b> | <b>\$83,832</b> |
| <b>Capital Expenditures</b>         |                       |   |  |  |  |  |                  |                 |
|                                     |                       | Outboard motor for 20 ft dive boat (150hp E-Tech)               | Existing motor is 12 years old, to ensure reliability replacing with new is needed   |  |  |  |                  | \$16,366        |
|                                     |                       |   |  |  |  |  | <b>Sub Total</b> | <b>\$16,366</b> |
| <b>Acquisitions and Stewardship</b> |                       |   |  |  |  |  |                  |                 |
|                                     |                       |   |  |  |  |  | <b>Sub Total</b> | <b>-</b>        |
| <b>Travel In Minnesota</b>          |                       |   |  |  |  |  |                  |                 |
|                                     | 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 |  |  |  |                  | \$10,000        |
|                                     |                       |   |  |  |  |  | <b>Sub Total</b> | <b>\$10,000</b> |



|                                 |                       |   |   |  |  |  |                    |                  |
|---------------------------------|-----------------------|---|---|--|--|--|--------------------|------------------|
| <b>Travel Outside Minnesota</b> |                       |   |   |  |  |  |                    |                  |
|                                 | Miles/ Meals/ Lodging | Fleet charges and staff expenses, no lodging  | Trips to Iowa to collect female mussels needed for propagation                |  |  |  |                    | \$4,000          |
|                                 |                       |   |   |  |  |  | <b>Sub Total</b>   | <b>\$4,000</b>   |
| <b>Printing and Publication</b> |                       |   |   |  |  |  |                    |                  |
|                                 | Publication           | Mussel phone app annual cost of maintenance   | To keep the phone app supported requires and annual expenditure to the vendor |  |  |  |                    | \$4,000          |
|                                 |                       |   |   |  |  |  | <b>Sub Total</b>   | <b>\$4,000</b>   |
| <b>Other Expenses</b>           |                       |   |   |  |  |  |                    |                  |
|                                 |                       | *Direct and necessary expenses: People Support (\$13,122); Safety Support (\$2,437); Financial Support (\$9,305) ; Communication Support (\$1,324); IT Support (\$26,452); and Planning Support (\$1,149) necessary to accomplish funded programs/projects. | *Direct and necessary expenses includes all department support services.      |  |  |  |                    | \$38,302         |
|                                 |                       |   |   |  |  |  | <b>Sub Total</b>   | <b>\$38,302</b>  |
|                                 |                       |   |   |  |  |  | <b>Grand Total</b> | <b>\$619,000</b> |

## Classified Staff or Generally Ineligible Expenses

| Category/Name                                   | Subcategory or Type | Description   | Justification Ineligible Expense or Classified Staff Request  |
|---|---------------------|---|---|
| Personnel - Zeb Secrist, NR Spec                |                     | Database manager, IT support, dive survey expert  | <b>Classified</b> : 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  | <b>Classified</b> : 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 | <b>Classified</b> : 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. |

## Non ENRTF Funds

| Category         | Specific Source   | Use   | Status                     | Amount          |
|------------------|---|---|----------------------------|-----------------|
| <b>State</b>     |   |   |                            |                 |
|                  |   |   | <b>State Sub Total</b>     | -               |
| <b>Non-State</b> |   |   |                            |                 |
| Cash             | USACE funds periodic monitoring at Mississippi River reintroduction sites | Supports staff salary, expenses and equipment cost to conduct monitoring. | Pending                    | \$10,000        |
|                  |   |   | <b>Non State Sub Total</b> | <b>\$10,000</b> |
|                  |   |   | <b>Funds Total</b>         | <b>\$10,000</b> |

## Attachments

### Required Attachments

#### *Visual Component*

File: [da95f91a-6bc.pdf](#)

#### *Alternate Text for Visual Component*

Left to right: MNDNR biologists releasing mussels into the Cedar River near Austin, MN. Juvenile mussels with identifying tags glued to their shells. Mussel life history graphic showing relationship with host fish. A bag of tagged mussels ready for release. Graphic showing the percent of mussels that are threatened and endangered compared to other animal groups in North America....

### Optional Attachments

#### *Support Letter or Other*

| Title            | File                             |
|------------------|----------------------------------|
| background check | <a href="#">421ae407-037.pdf</a> |

## Difference between Proposal and Work Plan

#### *Describe changes from Proposal to Work Plan Stage*

We reduced employee FTEs, added some costs/expenses in order to arrive at the approved budget total of \$619,000. Activities were not altered in nature but reduced in scope. changed completion date to 2024 and attached background check document

## 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?**

Yes

**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 Commissioner's Plan.

**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?**

Yes

**Does the organization have a fiscal agent for this project?**

No

