



Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-270

Proposal Title: A Riparian Area Adaptation Strategy for Southeast Minnesota

Project Manager Information

Name: Christian Lenhart

Organization: The Nature Conservancy

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Project Basic Information

Project Summary: We will conduct research on a riparian climate change adaptation strategy involving floodplain reconnection and shrub planting in Southeast Minnesota in partnership between TNC and the University of Minnesota

ENRTF Funds Requested: \$243,000

Proposed Project Completion: June 30, 2027

LCCMR Funding Category: Small Projects (H)

Secondary Category: Methods to Protect or Restore Land, Water, and Habitat (F)

Project Location

What is the best scale for describing where your work will take place?

Region(s): SE

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.

The Driftless Area of Minnesota is particularly prone to rapid runoff and erosion issues. Many of the valleys have been filled with legacy sediment from past erosion. As the streams cut back down through the deep sediment deposits, many streams had reduced floodplain connectivity and functionality. This created further environmental problems by increasing channel erosion and worsening flooding issues downstream. At the same time, we are experiencing increased rainfall and runoff, particularly in Southeast Minnesota. The Driftless Area has experienced the greatest increases in rainfall of any area in the state. Higher temperatures in streams are problematic for aquatic life as well. These combined stressors create a pressing need to develop a viable adaptation strategy in riparian areas of the Driftless Area that increase floodplain connectivity and make our streams more resilient to climate change. We have the opportunity to research a unique riparian adaptation restoration project being implemented at Vesta Creek in 2024-25. The project introduces a unique adaptation strategy involving low-tech stream restoration and climate-adapted shrub plantings. By comparing to traditional restoration approaches and a control site with no management done, the project will help inform badly needed stream adaptation strategies for the Driftless Area.

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 will investigate riparian area adaption strategies that makes streams more adaptable to increased flows by increasing floodplain connectivity in a cost-effective manner, while promoting climate-adapted shrubs and trees in the riparian zone. Floodplain connectivity is increased by excavating out excess floodplain sediment and depositing it outside of the active floodplain. Costs are kept down by minimizing in-stream structures and use of large rock. Reducing installation and maintenance costs make the projects more sustainable and resilient to future flow changes. We will plant more southern sources of shrubs and species near the northern end of their ranges to increase the resilience of the experimental restoration site being constructed in 2024 along Vesta Creek in Fillmore County. We will assess the benefits of the adaptation approach compared to a more traditional stream restoration project around the Choice Wildlife Management Area (WMA) and nearby streams. We will also research a control site, where no restoration or management has been done. The results of the study will inform an alternative approach to riparian corridor restoration and management that is complementary to existing restoration efforts. The new approach will increase resilience by increasing floodplain connectivity of streams that were contained within steep stream boundaries.

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?

The project will inform policy on floodplain function enhancement and climate change adaptation strategies, particularly in steep terrain and areas with entrenched streams. The approach is expected to enhance the ecological value of riparian corridors and floodplains. By grading back steep banks and connecting the floodplain it will reduce channel loading of sediment helping to improve water quality downstream. It will also promote more long-lived restoration projects that require less maintenance and are more resilient to climate change. Lastly, the approach is more cost-effective, helping to make stream restoration projects more economically feasible.

Activities and Milestones

Activity 1: stream geomorphic assessment

Activity Budget: \$170,000

Activity Description:

We will assess hydrologic conditions, sediment removal and other water quality benefits including nitrogen and phosphorus removal potential at the study sites. The research questions we will address include: How has hydrologic connectivity, sediment and nutrient removal been changed by restoration? We'll setup three study sites in the Root River watershed: control, adaptation approach (Vesta Creek), traditional restoration approach (Maple Creek). The control site will not have shrub plantings or any excavation done. The traditional approach will involve placement of in-stream and bank practices but not adaptation or excavation practices. The adaptation approach will include both excavation and planting of riparian shrub. At the research sites we will collect hydrologic data on water level and sediment accumulation in the floodplain. We will install monitoring wells in the floodplain and a streamflow gauge at each study site. We will measure sediment aggradation by a combination of survey and direct measurement on sediment aggradation monitoring mats. We'll also measure nutrient load in the river and predict nutrient removal using existing empirical tools and models. Finally, we'll estimate changes to bank erosion rates and net sediment gain/loss from the restoration project.

Activity Milestones:

| Description | Approximate Completion Date |
|--|-----------------------------|
| Survey of potential "control" sites | September 30, 2025 |
| Installation of hydrologic monitoring equipment at study sites | October 31, 2025 |
| Monitor and collect data on hydrology and sediment | December 31, 2026 |
| Report on findings | June 30, 2027 |

Activity 2: riparian planting assessment

Activity Budget: \$50,000

Activity Description:

We will assess the survival and compositional changes of riparian shrub plantings at the experimental site in Vesta Creek, comparing them with a traditional stream restoration project at Maple Creek. Shrub species selection will prioritize native species based on considerations of ecological suitability and resilience to climate change. Our approach will be conservative, allowing for species movement within their current or historic range and slightly into projected future hardiness zones ('facilitated adaptation'). At Maple Creek, we will use a standard seed mix typical for southeastern floodplain habitat for traditional restoration. Biannual plant surveys will be conducted to track changes over the study duration. Additionally, vegetation and natural regeneration will be surveyed at control sites where no active management occurred. All sites will be in the Root River watershed, allowing for comparative analysis of treatments. Furthermore, we will conduct a site inventory to assess current conditions across the study area. The data collected will serve as the basis for future long-term monitoring of trends in population dynamics, phenological shifts, and habitat changes. The outcomes of our study will inform approaches that best enhance ecosystem resilience and biodiversity in floodplain habitats.

Activity Milestones:

| Description | Approximate Completion Date |
|--|-----------------------------|
| Reconnaissance-level surveys to identify control site (no-restoration) | October 31, 2025 |
| Year 1 plant surveys | October 31, 2025 |

| | |
|--|-------------------|
| Measure other vegetative conditions in floodplain and complete plant surveys | December 31, 2026 |
| Project report | June 30, 2027 |

Activity 3: Outreach and education activities

Activity Budget: \$23,000

Activity Description:

We will organize a public workshop, conduct field trips, and produce 1-2 publications. The workshop will focus on sharing project goals, methodologies, and proposed outcomes. Additionally, field trips will offer participants the opportunity to learn about the project's progress and initial results. In fall 2025, partners and stakeholders will be invited to join a field trip to the Vesta Creek restoration site. During this trip, they will learn about the study design and compare it with other research sites, fostering knowledge exchange and collaborative learning. We will specifically work with collaborators from the Minnesota DNR, Nick Proulx and others, to ensure that lessons learned from this study are directly implemented into future restoration projects. Through these outreach and education activities, our goal is to raise awareness, build capacity, and inspire collective action towards floodplain restoration efforts in the region. 140

Activity Milestones:

| Description | Approximate Completion Date |
|---|-----------------------------|
| Lead partner field trip to research sites | November 30, 2025 |
| Conduct workshop on findings and the riparian adaptation approach | December 31, 2026 |
| Submit article for publication | June 30, 2027 |

Project Partners and Collaborators

| Name | Organization | Role | Receiving Funds |
|------------------------------|---|--|-----------------|
| Nick Proulx | Minnesota Department of Natural Resources (DNR) | Nick will provide review of the study and participate in the workshops. He helped us design the stream restoration project at Vesta Creek which we'll be studying. Most importantly he can take lessons learned and implement them in restoration projects led by the DNR. | No |
| Marcella Windmuller-Campione | University of Minnesota - Forest Resources | Science review and input. Dr. Windmuller-Campione is a professor in Forest Resources and led a previous study on riparian adaptation plantings along the Mississippi River. She may utilize the sites in some of the labs for her UMN classes. | 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?

TNC is currently developing a climate adaptation strategy in the Driftless area which will help carry the lessons learned from this study forward. We are currently working with the Minnesota DNR, local government units and SWCDs and the University of Minnesota to implement findings and direct related research, outreach and education. The lessons learned from this project will be presented at conferences and/or webinars at the university. More importantly, we'll collaborate with partners from the DNR and other organizations that are already working on climate adaptation strategies for the Driftless area.

Other ENRTF Appropriations Awarded in the Last Six Years

| Name | Appropriation | Amount Awarded |
|---|---|----------------|
| Community Response Monitoring for Adaptive Management | M.L. 2023, , Chp. 60, Art. 2, Sec. 2, Subd. 03r | \$483,000 |
| Quantifying Environmental Benefits of Peatland Restoration in Minnesota | M.L. 2023, , Chp. 60, Art. 2, Sec. 2, Subd. 08l | \$754,000 |

Project Manager and Organization Qualifications

Project Manager Name: Christian Lenhart

Job Title: Restoration Scientist & Research Professor

Provide description of the project manager's qualifications to manage the proposed project.

Christian Lenhart is a research professor at the University of Minnesota with the Department of Bioproducts & Biosystems Engineering and with The Nature Conservancy (TNC). He has managed more than 15 research projects since 2010 and has published over 30 peer-reviewed publications (and over 60 publications total) on river and wetland ecology and restoration. At TNC he has been doing restoration work in the Driftless Area since 2017 and conducting research on streams in the region going back to 2012. By researching stream bank erosion rates and hydrologic processes contributing to channel evolution, Professor Lenhart and his team developed regional stream erosion prediction graphs for the Whitewater River and other regions in Minnesota. Notably, Professor Lenhart has managed initiatives including riparian zone plantings with TNC, helping to gain an understanding for the challenges and opportunities with riparian plantings in the Driftless Area, and he currently leads a demonstration project on stream restoration for climate change adaptation in the South Fork Root River watershed within the Driftless Area, at Vesta Creek, one of the proposed research sites. That project, located in the Choice WMA will be restored in 2024 using LSOHC

funds. Beyond his research experience, Professor Lenhart has supervised junior researchers, advised 18 graduate students on their M.S. and PhD theses and supervised 20+ undergraduates on research projects at the University of Minnesota.

Organization: The Nature Conservancy

Organization Description:

Founded in 1951, the Nature Conservancy is a global conservation organization dedicated to conserving the lands and waters on which all life depends. Guided by science, we create innovative, on-the-ground solutions to our world's toughest challenges so that nature and people can thrive together. We are tackling climate change, conserving lands, waters and oceans at unprecedented scale, providing food and water sustainably and helping make cities more sustainable. Working in 72 countries and in all 50 United States, we use a collaborative approach that engages local communities, governments, the private sector, and other partners.

Budget Summary

| Category / Name | Subcategory or Type | Description | Purpose | Gen. Ineligible | % Benefits | # FTE | Classified Staff? | \$ Amount |
|---------------------------------------|----------------------|--|---------|-----------------|------------|-------|-------------------|-----------------|
| Personnel | | | | | | | | |
| Restoration Scientist | | Lead all aspects of study, coordinating work of junior researchers, fellows and technicians. He will coordinate between the University of Minnesota and TNC staff as well. | | | 44.86% | 0.16 | | \$16,232 |
| TNC Science Fellow | | The fellow will lead the riparian plant surveys and work with the University of Minnesota graduate student. TNC has science fellows for 2-3 year time periods. | | | 44.86% | 0.5 | | \$48,521 |
| Conservation Program Manager | | The Conservation Program Manager for the Driftless Area, David Ruff, coordinates restoration and protection efforts in the region for TNC. He will participate in meetings. Most importantly he'll take lessons learned from the study and apply them to projects in the Driftless Region. | | | 44.86% | 0.02 | | \$1,970 |
| Driftless Area Restoration Technician | | Coordinate field work, this person is based in Winona and will focus on the vegetation monitoring and assessment and occasional checking on monitoring equipment as well as collecting water quality samples | | | 44.86% | 0.06 | | \$4,764 |
| Hydrologic Restoration Technician II | | Assist with hydrologic monitoring and water quality sampling | | | 44.86% | 0.08 | | \$7,293 |
| Freshwater Intern | | Assist with data collection focusing on hydrologic monitoring and sediment assessment. | | | 13.12% | 0.14 | | \$5,430 |
| | | | | | | | Sub Total | \$84,210 |
| Contracts and Services | | | | | | | | |
| University of Minnesota | Sub award | The money will be used to fund a graduate student for 2 years. Since Dr. Lenhart has a joint position with the University of Minnesota, we have found this will be the most cost-effective way to get the research done. | | | | 1 | | \$95,000 |
| University of Minnesota - Research | Internal services or | We will send samples to the University's RAL for sediment and nutrient concentrations to determine | | | | 0 | | \$20,000 |

| | | | | | | | | |
|---------------------------------------|-----------------------|---|---|---|--|--|------------------|------------------|
| Analytical Lab (RAL) | fees (uncommon) | the benefits of the restoration study site compared to the other 2 sites. | | | | | | |
| | | | | | | | Sub Total | \$115,000 |
| Equipment, Tools, and Supplies | | | | | | | | |
| | Tools and Supplies | Plant Survey Supplies (GPS, quadrants, cutting and storage gear) | need for riparian plant assessment | | | | | \$1,500 |
| | Tools and Supplies | Soil Kits (auger, deposition measurement pads, bins/cans) | to assess soil erosion and deposition rates within floodplains at study sites | | | | | \$2,000 |
| | Tools and Supplies | Water level data loggers to place in floodplain, 15 total (3 sites x 5 per site) at \$550 each | the water level loggers and barometric loggers are for recording water level at the floodplains of each study site | | | | | \$8,250 |
| | Tools and Supplies | barometric loggers (Solinst or Hobo brand) 3 total at \$500 each (1 per study site) | to correct water level data Barologgers | | | | | \$1,500 |
| | | | | | | | Sub Total | \$13,250 |
| Capital Expenditures | | | | | | | | |
| | | Area-velocity loggers to measure streamflow at each site. We will purchase 3 loggers at \$7500 each for a total of \$22,500 | We will purchase hydrologic monitoring equipment to measure the flow in the streams at each study site. Each data logger measures the depth and velocity of flow. Cost each is \$7500 | X | | | | \$22,500 |
| | | | | | | | Sub Total | \$22,500 |
| Acquisitions and Stewardship | | | | | | | | |
| | | | | | | | Sub Total | - |
| Travel In Minnesota | | | | | | | | |
| | Miles/ Meals/ Lodging | 40 trips to site for data collection, survey and assessment at \$200 per trip from Twin Cities to Fillmore County, MN | travel to research sites | | | | | \$8,000 |
| | | | | | | | Sub Total | \$8,000 |

| | | | | | | | | |
|---------------------------------|-------------|--|--|--|--|--|--------------------|------------------|
| Travel Outside Minnesota | | | | | | | | |
| | | | | | | | Sub Total | - |
| Printing and Publication | | | | | | | | |
| | Publication | producing copies of publication for distribution | producing copies of publication for distribution | | | | | \$40 |
| | | | | | | | Sub Total | \$40 |
| Other Expenses | | | | | | | | |
| | | | | | | | Sub Total | - |
| | | | | | | | Grand Total | \$243,000 |

Classified Staff or Generally Ineligible Expenses

| Category/Name | Subcategory or Type | Description | Justification Ineligible Expense or Classified Staff Request |
|-----------------------------|---------------------|---|---|
| Capital Expenditures | | Area-velocity loggers to measure streamflow at each site. We will purchase 3 loggers at \$7500 each for a total of \$22,500 | The equipment is required to monitor streamflow for the research study. There is no device that does this that is under the \$5000 capital expense limit. Additional Explanation : Each streamflow monitoring device will be used to monitor flow at the three study sites through the length of the study. Additional years of monitoring data will be collected if the equipment is still working |

Non ENRTF Funds

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

Total Project Cost: \$243,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [701a18ae-1ba.pdf](#)

Alternate Text for Visual Component

A low-tech approach to restoring connectivity and increasing resilience to climate changes in Driftless Area streams is shown. A photo of Vesta Creek is shown that is currently entrenched and will be restored in 2024. We will study the adaptation approach, traditional restoration and a control site....

Financial Capacity

| Title | File |
|-------------------------|----------------------------------|
| TNC financial statement | 21a6f35e-f05.pdf |

Board Resolution or Letter

| Title | File |
|-----------------------------------|----------------------------------|
| TNC Director authorization letter | 36955f46-a7f.pdf |

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

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

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing \$10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

Sydney Petteway, TNC and Auste Eigirdas, TNC