Environment and Natural Resources Trust Fund

2024 Request for Proposal

General Information

Proposal ID: 2024-269

Proposal Title: Are Stream Restoration Efforts Effective? An Evidence-Based Assessment.

Project Manager Information

Name: Andrew Robertson

Organization: Saint Mary's University

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Project Basic Information

Project Summary: Assessing stream habitat improvement projects to improve trout populations and stream health in the Driftless Area.

Funds Requested: $200,000

Proposed Project Completion: June 30, 2026

LCCMR Funding Category: Small Projects (H)

Secondary Category: Water Resources (B)

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

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Trout populations in the Driftless Area (DA) are in poor health; > 80% of streams in SE MN have been classified as impaired. Poor stream health results from many environmental and human factors. River restoration efforts seek to reverse this situation. More than US$18 million have been invested in Habitat Improvement (HI) projects undertaken by Minnesota Trout Unlimited (MNTU), Trout Unlimited Driftless Area Restoration Effort (TUDARE), and Minnesota Department of Natural Resources (MNDNR) since 2008 to address stream health and improve trout populations. Restoration efforts do not always achieve their objectives. Why are projects failing? This can result from inappropriate techniques, like riprap and LUNKER structures, or techniques implemented at the wrong location. The size and type of structures used can be unsuitable in certain areas of a watershed. Improving stream restoration strategies does increase stream health and trout fishing. HI assessments – identifying drivers of success – promote the likelihood of better stream health and protects the economic value (~US$4.6 billion pa) gained from trout fishing in the DA. Undertaking 'Fit for purpose' science-based HI assessments are essential to the success of HI and increasing the likelihood of enhanced trout fishing and stream health in the DA.

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.

To enhance trout populations and stream health in the DA this project proposes the following.

1. Identification of watershed, riparian and river channel attributes required for successful HI.
2. Using these attributes, we will build a cutting-edge HI tool that identifies river sites and appropriate restoration activities to ensure successful HI is optimized.
3. We will facilitate a community of practice focused on enhancing HI in the DA.

As a result, this project builds approaches for improved site prioritization for HI, enhanced project design, improved ecosystems for future generations, reduced HI maintenance, and increase the number of improved streams. There are two aspects to this project. First, it develops fit-for-purpose strategies that identify specific river zones (tracts of rivers with similar biophysical and restoration character) and matches these with appropriate HI activities. Second, a community of practice focused on stream improvement. Collaborative partnerships with multiple state agencies (MNDNR, MPCA), private organizations (MNTU, TUDARE), and universities (Winona State University, Saint Mary's University of Minnesota, University of New England, Australia) will improve approaches to future HI. Collaborations that aim to improve protocols for HI implementation, community outreach (awareness), and education for the public (understanding science).

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?

1. Identify those watershed, riparian and river attributes required for successful HI (i.e., physical, and biological attributes).
2. Increase stream health throughout the DA via 'fit for purpose' habitat improvements and the development of next generation HI Tools leading to sustainable trout populations.
3. Foundational collaborations with partners, focused HI, and long-term increases in stream health.
4. Increased awareness of issues revolving around sensitive stream ecosystems and the value of trout fishing in the DA through education, dissemination, and partner collaborations.

Activities and Milestones

Activity 1: Assessment of habitat improvement projects and model development to increase the success of stream rehabilitation in the DA.

Activity Budget: $99,395

Activity Description:
The DA is a unique ecoregion affected by human activities. 'Fit for purpose' approaches will be developed in this project to enhance HI by improving river function and trout populations. Step 1 – assessment of HI projects across the DA to identify those watershed, riparian and river attributes conducive to long term HI success. Use these factors to develop strategies and tools for better HI projects. Data will include instream habitat and watershed variables, features used in HI design, and biological data (fish and macroinvertebrates). We will identify river zones and match "improved" areas with unimpacted areas for comparison. Step 2 – we will develop fit for purpose strategies and tools that predict HI outcomes derived from local site and watershed features. Step 3 - Train and develop student interns to aid in field and lab work (i.e., data collection and biological sampling) which will equip them for stream sampling and data analysis. To develop and execute an effective project design, we will need to gather essential materials for stream sampling and data analysis for the duration of the project.

Activity Milestones:

Description	Approximate Completion Date
Identify stream habitat project sites and compile existing data	December 31, 2023
Equipment acquisition	September 30, 2024
Intern development and training	September 30, 2024
Measure post-project geomorphic conditions	December 31, 2024
Develop predictive models	December 31, 2024

Activity 2: HI collaborations: improving learning opportunities.

Activity Budget: $100,605

Activity Description:
To increase HI effectiveness and steam health, we will promote collaborative efforts that enhance learning opportunities for stream restoration. Approximately US$4.6 billion is generated from trout angling to the SE MN economy. There are over 17,000 miles of trout streams in the DA and a high demand for their improvement. Collaborative efforts are integral to HI implementation and success, therefore, building relationships with multiple state agencies (MNDNR and MPCA), universities (WSU, SMU, UNE), and private organizations (TUDARE, MNTU) will streamline HI protocols, increase success and enhance learning. We will enhance learning by developing an educational platform for trout steam improvement. Education platforms (dashboards) are an ideal tool to make data and information on stream improvement accessible for fisher people, the community, and collaborators. Our dashboard will facilitate improved learning of successful HI and enhance the health of rivers with high importance. Analysis of all components of the project will aid in defining and describing what a typical "successful" HI project has achieved. Dissemination of findings will be disseminated via the education platform and key HI conferences such as: The Mississippi River Research Consortium and the Annual Driftless Symposium.

Activity Milestones:

Description	Approximate Completion Date
Analyze data and report findings	June 30, 2026
Education platform - Project Dashboard	June 30, 2026

Disseminate findings and publications	June 30, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Martin Thoms	University of New England, Armidale, Australia	Collaborator - will assist and oversee PhD student Varela's progress. Thoms is Varela's Supervisor as he attends UNE to obtain a PhD. Thom's provides many years of river science knowledge including resilience thinking and restoration ecology.	No
Douglas Dieterman	Minnesota Department of Natural Resources - Fisheries Division	Supervisory member of Varela. Will help oversee progress as it pertains to this research project. Dieterman will guide, train, and assist in data collection, analyzing data, and progress reporting. Dieterman will contribute funding for Stable Isotope Analysis.	No
Justin Watkins	Minnesota Pollution Control Agency	Supervisory member of Varela. Will aid in progress reporting, data collection, field visits, site selection, and general input into project implementation. Watkins will contribute funding for Stable Isotope Analysis.	No
Andy Robertson	GeoSpatial Services - SMU	Project Manager. Robertson will fund interns to assist in physical site sampling, data collection, GIS analysis and support for Varela to project completion. Students engaged in this research project will develop their own capstone projects under the guidance of Varela.	Yes

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?

Long-term implementation will be in the form of an online Education Platform. This platform will facilitate the sharing of data, information, and learnings of HI among a community focused on improving trout populations in the DA. This platform will allow stream health across the DA to be monitored. Our community of partners will contribute to the dashboard development and the data set. Future projects can be identified and improved with funding strings from outside sources. This will be an ongoing effort to show results of the 'fit for purpose' scientific approach into stream rehabilitation.

Project Manager and Organization Qualifications

Project Manager Name: Andrew Robertson

Job Title: Executive Director

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

Andrew Robertson is Executive Director of GeoSpatial Services at Saint Mary's University of Minnesota where he leads an experiential learning project center that focuses on providing students with work experience in natural resource management through targeted internships. He is a Registered Professional Forester with expertise in industrial forest management, wetland ecology, wetland restoration, riparian biodiversity, watershed planning and geospatial technologies and modelling. Andrew also has over 15 years of applied science experience across the Driftless Area of Minnesota assessing agricultural best management practices for managing water quality improvements. Assisting with this project are Professors Michael Delong and Martin Thoms as well as Dr. Douglas Dieterman, and Justin Watkins.. Michael Delong is Professor Emeritus of Biology and former Director of Large River Studies Center (LRSC) at Winona State University. His active research program has focused on rivers and streams in the southern, northwestern, and the Midwest of the U.S. for over 30 years. Professor Martin Thoms from the University of New England is a river scientist whose research addresses human-caused disturbances in rivers and their consequences for restoration activities and

river resilience over the past 20 years. Douglas Dieterman is a Research Scientist with the Minnesota Department of Natural Resources Fisheries Division. Doug has wide knowledge of river ecosystems within and around the DA including ecology and management of fish, the effects of disturbance on habitat and stream communities, the effects of restoration. Justin Watkins is a Watershed Manager with the Minnesota Pollution Control Agency in southeast Minnesota. Justin brings a wealth of knowledge on the effects of pollution on coldwater streams along with a background in stream and river ecosystems.

Organization: Saint Mary's University

Organization Description:
Saint Mary's University of Minnesota is a private, Lasallian Catholic university located in Winona, Minnesota, United States. It was founded in 1912 by the Brothers of the Christian Schools, a Catholic religious order that was founded by Saint John Baptist de La Salle.

Saint Mary's University of Minnesota offers undergraduate and graduate degree programs in a wide range of academic fields, including business, education, healthcare, social work, and the liberal arts. The university is known for its strong commitment to social justice and service, as well as its emphasis on experiential learning and student leadership development.

The university's main campus is located on a scenic bluff overlooking the Mississippi River in Winona, and it also has satellite locations in the Twin Cities and Rochester areas of Minnesota. The university has a diverse student body, with students from over 30 states and 20 countries, and it offers a variety of extracurricular activities, including athletics, student clubs, and community service opportunities.

Saint Mary's University of Minnesota is accredited by the Higher Learning Commission and is a member of the Council of Independent Colleges and the National Association of Independent Colleges and Universities.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Jennifer Cochran-Biederman		Primary Investigator			30.5%	0.2		$20,880
William Varela		Project designer and Implementor			7.65%	1.8		$47,366
							Sub Total	**$68,246**
Contracts and Services								
TBD	Professional or Technical Service Contract	Stable Isotope Analysis				0.6		$82,000
							Sub Total	**$82,000**
Equipment, Tools, and Supplies								
	Equipment	Laptop/Computer	Data Analysis and Mapping Hardware					$2,000
	Equipment	Surber Sampley	Collection of benthic macroinvertebrates for food web characterization (stable isotope analysis)					$800
	Equipment	Field supplies	Waders, rubber gloves and similar supplies for field visits.					$800
							Sub Total	**$3,600**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**

Travel In Minnesota								
	Miles/ Meals/ Lodging	Mileage car rental fees for travel to 60-70 sites across two field seasons in southeastern, MN (1 PhD Candidate, 2 GSS SMU interns).	Travel to stream sites approx. 120 mi/site x 65 sites = 7,800 mi x $0.42/mi =$ 6,552, Meals $25 x 60 = $3,000, lodging ~ 40 overnight stays = $4,000.					$13,552
	Conference Registration Miles/ Meals/ Lodging	Multiple Conferences for PhD student and two student interns from GSS	Disseminate findings and other research related to this project.					$1,209
							Sub Total	**$14,761**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
							Sub Total	**-**
Other Expenses								
		Indirect Cost - Saint Mary's University of Minnesota Winona	Administrative Cost					$31,393
							Sub Total	**$31,393**
							Grand Total	**$200,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
In-Kind	Justin Watkins - Minnesota Pollution Control Agency	Pay for Stable Isotope Analysis.	Secured	$15,000
In-Kind	Doug Dieterman - Minnesota Department of Natural Resource - Fisheries	Pay for Stable Isotope Analysis.	Secured	$29,000
			State Sub Total	**$44,000**
Non-State				
In-Kind	Andy Robertson - GeoSpatial Services SMU	Provide support in the form of student interns to assist with physical field work and sampling.	Secured	$42,000
In-Kind	Martin Thoms - University of New England, Department of Geography and Planning	Aid in overall project design, management, guidance for data analysis, GIS work, training, and general support to Varela.	Secured	$220,000
			Non State Sub Total	**$262,000**
			Funds Total	**$306,000**

Attachments

Required Attachments

Visual Component

File: 0c10ab28-9f6.pdf

Alternate Text for Visual Component

This is a map of the Driftless Area, mid-western United States. The area of focus will be in southeastern MN within the Driftless Area ecoregion. Map courtesy of Driftless Angler....

Financial Capacity

File: 7aab1d8c-f74.pdf

Optional Attachments

Support Letter, Photos, Media, Other

Title	File
Letter of authorization	917146f9-b30.pdf

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?

Yes

Does the organization have a fiscal agent for this project?

No

Does your project include the design, construction, or renovation of a building, trail, campground, or other capital asset costing $10,000 or more?

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?

No