



Environment and Natural Resources Trust Fund

2024 Request for Proposal

General Information

Proposal ID: 2024-075

Proposal Title: Educating Communities to Navigate the Mississippi's Future

Project Manager Information

Name: Jeffrey Marr

Organization: U of MN - St. Anthony Falls Laboratory

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Project Basic Information

Project Summary: The project will develop educational materials on the present day and future Mississippi River within the Twin Cities corridor and will deliver content through a rich media web environment.

Funds Requested: \$598,000

Proposed Project Completion: June 30, 2026

LCCMR Funding Category: Environmental Education (C)

Project Location

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

Region(s): Metro

What is the best scale to describe the area impacted by your work?

Region(s): Metro

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.

The Mississippi River is inextricably woven into Minnesota's landscape, economy, and cultures. Our relationship with this magnificent river will continue to be tightly interconnected well into the future. Over the next 5-10 years, significant community-scale decisions will emerge pertaining to the section of the Mississippi extending from the confluence of the Mississippi and Minnesota rivers (Bdote) to Upper St. Anthony Falls (Owamni-Yomni), defined here as the Minneapolis/St. Paul River Corridor (MSP-RC). The Army Corps of Engineers, for example, is currently evaluating the future of three locks within the MSP-RC possibly resulting in changes in ownership and operation of the locks and river dredging activities. In addition, there is a growing debate around managing and/or removing the Lower St. Anthony Falls Lock and Dam and Lock and Dam 1, which both include privately owned hydropower facilities, and restoring the river to a natural condition. These and other community-scale changes to the MSP-RC are substantial with impact to existing civil structures, river health, water quality, flood protection, public access, and other important topics. Currently, information and resources needed to support inquiry, dialog, and decision-making on the MSP-RC do not exist and the information that is available is difficult to access.

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.

The project will create multi-perspective multimedia content directly relevant to future decision-making within the MSP-RC and we will make this information accessible to stakeholders and the general public through a professionally developed website. Our project team includes historians, media developers/communicators, river engineers, geologists and outreach specialists. The project will develop science content for the MSP-RC over four periods of time: 1) the early river and valley formation; 2) post-settlement modifications of the river and the Falls at St. Anthony; 3) modern modifications and the present-day river; 4) the future river under various change scenarios. We will utilize a range of media formats and storytelling approaches including multi-perspective interviews, illumination of historical documents, digital visualization, and scaled models of the Mississippi River. Physical models provide a key visualization tool to examine river processes. The content developed during the project will be organized and presented through a website and StoryMaps format, allowing the visitor to explore multiple forms of history, science impacts, and future scenarios for the river. StoryMaps are a web-based media format organized around a location within a landscape and are well-suited for this project. River history and projected solutions will be presented through strategically positioned augmented reality.

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?

Two products will be produced from this project:

- 1) A professionally developed website organized as a StoryMap will be published. The site will be easy to access and serve multiple audiences from the public to decision makers. It will provide information needed to support inquiry, dialog, and decision-making with regards to the future of MSP-RC, considering impacts to existing civil structures, river health, water quality, flood protection, and public access.
- 2) The team will create a large body of multimedia content (videos, interviews, digitized historic documents, physical model simulations and animations), organized and accessible through the website.

Activities and Milestones

Activity 1: Final project design, storyboard development, physical model design and construction

Activity Budget: \$230,117

Activity Description:

This activity will involve developing the final storyboard for the project. For each of the four time periods introduced above, we will identify the target content pieces and develop plans for creating this content. The project team will meet over workshop sessions. We will seek perspectives from subject matter experts such as Minnesota Geological Survey, Indigenous cultural leaders, academic faculty, and management agencies. Examples of discussion questions include: How did construction of Lock and Dam 1 impact the natural river and how would the river be impacted if this dam were removed? What ecological changes have occurred in the river since human modification and how would ecosystems respond to future changes including movement of carp and other invasive species?

This activity will involve construction of a reduced-scale hydraulic model of the MSP-RC at the St. Anthony Falls Laboratory (SAFL) and will allow simulations of flowing water and sediment. Public tours will be available of this model and it will serve as a valuable hands-on demonstration tool. It will be constructed so that it can be modified to simulate various portions of the MSP-RC such as allowing the addition of locks and dams, bridges, stormwater outfalls, and hydropower plants.

Activity Milestones:

Description	Approximate Completion Date
Storyboard completed and work teams defined	October 31, 2024
Physical model design completed and modeling workplan developed	December 31, 2024
Physical model construction completed and ready for use	March 31, 2025

Activity 2: Development of multimedia content for four periods of river evolution

Activity Budget: \$198,811

Activity Description:

This activity is the largest portion of the project and will involve creating stand-alone multimedia content over four time periods. We focus on the physical evolution of the river, both with and without human intervention. 1) The early river: Geological mapping, historical records and interviews with archeologists, biologists, Indigenous elders, and geologists will capture a science-based understanding of the glacial- and post-glacial evolution of this reach of the Mississippi that has a history of human occupation dating to early post-glacial time and is an important spiritual place to the Dakota people. 2) Post-settlement modifications: Historic documents, interviews, and physical modeling will illustrate changes made to the river during early European settlement, e.g. removal of islands, dredging for navigation, bridge construction, and tunnel excavations. Focus will be on changes made near the St. Anthony Falls Milling District. 3) Modern modifications: Utilizing archived engineering documents and physical model simulations, we will highlight recent changes to the MSP-RC including construction of lock and dams, river navigation infrastructure, addition of hydropower, and stormwater systems. 4) Future River: Content will be created illustrating proposed changes to infrastructure with the MSP-RC and the impacts. Physical modeling scenarios will be documented and developed into short video stories.

Activity Milestones:

Description	Approximate Completion Date
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Complete capture of raw content for time period 1 (Early River)	December 31, 2024
Complete capture of raw content for time period 2 & 3 (Engineering Impacts)	July 31, 2025
Complete capture of raw content for time period 4 (Future River)	December 31, 2025

Activity 3: Publication of media hub content and StoryMaps environment

Activity Budget: \$169,072

Activity Description:

This activity will focus on developing the captured content pieces into final multimedia products. Interviews will be edited and developed into standalone stories. Audio, video, and interviews associated with the physical modeling scenarios will be developed into content pieces. In parallel to media production, the StoryMaps project website will be created. Through a media hub, partners and stakeholders will be able to access relevant pieces of media information such as interviews, diagrams, and maps to be used to educate the public.

We also plan to make content available outdoors, in many of the locations of the study. Interactive signage will be placed at strategic locations where points of interest exist along the MSP-RC. We will work with the many historically-oriented tours and organizations along the river to widely distribute project information. Signage will be developed and will contain descriptions of what is being viewed with a QR-type code embedded in the text. This code will initiate rich, interactive media such as videos, stills and animation, for the viewer to be immersed in the topic. We will work with local organizations and the City of Minneapolis Parks to place signage along frequented paths on the river roads and other public spaces.

Activity Milestones:

Description	Approximate Completion Date
Website design and layout finalized	September 30, 2025
Final content pieces created and ready for publishing	December 31, 2025
Beta version of project website completed and published for testing	March 31, 2026
Final version of project website complete and published	June 30, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Jeffrey Marr	St. Anthony Falls Lab - UMN	Principal Investigator and research engineering with expertise in hydraulics, hydraulic modeling, river sediment transport and hydraulic structures. Responsible for project oversight and will participate in all aspects of the research project.	Yes
Jessica Kozarek	St. Anthony Falls Lab - UMN	Co-Pi and research associate with research expertise in ecohydraulics, in-stream habitat, aquatic native and invasive species, and river restoration. Responsible for project oversight and participating in all aspects of the research project.	Yes
Diana Dalbotten	St. Anthony Falls Lab - UMN	Associate Director of Diversity and Broader Impacts. Participate with full project team in identifying key stories. Help build relationships leading to inclusion of multiple perspectives, experiences and knowledge into the project.	Yes
John Anfinson	Retired/Independent	Environmental and Mississippi River Historian – Will serve as the primary historian on the project team. Participate in all aspects of the project and serve as a subject matter expert in development of content. Will support post-project outreach and awareness of project outcomes.	Yes
Roopali Phadke	Macalester College	Professor of Environmental Studies will serve as a Senior Technical Advisor and collaborator. Participate and guide selection of key science stories. Contribute content as a subject matter expert. Advise on aspects of project pertaining to environmental and public engagement.	Yes
Andrew Wickert	St. Anthony Falls Lab/Dept of Earth and Environmental Sciences	Associate Professor, Department of Earth and Environmental Sciences will serve as a Senior Technical Advisor and collaborator. Participate and guide selection of key science stories. Contribute content as a subject matter expert. Advise on aspects of project pertaining to geologic history and processes/physics relevant to the project site.	Yes
Audrey Favorito	Wild Carrot Productions	Multimedia Producer. Audiovisual specialist with expertise in environmental education, civil engineering and research project work. In collaboration with the team, responsible for planning and implementing all media elements.	Yes
Patrick O'Leary	Wild Carrot Productions	Instructional Designer. Interactive media creator with expertise in environmental education and learning technologies. In collaboration with the team, responsible for story map, augmented reality and website creation.	Yes
Carrie Jennings	Freshwater Society	Research and Policy Director, Freshwater. A licensed professional geologist, she will apply her understanding of geology, hydrogeology and river evolution to guide model development and interpretation. Freshwater is dedicated to translating science to policy so they communicate results to managing agencies and the public.	Yes
Eileen Kirby	Freshwater Society	Research and Policy Coordinator, Freshwater. An environmental policy and research specialist with an environmental science background, Eileen will provide experience in scientific communication and community engagement.	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?

This project is focused on developing a new, professionally developed website containing multimedia content. Once launched, the partner organizations involved will help promote the new website and content through existing newsletters like the Mill City Times, blogs and websites like the Bdote Memory Map

(<https://bdotememorymap.org/memory-map/>) and social media posts. Freshwater will also offer public educational tours of the river and create a guidebook that highlights key locations. Ongoing costs associated with the website and video streaming services are relatively minor and will be the responsibility of SAFL, as this project aligns well with the Lab’s mission.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Land-Use and Climate Impacts on Minnesota's Whitewater River	M.L. 2022, , Chp. 94, Art. , Sec. 2, Subd. 03h	\$199,000

Project Manager and Organization Qualifications

Project Manager Name: Jeffrey Marr

Job Title: Associate Director of Engineering and Facilities

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

Marr is a licensed professional civil engineer (Minnesota) and the Associate Director of Engineering and Facilities at SAFL. He received his BS (1996) and MS (1999) from the University of Minnesota, Department of Civil Engineering and has been a member of SAFL professional research staff for over 20 years. Marr will serve as Project Manager and Principal Investigator for this project. His research expertise is in the areas of river hydraulics, boat-generated waves, and sediment transport including river and delta systems, deep water gravity currents, and reservoir/lake sedimentation and erosion. Marr manages SAFL’s Applied Research and Engineering team, a 10 member team that supports ongoing faculty research and carries out applied research with public and private sponsors. Marr is an experienced project manager and principal investigator, having managed large infrastructure projects such as the \$16M renovation of SAFL and \$8.5M construction of the UMN Wind Research Facility at UMore Park in Rosemount, MN. Marr has also managed many multi-investigator applied research projects. The project’s Co-PI is Jessica Kozarek. Kozarek is a research associate with expertise in river eco-hydraulics, hydraulic engineering, aquatic native and invasive species and other topics. Kozarek is also an experienced project manager, having led multi-investigator projects for state and federal agencies. Marr and Kozarek will share responsibility for project oversight and project delivery.

Organization: U of MN - St. Anthony Falls Laboratory

Organization Description:

SAFL is a research center of the College of Science and Engineering at UMN and will serve as the lead organization for this project. SAFL researchers address environmental, energy, and health challenges and have a strong capacity for effective science-communication. This project will take advantage of our experience in river hydraulics and, specifically, our experience and knowledge (including Prof. Wickert's) of the Mississippi River through the Twin Cities. We will utilize SAFL’s laboratory facilities to construct physical models of the MSP-RC and will use the models to demonstrate environmental processes. Diana Dalbotten, SAFL’s Director of Diversity and Broader Impacts, will ensure the project incorporates multiple perspectives and is accessible.

The full project team is a partnership with key individuals and organizations. John Anfinson is an environmental historian with deep expertise on this reach of the Mississippi River. Wild Carrot Productions (Audrey Robinson Favorito and Patrick O’Leary) is a highly regarded media production lab dedicated to science communication. Freshwater Society (Carrie Jennings and Eileen Kirby) provides deep technical expertise on the local geology and public perspectives on water management. Macalester College (Roopali Phadke) brings research expertise targeting environmental-public engagement and has ongoing research within the river corridor.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Andrew Wickert		Associate Professor, Department of Earth and Environmental Sciences will serve as a Senior Technical Advisor and collaborator. Participate and guide selection of key science stories. Contribute content as a subject matter expert. Advise on aspects of project pertaining to geologic history and processes/physics relevant to the project site. Science engagement and communication.			36.8%	0.06		\$11,125
Diana Dalbottne		Associate Director of Diversity and Broader Impacts. Participate with full project team in identifying key stories. Help build relationships leading to inclusion of multiple perspectives, experiences and knowledge into the project.			36.8%	0.02		\$2,440
Jeff Marr		Principal Investigator and research engineering with expertise in hydraulics, hydraulic modeling, river sediment transport and hydraulic structures. Responsible for project oversight and will participate in all aspects of the research project.			36.8%	0.18		\$31,284
Jessica Kozarek		Co-Pi and research associate with research expertise in ecohydraulics, in-stream habitat, aquatic native and invasive species, and river restoration. Responsible for project oversight and participating in all aspects of the research project.			36.8%	0.22		\$31,955
Richard Christopher		Research Scientist and lead of physical modeling design and construction			36.8%	0.54		\$55,314
Erik Steen		Design Engineer - design and fabricate special components of physical models			36.8%	0.08		\$9,214
Chris Milliren		Engineer, instrumentation - design of data collection systems for physical modeling effort			36.8%	0.04		\$4,242
Matt Hernick		Hydraulic Engineer - lead of research pertaining to river hydraulics and structures, modeling			32%	0.54		\$47,930
Ben Erickson		Lab Operations - coordination of lab operation and facility usage, visitors and site visits to models			32%	0.24		\$21,654
James Tucker		Engineer - support model construction and operation			30%	0.24		\$24,569

Undergraduate student (Library Science)		student to support capture and organization of media			0%	0.24		\$7,910
Undergraduate student (engineering)		Support research and modeling efforts			0%	0.42		\$14,502
							Sub Total	\$262,139
Contracts and Services								
TBD	Professional or Technical Service Contract	Develop digital visualization using existing topography and bathymetry elevation data of the Mississippi river that can be used in augmented reality.				0.3		\$12,000
TBD	Professional or Technical Service Contract	Web site development - cost of 3rd party group to set up and website domain and configure for highly visible, high traffic with capability for video streaming				0.1		\$12,000
Wild Carrot Productions, Llc	Sub award	WCP is a primary partner responsible for guiding the research team through Storyboard development, capturing content (interviews and videography), and producing final edited content pieces. They will also oversee development of the digital media hub website. WCP is a local firm and has special expertise in developing science content.				0.68		\$190,577
John Anfinson	Sub award	Anfinson will serve as the primary historian on the project team. Participate in all aspects of the project and serving as a subject matter expert in development of content. Will support post-project outreach and awareness of project outcomes.				0.1		\$30,000
Freshwater Society	Sub award	Serve as technical advisors and collaborators. Participate and guide selection of key science stories. Contribute content as a subject matter expert. Advise on aspects of project				0.1		\$22,500
Macalester College	Sub award	Serve as a Senior Technical Advisor and collaborator. Participate and guide selection of key science stories. Contribute content as a subject matter expert. Advise on aspects of project.				0.08		\$20,602
							Sub Total	\$287,679

Equipment, Tools, and Supplies								
	Tools and Supplies	LD1 Model: dimensional lumber and sheeting for model	building materials to construct a physical model of the river reach upstream and downstream of LD1.					\$10,000
	Tools and Supplies	LD1 Model: template materials	laser cut template of the river valley topography. Used to replicate the topography of the river valley.					\$3,000
	Tools and Supplies	LD1 Model: rock and concrete supplies	construction materials needed to form the river bathymetry within the physical model					\$3,000
	Tools and Supplies	LD1 Model: tooling, mixer, buckets	supplies needed to construct and shape the physical model surfaces					\$1,000
	Tools and Supplies	LD1 Model: plumbing, pipe and flow control	construction materials needed provide water to the physical model and control flow rate into the model.					\$3,000
	Tools and Supplies	LD1 Model: Materials to construct LD1 structures and features incl. powerhouse	Plastics and machinable aluminum needed to fabricate Lock and Dam 1 structures within the model.					\$8,000
	Tools and Supplies	LD1 Model: Sediment for simulations	sand and silts that will be used in the model run scenarios.					\$3,000
	Tools and Supplies	LD1 Model: athstetics - paint and other model attributes	paint, paint supplies and small model attributes (model homes, trees, etc) to provide realistic model attributes.					\$3,000
	Tools and Supplies	USAF Model: misc items needed for modification of model	paint, wood and aluminum needed to make modifications to upper SAF model elements like Lock installation, SAF hydropower, and stone arch bridge mods.					\$3,000
	Tools and Supplies	LD1: supplies for removal of LD1 (wood, fasteners, paint, machinable plastics)	supplies needed for simulations of dam removal or dam failure.					\$1,501
	Tools and Supplies	LD1: supplies to simulate gorge under removal scenario (sediment, limestone block simulants)	supplies needed to capture the simulation of gorge restoration under low flow and high flow conditions.					\$1,000
	Tools and Supplies	USAF: supplies for modification at USAF (machinable plastics, wood, sediment)	supplies needed to complete the simulations of changes to upper SAF.					\$1,000
	Tools and Supplies	Dumpster and supplies for removal of both physical models	rental of a construction materials dumpster to dispose of model(s) after project completion					\$7,000
							Sub Total	\$47,501

Capital Expenditures								
							Sub Total	-
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Mileage reimbursement for travel to river or historic archives	local travel and mileage for UMN to travel to MHS or other sites associated with project.					\$581
	Other	Parking ramps	Parking fees associated with parking ramps visiting MHS, USACE -St. Paul District, UMN Parking garages.					\$100
							Sub Total	\$681
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
							Sub Total	-
Other Expenses								
							Sub Total	-
							Grand Total	\$598,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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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: [5ebf3384-ac3.pdf](#)

Alternate Text for Visual Component

One page document showing block M in upper left for University of Minnesota and Project title. The objective of the project is summarized. Mid-page is a photograph showing the 9-mile stretch of river that is the study site with a summary of the four time periods....

Optional Attachments

Support Letter, Photos, Media, Other

Title	File
LOS_Macalester	8f2a463f-8f7.pdf
LOS_NPCA	5d720b84-a45.pdf
LOS_FMR	303c2360-296.pdf
LOS_Anfinson	6223eb45-54c.pdf
LOS_WildCarrotProductions	57865e44-31b.pdf
UMN Board Resolution Letter	4cceb138-b3d.doc
LOS_Freshwater	0eac1e97-db4.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?

No

Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration

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

