



# Environment and Natural Resources Trust Fund

2025 Request for Proposal

## General Information

**Proposal ID:** 2025-133

**Proposal Title:** New London Hydrogen Sulfide Mitigation Project

## Project Manager Information

**Name:** Dan Coughlin

**Organization:** Middle Fork Crow River Watershed District

**Office Telephone:** (320) 796-0888

**Email:** dan@mfcrow.org

## Project Basic Information

**Project Summary:** We will address the water quality impairments and deficiencies in Lake Monongalia that are creating hazardous hydrogen sulfide gas emissions in New London through the application of nanobubble aeration technology.

**ENRTF Funds Requested:** \$2,203,000

**Proposed Project Completion:** December 31, 2026

**LCCMR Funding Category:** Air Quality, Climate Change, and Renewable Energy (E)

## Project Location

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

Region(s):

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

Region(s): Central

**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.**

For decades in the spring of each year the City of New London has been plagued by significant hydrogen sulfide (H<sub>2</sub>S) gas releases from nearby Lake Monongalia. Due to high organics, sulfide concentrations and low dissolved oxygen in the lake's water and sediment layers, anerobic bacteria activity is able to flourish unchecked. A byproduct of those bacterial processes is H<sub>2</sub>S which has the odor of rotten eggs.

H<sub>2</sub>S levels occasionally reached levels high enough to turn white exterior paint black on nearby buildings and peeled the interior paint in the DNR's own nearby fisheries building. In 2002 the MPCA in partnership with the University of Minnesota and the DNR conducted a major study of the causes behind the H<sub>2</sub>S issue including gas levels recorded at New London Dam reaching as high as 133 times the state's maximum safe levels.

Traditional aeration was attempted by the DNR after conclusion of the study, but it was found to be ineffective and could actually exacerbate the issue by stirring up soft lake sediments. Those efforts were soon discontinued, and the community resigned itself to this ongoing problem with no technology or economical treatment options available to address the ongoing H<sub>2</sub>S issue.

### **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.**

With traditional aeration methods in Lake Monongalia failing to have an impact on the in-lake production and outgassing of hydrogen sulfide, the New London community largely resigned themselves to this being their fate. That is until nanobubble technology emerged on the scene. After extensive investigation into the potential of nanobubbles on persistent low dissolved oxygen levels (the root cause of the lake's hydrogen sulfide generation) we found that nanobubble technology is showing real, measurable results in addressing low oxygen, high organic situations in similar water bodies.

Based on research and ongoing monitoring data, we calculated that the present oxygen demands of this lake system would require two large nanobubble generation units to adequately address the anoxic conditions at the root of the lake's identified issues. In addition to the immediate need of reducing hydrogen sulfide levels in the water and aerosolized into the local atmosphere, the secondary benefits of breaking the algae cycle, improving water quality & clarity, providing adequate dissolved oxygen for fish, and creating conditions conducive for native aquatic plants to thrive will provide significant benefits to the overall health of the lake and downstream environments, expanded recreational opportunities and greater economic stability for the community.

### **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 immediate need is to significantly curtail the production of hydrogen sulfide in Lake Monongalia that continues to impact the safety and well-being of city residents, business owners and visitors.

Increasing available oxygen in the lake will help oxidize and bind excess phosphorus and nutrients in the water and soft bottom sediments. This in turn will disrupt the algae cycle, increase water clarity, help native aquatic plant growth, and allow fish to thrive in areas presently devoid of needed oxygen. A healthier lake will also bring more public awareness and appreciation of this natural resource.

## Activities and Milestones

### Activity 1: Permitting & Installation

**Activity Budget:** \$1,851,780

**Activity Description:**

This activity includes project permitting and land rights acquisition, as well as unit installation. The objective of this activity is to acquire the necessary permits for project installation. Permitting and land rights are required for the two nanobubble units to be installed 1) on Lake Monongalia via a barge unit and 2) at the location of the existing DNR aerator. Permitting will be done in coordination with the appropriate agencies and will require communication between MFCRWD staff, MFCRWD's technical consultant, Moleaer staff, city staff, and state agency staff (i.e., MnDNR). MFCRWD staff have already been working with DNR staff for permitting and land rights to install the technology in the lake and have received verbal confirmation that the project will be permitted. The next step is to receive formal permitting. Equipment installation will require necessary site preparation following permitting. MFCRWD has made preliminary inquiries to Xcel Energy, Kandiyohi Power Cooperative, and the MnDNR to ensure the proper electrical connections and site preparation will be feasible. MFCRWD staff have been working closely with Moleaer staff to understand site needs and scope the proper nanobubble equipment and equipment is ready to be ordered as soon as funds are available.

**Activity Milestones:**

Description	Approximate Completion Date
Draft Plan Approval	January 31, 2025
Complete Predesign Review through the Dept. of Administration	February 28, 2025
Enrollment in the Minnesota B3 Guidelines Tracking Tool	March 31, 2025
Secure Land Use Agreements with Kandiyohi County and City of New London	March 31, 2025
ESA (Checklist & Records Check)	March 31, 2025
Consultation with SHPO (If deemed necessary)	March 31, 2025
Final Plan Approval & Authorization to seek bids	April 30, 2025
Project Ordering Resolution / Bid Award(s)	May 31, 2025
Agency & local permit approval(s)	July 31, 2025
Site electrical updates completed	August 31, 2025
Equipment received, mobilization, final site prep, preconstruction meeting(s)	October 31, 2025
Equipment Installed / Change Orders / Substantial Completion	October 31, 2025
Ongoing community engagement activities & information sessions	October 31, 2025
Final Inspections & Certifications	October 31, 2025

### Activity 2: Start-Up & Monitoring

**Activity Budget:** \$216,300

**Activity Description:**

Moleaer staff will assist the project partners in getting the nanobubble units running following their installation. MFCRWD will monitor conditions in Lake Monongalia via buoys outfitted with water quality sensors that measure dissolved oxygen, ORP, pH, temperature, conductivity, and algae concentrations. Sensors will be operating continuously and are cloud-connected for easy viewing. MFCRWD staff have been working with the MPCA to identify other monitoring parameters that will help evaluate the nanobubble efficacy and includes sediment core and sulfide sample collection.

**Activity Milestones:**

Description	Approximate Completion Date
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All construction funds secured	May 31, 2025
Monitoring buoys installed	October 31, 2025
Equipment online and in-use	October 31, 2025
Installation of Signage with ENRTF language & logo	October 31, 2025
Ongoing air and water monitoring data collection (sediment cores, water samples, etc.)	December 31, 2025

### Activity 3: Process Optimization & Analysis

**Activity Budget:** \$134,920

**Activity Description:**

Using data collected during monitoring, MFCRWD staff will assess the nanobubble aeration process and evaluate it for improvements in timing and/or duration of operation. The Moleaer staff are budgeted for two years of assistance to the District and City Public Works staff with the intention of handing over long-term operations and maintenance to the City. This activity will also consist of a final report of the installation, monitoring, and evaluation of the nanobubble aerator.

**Activity Milestones:**

Description	Approximate Completion Date
Data Analysis, Issuance of Final Report on Initial Operational Phase (Fall 2026)	December 31, 2026
Recording of all funding restrictions or other project encumbrances	December 31, 2026

## Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Katie Kemmitt / Chris Meehan	Stantec Engineering	District Engineer	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?**

The proposed nanobubble systems have an anticipated operational lifespan of 20 years. Their components are like those municipal water and wastewater operators regularly maintain. A long-term partnership with the city will be established where the city provides for routine maintenance needs and electric charges; while the MFCRWD will handle large repairs and ongoing air and water data collection.

Professor Miki Hondzo at St. Anthony Falls Laboratory has already been retained via a WBIF grant to assist with the establishment of monitoring sites and protocols so that solid baseline data is gathered ahead of any treatment efforts in the lake.

## Project Manager and Organization Qualifications

**Project Manager Name:** Dan Coughlin

**Job Title:** District Administrator

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

Dan Coughlin has served as a local government administrator for two decades, first as a city administrator and more recently as a watershed district administrator. He has provided administrative oversight and management of numerous large-scale projects including water and wastewater treatment plant construction and/or updates, water tower construction, municipal well siting and construction, street and utility infrastructure repair / replacement, railroad crossing upgrades, drainage ditch and stormwater system repair and alterations, trail & sidewalk placements, and the construction or major remodeling of various public buildings and facilities including city halls, fire and police stations, public works facilities, etc. While Dan would serve as the primary project point of contact, the project would also involve department staff and consultant staff with the MFCRWD organization as well.

**Organization:** Middle Fork Crow River Watershed District

**Organization Description:**

The Middle Fork Crow River Watershed District was established in 2005 with its stated purpose being "the protection and preservation of water quality in the Middle Fork Crow River Watershed District region." It should be noted that part of the driving motivation for the establishment of our organization was the water and air quality issues impacting the City of New London, MN and its surrounding region due to water quality impairments in Lake Monongalia which borders the community. It makes this

## Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
<b>Personnel</b>								
District Administrator		Project Supervision & Oversight, Public and Stakeholder Engagement & Outreach			24%	0.2		\$29,000
Program Manager		Monitoring, Data Collection, Coordination with Laboratory, Public Education			25%	0.2		\$24,200
Office & Finance Manager		Financial Record Keeping, Invoicing & Payments, Audit Prep			27.5%	0.04		\$5,700
Project Manager		Site Visits, Stakeholder communications			26%	0.12		\$11,500
							<b>Sub Total</b>	<b>\$70,400</b>
<b>Contracts and Services</b>								
Rinke Noonan Attorneys at Law	Professional or Technical Service Contract	Legal assistance with drafting agreements, reviewing formal documents, etc.				0.02		\$9,500
Stantec Engineering	Professional or Technical Service Contract	Civil Engineering, Environmental Engineering, Design Services, Project Review				0.04		\$14,900
Moleaer Inc	Professional or Technical Service Contract	Nanobubble system initial deployment & startup, local staff training, and 2 years of quarterly tech visits for maintenance & upkeep.				0.02		\$40,000
							<b>Sub Total</b>	<b>\$64,400</b>
<b>Equipment, Tools, and Supplies</b>								
	Equipment	Three (3) monitoring buoys with wireless telemetry - with sensors at water level and sediment layer interface	Collect real-time, continual data in key locations in Lake Monongalia (recommended by St. Anthony Falls Laboratory Professors) to monitor a variety of water factors including H2S, PH, Temp, DO, etc.					\$76,000

	Equipment	Two (2) Nanobubble Generator Units	These are the hub of the project which will introduce into the lake's water column nanobubbles sufficient to provide for the calculated oxygen demand of the lake so to mitigate anoxic conditions that cause hydrogen sulfide outgassing episodes					\$1,396,000
	Equipment	40' x 20' Anchored Barge	Allows for placement of a nanobubble generator unit within the Mill Pond area of Lake Monongalia where added oxygen is needed to buffer / arrest hydrogen sulfide in that immediate body of water before it reaches the New London Dam.					\$285,000
	Equipment	Two (2) Electric Subpanel / Power Disconnects	Provides for a breaker / power disconnect ahead of the wiring serving the nanobubble generator units					\$18,000
	Tools and Supplies	Wiring & conduit for two electric runs from subpanels to nanobubble units	Final electric connection from breaker subpanel to nanobubble unit containers					\$10,000
	Equipment	3-Phase Electric Connection w/ Step-Down Transformers (2)	Initial connection / electric hookup from electric utility ahead of the subpanel connection					\$6,000
	Tools and Supplies	Sensor calibration supplies	Buoy sensors require regular calibration to maintain valid results					\$4,000
							<b>Sub Total</b>	<b>\$1,795,000</b>
<b>Capital Expenditures</b>								
							<b>Sub Total</b>	-
<b>Acquisitions and Stewardship</b>								
							<b>Sub Total</b>	-
<b>Travel In Minnesota</b>								
							<b>Sub Total</b>	-

<b>Travel Outside Minnesota</b>								
							<b>Sub Total</b>	-
<b>Printing and Publication</b>								
	Publication	Public Notices, public outreach informational materials	As a public entity we are required to provide public notice in our newspaper of record and construction journals when seeking bids for major projects; We also want to engage the public through newsletters and submitted newspaper articles.					\$2,500
	Printing	Production of progress and final report documents on first 2 year operational phase	Creation of end-user documents for distribution to stakeholders and partnering agencies					\$1,000
							<b>Sub Total</b>	<b>\$3,500</b>
<b>Other Expenses</b>								
		5% Contingency	Buffer for unanticipated cost overruns, change orders, inflation instability					\$104,700
		Site Preparation	Create improved, level site for nanobubble generator, electric transformer & subpanel					\$9,000
		Crane and Loader Lease	Needed to take 10 ton unit containers off shipping truck and place them at location					\$10,000
		Info and Educational Signage (2 sites, Assumes 1 large sign, 1 educational kiosk sign)	Provide info on the project, source of funding, partnering agencies, etc.					\$5,000
		Wireless Telemetry Unit	Provides nanobubble unit telemetry information to maintenance & monitoring staff					\$1,000
		Shipping costs for two (2) nanobubble units from California	The only North American manufacturer of nanobubble units is in California - so oversized load shipping is a factored cost					\$5,000
		Electric utility charges	Electricity demand costs for a 2-year initial project phase (2 units, 8 months of 24 hr/day operations)					\$128,000



		Open House / Public Site Tours / Education Materials	As part of ongoing community engagement and education, we intend to host events on-site for the general public, stakeholders, and area schools.					\$4,000
		Shipping and Installation of Barge for Mill Pond	The barge needed for one of the nanobubble deployments will be shipped in pieces then assembled and tied to permanent anchors.					\$3,000
							<b>Sub Total</b>	<b>\$269,700</b>
							<b>Grand Total</b>	<b>\$2,203,000</b>

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
<b>State</b>				
			<b>State Sub Total</b>	-
<b>Non-State</b>				
Cash	MFCRWD Local Property Tax Levy	Unless other allowable matching funds or donations are received, the Middle Fork Crow River Watershed District will issue bonds to cover its pledged local match offset to ENRTF funds and will use its general property tax levy authority to service that debt over time.	Secured	\$550,675
			<b>Non State Sub Total</b>	<b>\$550,675</b>
			<b>Funds Total</b>	<b>\$550,675</b>

**Total Project Cost: \$2,753,675**

**This amount accurately reflects total project cost?**

Yes

## Attachments

### Required Attachments

#### *Visual Component*

File: [bfb5ad02-562.pdf](#)

#### *Alternate Text for Visual Component*

The exhibit provided is an aerial view of the City of New London and Lake Monongalia which wraps around the community. The exhibit shows the location of the proposed nanobubble treatment sites, the location of the New London Dam, and the location of the Middle Fork Crow River....

#### *Financial Capacity*

Title	File
MFCRWD Financial Audit Report 2022	<a href="#">2631ab01-003.pdf</a>

#### *Board Resolution or Letter*

Title	File
MFCRWD Board Resolution 2024-02, Authorization to Request ENRTF Funding	<a href="#">0bbfe91a-ab4.pdf</a>

### Supplemental Attachments

#### *Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other*

Title	File
New London H2S Mitigation Project - Capital Construction Budget Addendum	<a href="#">7bdd9133-1fa.xlsx</a>
Nanobubble and MPCA 2002 Study Exhibit	<a href="#">22e86919-59e.pdf</a>
Lakes Area Review Article - New London H2S Nanobubble Info	<a href="#">10db6fd4-009.pdf</a>
Capital Construction Supplemental Questionnaire - New London H2S Mitigation Project	<a href="#">0468a4e3-2ba.pdf</a>
Original 2002 MPCA DNR U of M Study of Lake Monongalia	<a href="#">6383434f-181.pdf</a>

## 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?**

No

**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?**

Yes

**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:**

Chris Meehan and Katie Kemmitt with Stantec Engineering (designated MFCRWD district engineers)

