

**Environment and Natural Resources Trust Fund  
2020 Request for Proposals (RFP)**

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**Project Title:**

**ENRTF ID: 093-B**

Innovative Phosphorus Removal Solutions for 10,000 Clean Lakes

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**Category:** B. Water Resources

**Sub-Category:**

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**Total Project Budget: \$** 405,000

**Proposed Project Time Period for the Funding Requested:** June 30, 2022 (2 yrs)

**Summary:**

Using a venture capitalist approach, the 10,000 Clean Lakes Project will solicit new opportunities for more affordable, more effective, and longer-lasting solutions to treat existing phosphorus problems in Minnesota's lakes.

**Name:** Maggie Karschnia

**Sponsoring Organization:** Prior Lake-Spring Lake Watershed District

**Job Title:** Water Resources Project Manager

**Department:** \_\_\_\_\_

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Prior Lake MN 55372

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**Location:**

**Region:** Metro

**County Name:** Statewide

**City / Township:**

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**Alternate Text for Visual:**

Using a venture capitalist approach, the 10,000 Clean Lakes Project will solicit new opportunities for more affordable, more effective, and longer-lasting solutions to treat existing phosphorus problems in Minnesota's lakes.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____ %



PROJECT TITLE: Innovative Phosphorus Removal Solutions for 10,000 Clean Lakes

I. PROJECT STATEMENT

Current options to remove excess, algae-producing phosphorus in lakes are costly, often exceeding \$1 million per lake, and offer only temporary relief. Minnesota needs better lake management solutions, ones that are more affordable, more effective, and longer-lasting.

THE PROBLEM: Minnesota is proudly known as the "Land of 10,000 Lakes" and offers beautiful vistas, abundant wildlife, spectacular fishing, and ample recreational opportunities within its bounty of lakes. However, the MPCA has found that about 40% of Minnesota's lakes, rivers and streams that have been tested are not meeting state water quality standards, which brings that number down to "Land of 6,000 Clean Lakes".

THE SOLUTION: One approach to accelerate a 10,000 Clean Lakes Solution is to put the government in the role of venture capitalist. Typically, government agencies responsible for implementing solutions to impaired waters aren't able or willing to take risks on new ideas. State grants are typically only able to test one new idea per funding round, providing slow results.

Venture capitalists typically have to invest in at least ten new businesses in order to find the few successful ones that make the return for the entire investment portfolio. Finding successful new businesses (or ideas) requires investment in many to find the big winners.

The overall goal of this project is to solicit excitement and opportunity in the private market to find a more affordable, more effective, and longer-lasting solution to excess phosphorus in our lakes. Currently, the best lake treatment for excess phosphorus is an Alum treatment which typically runs close to \$1 Million per lake and only provides temporary relief to the problem which usually returns 10-15 years later.

The direct outcome of this project will be to:

- 1) Solicit multiple approaches/proposals to address in-lake phosphorus in Minnesota's lakes
2) Provide seed money to the top ten proposals for further development into complete concept plans.
3) Select the top three concept plans for further development into feasibility studies on three impaired lakes in Minnesota, ready for implementation.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1 Title: Solicit Proposals

Description: Solicit a minimum of twenty (20) proposals for new, innovative solutions to address in-lake phosphorus. Of these, ten will be selected for further development into concept plans (Activity 2).

ENRTF BUDGET: \$2,000

Table with 2 columns: Outcome, Completion Date



**Environment and Natural Resources Trust Fund (ENRTF)  
2020 Main Proposal Template**

1. Develop and release a Request for Proposals to relevant engineering firms, businesses, colleges, local government agencies & non-profits with assistance from U of M consultant.	September 2020
2. Engineering and U of M consultant review of proposals to ensure sound practices, incorporation of engineering standards (as applicable), and practicability.	December 2020
3. Review proposals and use a competitive decision matrix to select top ten for further funding into concept plans as directed by a state-wide technical panel composed of representatives from watershed organizations, DNR & BWSR staff, university professors, Barr & EOR engineers, and other selected water resource professionals.	December 2020

**Activity 2 Title: Develop Concept Plans**

**Description:** Engage the top ten proposals for further development and funding into concept plans with estimated budgets and proposed phosphorus removals. Select the top three for further development (Activity 3).

**ENRTF BUDGET: \$102,000**

Outcome	Completion Date
1. Providing funding to top ten proposals to develop concept plans with estimated budgets and phosphorus removals. (\$5k - \$15k each, based on proposed budget)	April 2021
2. Engineering review of the ten completed concept plans to ensure sound practices, incorporation of engineering standards (as applicable), and practicability.	May 2021
3. Review ten concept plans and use a competitive decision matrix to select the top three concept plans for further development into feasibility studies as directed by a state-wide technical panel composed of representatives from watershed organizations, DNR & BWSR staff, university professors, Barr & EOR engineers, and other selected water resource professionals. The panel will also select three lakes in Minnesota for subject of the feasibility studies based on compatible site conditions, willing partners, and urgency.	May 2021

**Activity 3 Title: Complete Feasibility Studies**

**Description:** Feasibility studies for innovative in-lake treatments will be completed for three impaired lakes in MN.

**ENRTF BUDGET: \$301,000**

Outcome	Completion Date
1. Engage in contracts with the three selected concept plans for further development to complete feasibility studies on selected study lakes.	February 2022
2. Engineering review of the three draft feasibility studies before finalized.	February 2022

**III. PROJECT PARTNERS AND COLLABORATORS:**

Capitol Region Watershed District	Tony Havranek, Senior Environmental Scientist at WSB
Ramsey-Washington Watershed District	Emily Javens, Executive Director of MAWD
Brian Huser, Associate Professor at Swedish University	Keegan Lund, Aquatic Biologist at MnDNR
Greg Wilson, Senior Water Resources Engineer at Barr	Melissa King, Board Conservationist at BWSR

**IV. LONG-TERM IMPLEMENTATION AND FUNDING:**

This project will result in three completed feasibility studies **ready for implementation**, potentially as Phase II projects for LCCMR in 2022. The ideas invested in and developed will provide **long-lasting clean lake solutions** for Minnesota that will provide benefits that span far beyond the life of the grant. Those ideas that are funded for concept plans but not feasibility studies could also be developed further into future LCCMR projects.

Attachment A: Project Budget Spreadsheet  
 Environment and Natural Resources Trust Fund  
 M.L. 2020 Budget Spreadsheet



Legal Citation:  
 Project Manager: Maggie Karschnia  
 Project Title: Innovative Phosphorus Removal Solutions for 10,000 Clean Lakes  
 Organization: Prior Lake-Spring Lake Watershed District  
 Project Budget: \$405,000  
 Project Length and Completion Date: Two-year project, July 2020 - June 2022  
 Today's Date: April 15, 2019

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
<b>BUDGET ITEM</b>			
<b>Personnel (Wages and Benefits)</b>	\$ -	\$ -	\$ -
<b>Professional/Technical/Service Contracts</b>			
<i>Engage in contracts with top ten proposals (competitive RFP process, proposals selected through a technical panel using a decision matrix) to develop concept plans for innovative phosphorus removal projects.</i>	\$ 100,000	\$ -	\$ 100,000
<i>Engage in contracts for top three concept plans (selected from above top ten concept plans through a technical panel using a decision matrix) to develop feasibility studies for innovative phosphorus removal projects on three separate lakes in Minnesota.</i>	\$ 300,000	\$ -	\$ 300,000
<i>John Gulliver, Professor of Civil, environmental and Geo-Engineering at the University of Minnesota, will assist with proposal solicitation through the University of Minnesota system. John will also provide a key advisory role on the technical, state-wide panel used to make advancement decisions on proposals and concept plans, as well as review concept plans and feasibility studies for completeness and sound practices.</i>	\$ 5,000		\$ 5,000
	\$ -	\$ -	\$ -
<b>COLUMN TOTAL</b>	\$ 405,000	\$ -	\$ 405,000

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
<b>Non-State:</b> <i>PLSLWD Engineer, Carl Almer at EOR Inc., will review proposals, concept plans and final feasibility studies to ensure sound practices, incorporation of engineering standards (as applicable), and practicability. Note: PLSLWD does not have an engineer on staff and competitively selects its engineering contract from outside engineering firms, which is currently EOR, Inc.</i>	Secured	\$ 20,000	\$ -	\$ 20,000
<b>State:</b>		\$ -	\$ -	\$ -
<b>In kind (PLSLWD):</b> 1) Maggie Karschnia, PLSLWD Project Manager, \$ 5,000, 2.5% FTE each year for two years 2) Diane Lynch, PLSLWD District Administrator, \$3,000, 1% FTE each year for two years	Secured	\$ 8,000	\$ -	\$ 8,000
<b>OTHER IN-KIND:</b> 1) Greg Wilson, Senior Water Resource Engineer at Barr, to provide assistance with review of proposals, concept plans and final feasibility studies. 2) Tony Havranek, Senior Environmental Scientist, to provide assistance with review of proposals and concept plans. 3) Brian Huser, Associate Professor at the Swedish University of Agricultural Sciences, to provide assistance with review of proposals, concept plans and final feasibility studies. 4) Melissa King, Board Conservationist at BWSR, to participate on technical panel to select projects for advancement. 5) Keegan Lund, Aquatic Biologist at MnDNR, to participate on technical panel to select projects for advancement. 6) Ramsey-Washington Metro Watershed District staff to participate on technical panel to select projects for advancement. 7) Captial Region Watershed District staff to participate on technical panel to select projects for advancement. 8) Emily Javens, Executive Director at the Minnesota Association of Watershed Districts, to participate on technical panel to select projects for advancement.	Secured	TBD		

Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
		\$ -	\$ -	\$ -



## VENTURE CAPITALIST APPROACH TO

# 10,000 CLEAN LAKES

**THE PROBLEM:** Current options to remove existing, algae-producing phosphorus in lakes are costly & offer only short-term relief. Minnesota needs better solutions that are more affordable, effective, and longer-lasting. Research & grant projects only test one idea at-a-time, making innovation slow.

**THE SOLUTION:** Use a venture capitalist approach to fuel the creation & development of new ideas for lake treatment solutions at an accelerated pace.



### SOLICIT PROPOSALS

Aggressively solicit proposals from private businesses, colleges, government agencies, and individuals for new, innovative solutions to reduce in-lake phosphorus (excess nutrients) in Minnesota's lakes.

2



### CONCEPT PLANS

Select the top ten proposals through a comprehensive decision matrix that considers time, expense, and attainability. Provide funding to the selected proposals to further develop the ideas into **ten concept plans**.

3



### FEASIBILITY STUDIES

Use a technical statewide panel (including UMN, DNR, MPCA, BWSR, LGUs, etc.) to choose the top three concept plans for further development into **three feasibility studies** ready for implementation.

POTENTIAL PROJECTS

**MAGNETIC IRON:** Use magnetic iron particles that can capture phosphorus in lake water and then can be re-used.

**LANTHUM DWTR:** Recycle drinking water treatment residue (DWTR) & use as a Lanthum carrier to immobilize phosphorus.

**ALUMINUM CLAY:** Aluminum is injected into a clay product and then inserted into the lake sediment to bind phosphorus.

## CLEAN LAKES FOR MINNESOTA

Minnesota is proudly known as the "Land of 10,000 Lakes" offering beautiful vistas, abundant wildlife, spectacular fishing, and ample recreational opportunities within its bounty. However, the MPCA estimates that **about 40 %** of Minnesota's tested waters **do not meet water quality standards**, which brings that number down to "Land of About 6,000 Clean Lakes." Many of the lakes are on the impaired waters list for excess nutrients (e.g. **phosphorus**) which can lead to harmful algae blooms and poor water quality, impairing aquatic recreation, swimming and fishing. This proposal aims to accelerate the goal of **10,000 Clean Lakes**.

## ABOUT VENTURE CAPITALISM

One approach to accelerate a **10,000 Clean Lakes Solution** is to put the government in the role of **venture capitalist**, encouraging greater innovation & competition. Venture capitalists typically have to invest in at least ten new businesses in order to find a few successful ones that make the return on investment for the entire portfolio. Why? Because finding a few successful new businesses (or ideas) requires the investment of seed money in order to find the **big winners**. This approach can be applied towards lake treatments to find a **more affordable, more effective & longer-lasting solution for Minnesota's lakes**.



## **PROJECT MANAGER QUALIFICATIONS**

### **Maggie Karschnia, Water Resources Project Manager**

Maggie Karschnia has been the project manager at the Prior Lake-Spring Lake Watershed District for the past four years and has implemented phosphorus reduction projects in lakes which includes the utilization of state grants to help aid in accelerating the programs. Maggie has a strong project management background from her work protecting critical shoreline and wetlands across the state as the Wetlands & Grasslands Program Manager for the Minnesota Land Trust. She is equally comfortable managing projects and supervising contractors herself as she is working with a variety of partners to get projects completed. Maggie has a B.S. in Conservation from the University of Wisconsin – River Falls and an M.A. in Natural Science and Environmental Education from Hamline University.

### **Diane Lynch, District Administrator**

Diane Lynch has been the district administrator at the Prior Lake-Spring Lake Watershed District for nearly five years. She is an environmental manager with over 20 years of public and private sector experience in: initiating and managing water and natural resource projects; mediating conflicts; facilitating large public meetings and hearings; developing and researching policies, drafting legislation and lobbying at local, regional and state levels of government and managing all aspects of development and fundraising. Diane has a M.S. in Conservation Biology from the University of Minnesota.

### **Carl Almer, LEED AP, Water Practice Lead at EOR, Inc.**

Carl Almer has 23 years of experience as a water resources engineer. He currently serves as the District Engineer for 2 watershed districts in the Twin Cities metro area. Carl excels in stormwater BMP identification, feasibility assessment & prioritization, LID design, stream assessment, monitoring, stream restoration, hydraulic/hydrologic and water quality modeling. He also has expertise in watershed rule development, and watershed district planning. Carl has a B.S. in Geological Engineering from the University of Minnesota.

## **ORGANIZATION DESCRIPTION**

The Prior Lake-Spring Lake Watershed District (PLSLWD) was established on March 4, 1970 by order of the Minnesota Water Resources Board (MWRB) under the authority of the Minnesota Watershed Act (Minnesota Statutes, Chapter 112). The order was in response to a petition filed by resident landowners within the watershed on June 24, 1969. This citizen petition sought establishment of the District for the purposes of wisely managing and conserving the waters and natural resources of the watershed.

The PLSLWD is approximately 42 square miles in size and is located in north central Scott County, Minnesota, encompassing parts of the cities of Prior Lake, Shakopee, and Savage and parts of Sand Creek and Spring Lake Townships. In addition, a portion of the Shakopee Mdewakanton Sioux Community tribal lands are located within the District.

The PLSLWD is administered by a five-person Board of Managers (Board) appointed by the Scott County Commissioners. All of the District's policies, goals, and accomplishments are directed by the citizens who serve on the Board.

### **Our Mission Statement:**

*Our mission is to manage and preserve the water resources of the Prior Lake-Spring Lake Watershed District to the best of our ability using input from our communities, sound engineering practices, and our ability to efficiently fund beneficial projects which transcend political jurisdictions.*