



Environment and Natural Resources Trust Fund

2025 Request for Proposal

General Information

Proposal ID: 2025-323

Proposal Title: Emerging Issue: CWD Prions in Minnesota Waters

Project Manager Information

Name: Diana Karwan

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

Office Telephone: (612) 624-2774

Email: dlkarwan@umn.edu

Project Basic Information

Project Summary: Chronic Wasting Disease (CWD) environmental detection is combined with watershed knowledge to predict and evaluate how far and how fast CWD might move through watersheds and serve as a source

ENRTF Funds Requested: \$486,000

Proposed Project Completion: July 31, 2027

LCCMR Funding Category: Foundational Natural Resource Data and Information (A)

Adjusted Funding Timeline Request, per hearing of Project 2025-323 on Friday June 21, 2024

Based on discussion during hearing for project 2025-323, the PI and Co-PIs propose the following option: Funding for Activity 1 become available in July / August 2024 that would cover Activity 1 (\$163,267), which can include:

- field sampling plan for sampling based on prior reporting and hydrologic knowledge,
- initial sampling during the spring/ high water flow season around April/May 2025 depending on snow conditions. This would allow to begin with snowmelt in April 2025,
- continued engagement with interested groups (wildlife managers, watershed managers, state, tribal, local landowners, etc) via MNPRO outreach staff

Based on the budget breakdown in this proposal, Activity 2 (\$322,733) could begin with funds coming in July 2025. Activity 2 would now include:

- surface water sampling in late summer / lower flow conditions (~August September) 2025,
- sample analysis (e.g. CWD detection in MNPRO) from both rounds of sampling,
- archiving of sample material for future MNPRO analysis,

- continued engagement with interested groups (wildlife managers, watershed managers, state, tribal, local landowners, etc) via MNPRO outreach staff,
- written reports of findings for state and scientific communities.

Such a breakdown would allow for work to continue following on findings reported in January 2024, that we see evidence of CWD prions moving in surface water environments.

Project Location

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

Region(s): SE, Central, NW,

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.

Chronic Wasting Disease (CWD) is a fatal disease of deer and elk which has been found on farms and in wild herds in Minnesota and 32 other states. CWD agents, called prions, can survive for long periods of time outside of animals. Current efforts mainly focus on disease detection, transmission, and movement between animals. The detection and movement of CWD in the environment, outside of deer, remains far less understood. Recent findings from our group indicate that CWD prions associate with fine sediments suspended in water and are detectable on sediments eroding from land in two distinct Minnesota regions. Specifically, sediments were found downstream of cervid farms with known CWD infections after the farms had been depopulated. In many areas of Minnesota, soils erode from the landscape and move to receiving waterways. This proposed project combines CWD environmental detection with watershed knowledge to predict and evaluate how far and how fast CWD might move through watersheds, outside of deer. Movement through water could spread CWD prions from known hotspots of contamination hence placing more deer in wild herds at risk. Evaluation of the movement of CWD through water to downstream areas requires collaboration of both veterinary and water scientists.

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.

This is an Emerging Issues Request. We will evaluate the movement of CWD in streams and rivers as an emerging contaminant associated with fine sediment. The project team seeks to build on and integrate two bodies of distinct work, one in wildlife disease and the other in water resources, to assess and communicate the risk of CWD moving through Minnesota's waterways. Previous work identified water flows from CWD landscape hotspots to the Red River of the North, including Red Lake, as well as the Upper and Lower Mississippi River Basins. Individual watershed plans and existing river network information will be examined, reviewed, and synthesized for predictions of fine sediment movement. We also leverage the Minnesota Prion Research and Outreach Lab's (MNPRO) recent advances in environmental detection of CWD prions in the environment (e.g. soils). We will use water science and watershed knowledge to predict where to sample, and MNPRO detection methods to evaluate CWD prions. Furthermore, we will communicate to groups invested in watershed planning (e.g. MPCA, tribal partners) on the outcomes of our study: 1. The anticipated spatial extent and time it takes for CWD to travel in waterways, and 2. CWD detection status for these predictions.

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. The anticipated space and time for CWD prion travel in waterways
2. CWD detection status for these predictions based on state hotspots.
3. Communication of the above in maps, reports, and presentations focused on watershed and wildlife management communities.

Activities and Milestones

Activity 1: Predictive estimation of prion transport through Minnesota waterways

Activity Budget: \$163,267

Activity Description:

We propose to compile known information about stream and river sediment transport in two distinct regions of Minnesota where we have preliminary evidence for CWD being transported from hotspots on sediments. Work under Activity One leverages hydrologic analysis and known sediment transport rates, with emphasis on fines/silts/clays/organics to inform locations in surface water pathways where fine sediments, such as eroded soils, might get stored on their way down stream to receiving water bodies. This includes:

- (1) Compile existing information (agency reports, results of prior modeling studies that can give a range of sediment transport parameters) specific to fine sediment transport rates in two focal regions centered on known cervid farm CWD contamination.
- (2) Produce a set of locations likely to receive CWD contamination, focusing on where this contamination is likely to be stored in waterways. This will serve as targeted sampling locations under Activity 2.
- (3) Communicate via reports, presentations, and meetings with agencies and groups involved in management of targeted watersheds and statewide (e.g. tribal communities in the focal watersheds, MPCA, MN DNR, watershed districts).

This is an Emerging Issues Request. The timeline reflects emerging issues funds becoming available in summer 2024.

Activity Milestones:

Description	Approximate Completion Date
Compiled report of fine sediment movement predictions and target sample locations for Activity 2	July 31, 2025
Present work and findings to key watershed and hunting groups	July 31, 2026

Activity 2: Field sampling and prion testing of downstream water environments

Activity Budget: \$322,733

Activity Description:

We will use the information from Activity 1 to inform a stream and river sediment sampling effort to detect CWD on sediments further downstream of our known hotspots and other identified hotspots in the state. Sampling will be conducted under both spring high flow (e.g. snowmelt conditions if possible) and summer lower flow conditions. Sediments carried by water, and water present at the time from streams, lakes, etc, will be collected and subsequently analyzed for CWD by RT-QuIC testing in MNPRO based on established protocols. Additional sediment properties, such as clay content, will also be analyzed to refine estimates of sediment movement and the downstream sediment's suitability for facilitating CWD movement. Laboratory analysis will detect presence of CWD prions. Activity 2 leverages the diagnostic and testing capabilities existing in MNPRO and applies it to watershed predictions accounting for movement of soils. Results will be communicated in conjunction with the water movement report (Milestone 1, Activity 1) to assess the ability to detect CWD moving downstream from landscape hotspots via waterways in Minnesota. Timeline proposed reflects Emerging Issues Request.

Activity Milestones:

Description	Approximate Completion Date
Complete summer conditions environmental sampling	September 30, 2025
Complete spring conditions environmental sampling	May 31, 2026

Complete all laboratory analysis of prion presence/absence and corresponding sediment laboratory characterization	August 31, 2026
Present work and findings to key watershed and hunting groups	August 31, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Tiffany Wolf	University of Minnesota	Co-PI	Yes
Stuart Lichtenberg	University of Minnesota	Co-PI	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?

Information gathered, described above, will continue to be publicly available.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Understanding Brainworm Transmission to Find Solutions for Minnesota Moose Decline	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03f	\$400,000
Diagnostic Test for Chronic Wasting Disease	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03t	\$1,804,000
CWD Prion Research in Soils	M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 20a5	\$336,000
Establishing a Center for Prion Research and Outreach	M.L. 2022, , Chp. 94, Art. , Sec. 2, Subd. 03k	\$3,877,000
Chronic Wasting Disease Prion Soil Research	M.L. 2022, , Chp. 94, Art. , Sec. 2, Subd. 03n	\$732,000

Project Manager and Organization Qualifications

Project Manager Name: Diana Karwan

Job Title: Associate Professor

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

Dr. Diana Karwan has over 20 years of experience conducting and managing hydrologic research focusing on the water quality issues related to fine sediments and the effects of land use and land cover change on water quantity and quality. Dr. Karwan is currently an Associate Professor in the Department of Forest Resources at the University of Minnesota and holds an adjunct appointment in the Department of Soil, Water, and Climate. She is also the co-Director of Graduate Studies for the Water Resources Science program. Research projects have been funded by federal (e.g. NSF, USGS, USDA Forest Service), state (LCCMR and Clean Water Council), and non-profit agencies such as the National Council for Air and Stream Improvement. She has authored peer-reviewed journal articles and given presentations at scientific conferences and for community groups on these studies (see: <https://forestry.umn.edu/people/diana-karwan>).

Organization: U of MN - College of Food, Agricultural and Natural Resource Sciences

Organization Description:

The University of Minnesota is a land-grant institution and research university with a strong tradition of education and service to the state. The Department of Forest Resources, home unit of the PI, sits within the College of Food, Agriculture and Natural Resource Sciences. It is the leading research and educational institution on forest related issues, including water quality, in Minnesota. For over 100 years the department has played a key role in discovering and fostering sustainable forest and natural resource management activities in Minnesota. The University of Minnesota

College of Veterinary Medicine affects the lives of animals and people every day through educational, research, service, and outreach programs. We are dedicated to the education of future and current veterinarians and biomedical scientists and the discovery of new knowledge and skills.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
Personnel								
Senior Personnel / PI and Co-PI		Lead science, manage project, supervise and design review, lab, and fieldwork			36.5%	0.1		\$42,649
Research and Outreach Staff - P&A		Conduct literature review, field and laboratory sampling and analysis. Meet with communities to discuss findings			36.5%	0.8		\$80,146
Laboratory Specialist Staff		Conduct laboratory analysis of collect samples			31.8%	1.02		\$92,417
Graduate Students		University of Minnesota Graduate Students contributing to all aspects of research; fringe includes tuition			63.7%	2		\$177,033
							Sub Total	\$392,245
Contracts and Services								
							Sub Total	-
Equipment, Tools, and Supplies								
	Equipment	Field and laboratory equipment / consumables	Consumable supplies and equipment needed for field and laboratory work compliant with prion sampling protocols (e.g. chemical reagents, sampling and storage supplies such as bags, bottles, PPE including tyvek, gloves, waders for stream sampling)					\$60,755
							Sub Total	\$60,755
Capital Expenditures								
		Freezer	Freezer dedicated for environmental samples (-80C); needed to keep	X				\$18,000

			samples separate and stored prior to analysis					
							Sub Total	\$18,000
Acquisitions and Stewardship								
							Sub Total	-
Travel In Minnesota								
	Miles/ Meals/ Lodging	Approximately 4 trips/year will be conducted (e.g. near cities of Bemidji and Winona). At this time, team will collect samples and meet with relevant local groups. 3-5 team members will travel for 3 nights each time.	Approximately 4 trips/year will be conducted for sample collection in effected areas of the state (e.g. near cities of Bemidji and Winona). At this time, team will collect samples and meet with relevant local groups. Meeting participation with agency staff will also take place in person.					\$15,000
							Sub Total	\$15,000
Travel Outside Minnesota								
							Sub Total	-
Printing and Publication								
							Sub Total	-
Other Expenses								
							Sub Total	-
							Grand Total	\$486,000

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Capital Expenditures		Freezer	<p>Samples collected under this project need to be stored appropriately for analysis to be properly conducted.</p> <p>Additional Explanation : storage for environmental samples will remain in the MNPRO facility and store any unused portion of sediment and environmental samples after analysis under this project</p>

Non ENRTF Funds

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

Total Project Cost: \$486,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: [12fe2c8a-726.pdf](#)

Alternate Text for Visual Component

Map showing the hypothetical flow of CWD prions through Minnesota watersheds if they were to enter the stream network from depopulated CWD-positive farms. This is based on the watersheds containing farms and the next 10 watersheds downstream. The proposed project aims to add possible travel times to such distances....

Supplemental Attachments

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

Title	File
SPA Letter - Karwan	9841e9c8-135.pdf
Final Report to the Clean Water Fund - 2024	67c21abd-d69.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?

Yes, Sponsored Projects Administration

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:

Tiffany Wolf, Stuart Lichtenberg