Environment and Natural Resources Trust Fund

M.L. 2022 Approved Work Plan

General Information

ID Number: 2022-217

Staff Lead: Becca Nash

Date this document submitted to LCCMR: October 18, 2022

Project Title: Establishing a Center for Prion Research and Outreach

Project Budget: $3,877,000

Project Manager Information

Name: Peter Larsen

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Project Reporting

Date Work Plan Approved by LCCMR: October 27, 2022

Reporting Schedule: March 1 / September 1 of each year.

Project Completion: June 30, 2026

Final Report Due Date: August 14, 2026

Legal Information

Legal Citation: M.L. 2022, Chp. 94, Sec. 2, Subd. 03k

Appropriation Language: $3,877,000 the second year is from the trust fund to the Board of Regents of the University of Minnesota to form a multidisciplinary center to perform coordinated research on the detection, prevention, and treatment of chronic wasting and other prion diseases threatening wildlife across Minnesota. Money appropriated in this paragraph may also be spent on a strategic plan, capital equipment, and staff as approved in the work plan required under Minnesota Statutes, section 116P.05. Money appropriated in this paragraph may not be spent on activities unless they are directly related to and necessary for the purposes of this paragraph. Money appropriated in this paragraph must not be spent on indirect costs or other institutional overhead charges that are not directly related to and necessary

for the purposes of this paragraph. This appropriation is subject to Minnesota Statutes, section 116P.10. This is a onetime appropriation and is available until June 30, 2026.

Appropriation End Date: June 30, 2026

Narrative

Project Summary: Responding to the immediate need for cohesive research efforts focused on a prion disease that is spreading across Minnesota through the formation of an innovative and multidisciplinary research center.

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

Chronic wasting disease (CWD) is an immediate threat to Minnesota's moose, elk and white-tailed deer. The disease is 100% fatal and spreads via direct (animal to animal) and indirect (environment to animal) routes. CWD prions remain infectious within the environment for years and have been identified in soil, plants, and waterways. Thus, CWD is a multi-billion dollar, perpetual threat to the state's economy through reduction in hunting activities and sales, decreased property values, and limited trade of agricultural commodities from positive areas. First identified in Minnesota in 2002, CWD has steadily spread to 14 counties, becoming established in the southeast and moving northward to the southern metro. A strategic research effort focused on CWD detection, prevention, and therapeutics is lacking. Given the diversity of biological and ecological systems impacted, the long-term economic risk of CWD, and concerns of spread to wildlife, livestock, and humans, we urgently recommend the formation of a multidisciplinary center aimed at confronting CWD and related prion diseases. The Minnesota Center for Prion Research and Outreach (MNPRO) unites researchers across the neurodegenerative disease spectra, thus serving as an incubator for profound research advances and optimally situating the center to address CWD and all prion-related diseases.

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.

Minnesota has taken a strong approach to CWD management and plays a leading role across the nation in advancing cervid-related research. However, the challenges posed by CWD are far-reaching and can only be met through strategic and multidisciplinary efforts. Thus, MNPRO was established as a 'grassroots movement' in 2019 to join the state's efforts in CWD research and control by advancing diagnostic methods and elevating the issue among all stakeholders through outreach and education. MNPRO's early successes in diagnostic technology R&D and engagement with the public and diverse hunting communities through collaborative research and outreach demonstrate the value of a multidisciplinary center in addressing the challenges of CWD. These efforts have revealed critical needs within the state that require a center-level approach aimed at effectively confronting the multifaceted health and economic issues presented by CWD. This proposal builds on these early successes by 1) validating the novel diagnostics developed by MNPRO for CWD surveillance of wild and captive deer, 2) developing ultra-sensitive environmental testing for monitoring CWD in herds, 3) expanding CWD outreach activities online and throughout the state, and 4) formalizing MNPRO as an official Center within the University of Minnesota and sustaining MNPRO's research operations.

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?

Outcomes include: validated real-time CWD diagnostics, ultra-sensitive environmental CWD testing, state-wide assessment of CWD prion strain diversity and genetic susceptibility, expanded CWD public outreach materials for statewide distribution (both electronic and hard-copy), center-level research operations for RT-QuIC CWD testing, a curated biorepository of animal and environmental samples (currently over 2,000 samples), and the formal establishment of MNPRO as a Center within the University of Minnesota. Additionally, we will form a cohesive research strategy to help facilitate soil research associated with 2022-294. These outcomes will help mitigate CWD-related impacts to deer health, state economics, and the associated livelihoods and cultures.

Project Location

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

Statewide

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

Activities and Milestones

Activity 1: Next-generation CWD Diagnostic Test Optimization

Activity Budget: $1,603,715

Activity Description:
Previous ENRTF funding, has resulted in the expansion of our CWD testing abilities using a highly-sensitive test known as RT-QuIC. RT-QuIC can identify CWD prions in both deer tissues and environmental samples. Beyond RT-QuIC, we have invented several new prototypes of diagnostic tests to perform advanced CWD research in Minnesota, including: MN-QuIC, a portable test that can identify CWD in deer samples within 24-hours; Cap-QuIC, a liquid capillary driven test that allows for the miniaturization of CWD diagnostics using microfluidics; and a domino-sized device (microfluidic chip) capable of detecting CWD positive tissues within 4 hours. The new prion detection diagnostic tools developed by MNPRO have the potential to significantly advance the rapid detection and proactive management of CWD in Minnesota. Activity 1 will validate our new tests with standardized tissues from the USDA and compare our results with other tests used by state agencies (ELISA and IHC). The final milestone will provide options for testing hundreds of deer samples using our optimized next-generation CWD tests. Collectively, Activity 1's milestones will result in validated next-generation CWD tests to help fight the spread of CWD. The project manager, co-leads, scientists, postdoctoral researcher, technicians, and students will collectively work on Activity 1.

Activity Milestones:

Description	Approximate Completion Date
MN-QuIC test accuracy confirmed using standardized deer tissues from the USDA	February 28, 2023
Cap-QuIC test accuracy confirmed using standardized deer tissues from the USDA	April 30, 2023
MN-QuIC test compared with other CWD tests used by DNR and BAH (ELISA and IHC)	September 30, 2023
Cap-QuIC test compared with other CWD tests used by DNR and BAH (ELISA and IHC)	November 30, 2023
Microfluidic chip test accuracy confirmed using standardized deer tissues from the USDA	February 28, 2025
Microfluidic chip test compared with other CWD tests used by DNR and BAH (ELISA, IHC)	October 31, 2025
Next-generation CWD tests modified for efficiently testing dozens or hundreds of deer samples	June 30, 2026

Activity 2: Miniature antibody-based CWD diagnostics, environmental surveillance, and Minnesota's CWD prion variation

Activity Budget: $420,000

Activity Description:
Previous ENTRF funding resulted in our discovery of tiny antibodies (nanobodies) that bind to deer prions and can be used like tiny magnets for finding CWD prions. Our nanobodies can be combined with PCR technology for very sensitive detection of prions in environmental samples. In parallel to nanobody R&D, we designed CWD-prion environmental “sentinels” that can be used to monitor deer herds for CWD. When deer interact with these sentinels, the sentinels can be swabbed and tested for CWD prions. Although our nanobody and sentinel technologies could detect very small quantities of prions, the variation of CWD prions in Minnesota is unknown, potentially impacting our nanobody and sentinel tests (e.g., some prions might survive in the environment for 2-4 years but others for over a decade). Prion gene genetic information is important to understand CWD variation and deer susceptibility to CWD. Outcomes include: a validated nanobody-PCR test for CWD prions in Minnesota's environment, herd-level CWD monitoring options with sentinels, Minnesota deer prion gene DNA sequence data to help stakeholders understand CWD prion diversity. These outcomes will help CWD stakeholders fight the disease in new ways. The project manager, co-leads, a scientist, and technicians will work on Activity 2.

Activity Milestones:

Description	Approximate Completion Date
Identify nanobody combinations useful for PCR test development	December 31, 2023
Confirm CWD nanobody-PCR test using CWD positive environmental samples (water, soil)	April 30, 2024
Confirm nanobody-PCR test using sentinel technology for herd-level CWD monitoring	August 31, 2024
Complete DNA sequencing and analysis of the prion gene from deer across Minnesota	June 30, 2025

Activity 3: Expansion of MNPRO CWD Outreach Activities

Activity Budget: $485,000

Activity Description:

We will distribute outreach materials across Minnesota and during key public events. Thanks to previous ENTRF funding, we developed outreach materials devoted to Amish, Hmong, and Tribal communities. MNPRO also worked with U of M partners to create a website about the science of CWD and portable augmented reality posters for CWD outreach events. We will expand the distribution of materials, including for diverse communities, transfer and update the educational website to MNPRO's website including production of new videos, augmented reality posters, and CWD literature, and develop new outreach materials (handouts, posters, etc.) for MNPRO outreach events (State Fair, deer classic, tribal gatherings, community events, etc.) and to share with state agency partners for distribution. Peak demand and interest occurs annually during hunting season, thus our outreach material distribution will be timed accordingly. The project manager, co-leads, and MNPRO staff and students will collectively participate in, travel to, outreach activities throughout the life of the grant. We will measure our educational impact via distribution of Institutional Review Board approved questionnaires querying participants' CWD knowledge at annual events through the life of the grant. Resulting data will guide our future CWD educational efforts and will be synthesized and published.

Activity Milestones:

Description	Approximate Completion Date
Develop questionnaire to collect data on CWD knowledge. Secure IRB approval prior to distribution.	February 28, 2023
Migrate CWD educational website to MNPRO's website	April 30, 2023
Update and create new educational CWD handouts and posters for distribution.	May 31, 2023
Plan and hold at least 4 CWD outreach events throughout Minnesota in 2023	December 31, 2023
Update and create new educational CWD content (videos, text, modules) for MNPRO website	August 31, 2024
Plan and hold at least 4 CWD outreach events throughout Minnesota in 2024	December 31, 2024
Plan and hold at least 4 CWD outreach events throughout Minnesota in 2025	December 31, 2025
Synthesize questionnaire data, report overall impact of outreach activities, publish findings.	May 31, 2026
Maintain, curate, update educational materials in light of annual state-wide CWD developments.	June 30, 2026

Activity 4: Essential MNPRO Center functions to support prion disease research and outreach

Activity Budget: $1,368,285

Activity Description:

Minnesota's CWD response is strengthened by a long-term, coordinated effort facilitated by a multidisciplinary prion research center. Activity 4 formalizes MNPRO as an official center within the University of Minnesota which, until now, has been a grass-roots effort by faculty and staff. MNPRO will build on previous ENTRF funding, uniting Activities 1-3 and functioning as a think-tank research-driven Center to fight prion diseases. MNPRO will solidify collaborative work with experts across UMN Colleges, Minnesota agencies, and community partners. Activity 4 provides operational funds supporting: hiring of MNPRO staff; dissemination of research advancements via reports and publications; a strategic planning event to establish advisory boards who will provide a research needs assessment to actively fight CWD in Minnesota and who will guide future growth; research support for state partners including RT-QuIC testing for special

investigations, environmental monitoring for CWD prions, herd-level CWD monitoring; and a curated biorepository of MN cervid tissues, created with state and tribal agencies, to support current and future CWD and deer-related research projects. Formalization of MNPRO facilitates official commitments with state partners including the DNR, BAH, MPCA, and tribal agencies. The project manager, co-leads, scientists, postdoctoral researcher, communications specialist, technicians, and students will work on Activity 4.

Activity Milestones:

Description	Approximate Completion Date
MNPRO staff recruited and on-boarded; partner commitments confirmed	June 30, 2023
Coordinate strategic planning process with the UMN Strategic Partnership and Research Collaborative	July 31, 2023
Procure two microplate readers for expanded RT-QuIC testing and freezer for cervid biorepository	December 31, 2023
Technical advisory board established and research needs assessment performed	December 31, 2023
External advisory board established and strategic plan developed	December 31, 2023
Disseminate research results generated during 2023	December 31, 2024
Strategic plan implemented and MNPRO assigned Center level status within UMN	June 30, 2025
Disseminate research results generated during 2024	December 31, 2025
Broad-scale MNPRO services performed, annual advisory Board meetings and Center review	June 30, 2026
Disseminate research results generated during 2025	June 30, 2026
Publication of 6 to 8 open-access peer-reviewed manuscripts	June 30, 2026

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Tiffany Wolf	University of Minnesota	Co-Lead. Dr. Wolf will assist with the development, oversight, and execution of all center-related research and outreach activities.	Yes
Marc Schwabenlander	University of Minnesota	Co-Lead. Mr. Schwabenlander will coordinate center-level research and outreach projects, facilitate stakeholder connections, and connect MNPRO research activities to the public.	Yes
Katey Pelican	Strategic Partnerships and Research Collaborative	Coordinating and facilitating MNPRO's strategic planning exercise as described in Activity 4.	Yes
Thomas Douville	Biotechnology Resource Center	Mass producing nanobodies relating to Activity 2.	Yes
Michelle Carstensen	Minnesota Dept. of Natural Resources	Identifying deer populations to characterize prion strain diversity relating to Activity 2, assisting with the distribution of MNPRO outreach materials relating to Activity 3 and identifying key CWD-related research areas for the state of Minnesota which will guide MNPRO's strategic research initiatives as part of Activity 4.	No
Linda Glaser	Minnesota Board of Animal Health	Identifying captive deer populations to characterize prion strain diversity relating to Activity 2, assisting with the distribution of MNPRO outreach materials relating to Activity 3 and identifying key CWD-related research areas for the state of Minnesota which will guide MNPRO's strategic research initiatives as part of Activity 4.	No
Nicole Neeser	Minnesota Department of Agriculture	Identifying key CWD-related research areas for the state of Minnesota which will guide MNPRO's strategic research initiatives as part of Activity 4.	No
Travis Bartnick	Great Lakes Indian Fish & Wildlife Commission	Assisting with the distribution of MNPRO outreach materials relating to Activity 3 and identifying key CWD-related research areas for the state of Minnesota which will guide MNPRO's strategic research initiatives as part of Activity 4.	No
Sang-Hyun Oh	University of Minnesota	Collaborating with respect to new diagnostic technologies for the detection of CWD prions relating to our Activity 1.	No
Roxanne Larsen	University of Minnesota	Collaborating with respect to the development and distribution of new outreach materials for CWD education in Minnesota relating to our Activity 3.	No
Adam Landon	Minnesota Dept. of Natural Resources	Collaborating with respect to the development and distribution of new outreach materials for CWD education in Minnesota relating to our Activity 3.	No
David Fulton	University of Minnesota	Collaborating with respect to the development and distribution of new outreach materials for CWD education in Minnesota relating to our Activity 3.	No

Dissemination

Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.
The Minnesota Center for Prion Research and Outreach (MNPRO) will serve as an CWD research informational hub for state agencies, tribal nations, broader public, academia, and the legislature. Our outreach effort over the past three years have reached an estimated 10,000 people across Minnesota and the United States, despite the pandemic. We will build on these successes by using the following opportunities to share methods and findings more broadly:

- dissemination via the MNPRO website: https://mnpro.umn.edu/
- presentation at local, regional, and national scientific, management, and public/stakeholder meetings

- publication of findings in peer-reviewed scientific (e.g. Science of the Total Environment) and professional journals (e.g. The Wildlife Professional)
- dissemination to the media via press releases and UMN Research Briefs
- in person outreach events throughout the state, annually (e.g., State Fair, deer classic, tribal gatherings, etc.)
- testimonials to LCCMR and other policy platforms

The Minnesota Environment and Natural Resources Trust Fund (ENRTF) will be acknowledged through use of the trust fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the ENRTF Acknowledgement Guidelines.

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?

Results stemming from MNPRO's research activities will be shared with local, regional, and national partners and will be published in peer-reviewed journals. We will work to secure external funding in order to sustain the Center into the future. In particular, we will pursue federal funds from the National Institutes of Health, National Science Foundation, and the United States Department of Agriculture (USDA). We anticipate our latest research will help to secure significant external funds which will drive MNPRO's activities for the greater good of Minnesota's natural resources.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
MITPPC - Phase III - Understanding the Benefits and Limitations of Using Goats for Invasive Plant Control	M.L. 2016, Chp. 186, Sec. 2, Subd. 06a-02	$0
Emerging Issues Account	M.L. 2018, Chp. 214, Art. 4, Sec. 2, Subd. 10	$439,000
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

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Peter Larsen		Project Manager			36.5%	1		$196,035
Tiffany Wolf		Co-Lead			36.5%	0.8		$130,043
Marc Schwabenlander		Co-Lead			36.5%	2		$234,884
Communications Specialist		Develop and maintain platforms for internal and external MNPRO communications			28.7%	4		$371,317
Research Scientists		Three scientists to lead MNPRO wetlab and epidemiology projects and staff			33.5%	9.6		$914,100
Laboratory Technicians		Three staff to perform dedicated research and development for prion detection, strain identification, and therapeutics			28.7%	8		$532,946
Graduate Students		Two graduate students to perform research on CWD spread and persistence in the MN environment.			87.9%	4		$397,626
Undergraduate Students		Four undergraduate students to perform research within the main MNPRO laboratory and to assist with field-work.			0%	1		$39,936
Post doc		A post-doc to help manage diagnostic R&D and MNPRO center level activities			20.9%	2.5		$198,114
							Sub Total	**$3,015,001**
Contracts and Services								
Private contractors	Professional or Technical Service Contract	Funds are requested to maintain and repair research equipment purchased with LCCMR funds using both University of Minnesota resources and manufacturer resources, throughout the life of the project. Activity 4.				0		$40,000
University of Minnesota Strategic Partnerships & Research Collaborative (SPARC)	Internal services or fees (uncommon)	Strategic planning - SPARC staff will lead and coordinate long term strategic planning events involving an external advisory board for MNPRO to establish a sustainable center. Activity 4.				0		$20,000

University of Minnesota Biotechnology Resource Center	Internal services or fees (uncommon)	We will work with the U of M Biotechnology center to mass produce miniature antibodies (nanobodies) for research identified in Activity 2.				0		$60,000
University of Minnesota Biotechnology Resource Center	Internal services or fees (uncommon)	We will work with the U of M BRC to produce the ingredients (i.e., recombinant protein) used for many of our CWD assays including RT-QuIC, MN-QuIC, Cap-QuIC, and Micro-QuIC pertaining to our Activities 1, 2, and 4.				0		$42,000
							Sub Total	**$162,000**
Equipment, Tools, and Supplies								
	Equipment	Small molecular lab operation equipment consisting of pipettes, vortex machines, mini-centrifuges, micro-scales, barcode scanners, etc.	Small equipment to perform the molecular research pertaining to our Activities 1 and 2.					$47,000
	Tools and Supplies	Lab supplies for day to day operation of MNPRO	PPE including gloves, eyewear, disposable gowns, protein and DNA extraction kits, PCR kits, PCR cleanup kits, reagents, chemicals, antibodies for prion detection and visualization, RT-QuIC supplies including 96-well plates, 384-well plates, thioflavin-T, etc. We estimate ~$50k to $55k per year for routine molecular lab operation for Activities 1, 2, 4.					$214,999
	Tools and Supplies	DNA sequencing kits and flowcells	To produce DNA sequence data for prion strain typing as described in Activity 2.					$50,000
	Tools and Supplies	Prion detection ELISA kits	To use the traditional ELISA test for CWD prion detection as a baseline comparison for our new tests described in Activity 1.					$12,000
	Tools and Supplies	Supplies for the fabrication of microfluidic channels and capillary arrays	We will construct the equipment used for all of our Cap-QuIC and Micro-QuIC assays using plastic molds, capillary tubes, and nanofabrication supplies relating to Activity 1.					$80,000
							Sub Total	**$403,999**

Capital Expenditures								
		Microplate readers for RT-QuIC	Microplate readers are the tool for prion detection in the RT-QuIC assay and will support Activities 1 and 2	X				$70,000
		ELISA Plate Washer	To perform ELISA-based testing of CWD for milestones in Activity 1.	X				$7,000
		Real-time PCR Machine	The RT-PCR machine will be used for 1) genotyping the PRNP gene of deer and 2) ultra-sensitive detection of CWD prions using an antibody-binding assay. Activity 2.	X				$25,000
		Ultra-cold freezer	The ultra-cold freezer is needed to store biological and environmental samples associated with MNPRO research activities and biorepository, Activities 1, 2 and 4.	X				$12,000
		2 Enzo Absorbance 96 Plate Readers	This instrument will be used for field-based high-throughput testing using our MN-QuIC assay. Activity 1.	X				$24,000
		MIC Portable RT-PCR	This portable instrument will be used for ecological-based screening of CWD prions (i.e., within the field). Activity 2.	X				$15,000
		ELISA Reader	This machine is needed for the validation experiments involving ELISA comparisons to our new diagnostic assays. Activity 1.	X				$10,000
		Eppendorf CleanCap UV and HEPA filter system	This equipment will be attached to our high-throughput robotic pipette system to prevent contamination for our high-throughput RT-QuIC analyses pertaining to Activity 1.	X				$8,000
							Sub Total	**$171,000**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								

	Miles/ Meals/ Lodging	Travel for MNPRO staff and researchers; ~10 trips (overnight stays throughout the state) with 2-6 people per year	Conduct research, meet with stakeholders/partners, public outreach events, etc. Activities 1, 2, 3, 4.					$50,000
	Conference Registration Miles/ Meals/ Lodging	Travel for MNPRO staff and researchers ~5 trips with 1-5 people per year	Present research findings at locations throughout Minnesota, cover registration fees associated with conferences, etc. Activities 3 and 4.					$15,000
							Sub Total	**$65,000**
Travel Outside Minnesota								
	Conference Registration Miles/ Meals/ Lodging	Funds for 1 or 2 MNPRO scientists to present research at a scientific conference, once per year for two years of the project.	To present research findings to the scientific community at a professional conference. Activity 4.	X				$10,000
							Sub Total	**$10,000**
Printing and Publication								
	Printing	Outreach materials, surveys, reports, booklets, posters, models	Educating Minnesota's public and disseminating research results throughout the state pertaining to our Activity 3.					$30,000
	Publication	Fees for 6 to 8 open-access peer-reviewed publication of research results	Funds for MNPRO scientists to publish research findings in open-access peer-reviewed journals. Operational funds, Activity 4.					$20,000
							Sub Total	**$50,000**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$3,877,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Capital Expenditures		Microplate readers for RT-QuIC	This equipment is required to perform RT-QuIC testing of tissues and environmental samples for CWD. It is also needed to validate our newly developed CWD tests. **Additional Explanation :** Microplate readers will be used for MNPRO research and state agency support for the detection of prions using the RT-QuIC assay. We will purchase 2 at $35,000 each. These 2 machines will be used for wildlife and environmental prion testing for the life of the machine. Activity 1 and 2.
Capital Expenditures		ELISA Plate Washer	This equipment is required to validate our CWD diagnostic assays. **Additional Explanation :** This equipment will be used exclusively for ELISA testing of deer tissues for CWD for the life of the equipment.
Capital Expenditures		Real-time PCR Machine	This is needed to achieve our prion genotyping goals as well as our ultra-sensitive environment-based testing for CWD prions. **Additional Explanation :** This machine will be used exclusively for identifying deer prion gene variants and for ultra-sensitive prion detection assays using antibodies. This equipment will be used for wildlife and environmental prion testing for the life of the machine.
Capital Expenditures		Ultra-cold freezer	This freezer is needed to perform the proposed research (sample storage) **Additional Explanation :** This freezer will hold only MNPRO research and biorepository samples. This equipment will be used for wildlife and environmental sample storage for the life of the machine.
Capital Expenditures		2 Enzo Absorbance 96 Plate Readers	We require these portable plate readers for high-throughput testing of cervid samples using our MN-QuIC gold-nanoparticle assay. **Additional Explanation :** This machine will be used only for MN-QuIC based testing of various deer tissues and related environmental samples. This equipment will be used for MN-QuIC testing of cervids and related samples for the life of the machine.
Capital Expenditures		MIC Portable RT-PCR	This is needed to complete the environmental screening goals related to our CWD research. **Additional Explanation :** This machine will allow for the real-time detection of CWD prions in MN waterways using antibody-based binding assays. This equipment will be used for wildlife and environmental prion testing for the life of the machine.
Capital Expenditures		ELISA Reader	This is needed for the cross-platform validation of our diagnostic assays. **Additional Explanation :** The ELISA reader will be used exclusively with the CWD ELISA assay, performed on deer tissues from throughout MN. This equipment will be used for

			wildlife prion testing for the life of the machine.
Capital Expenditures		Eppendorf CleanCap UV and HEPA filter system	We need this equipment to prevent contamination of high-throughput CWD testing **Additional Explanation :** This equipment will ensure safe and reliable usage of our robotic Eppendorf pipette system that is used for our high-throughput RT-QuIC CWD testing.
Travel Outside Minnesota	Conference Registration Miles/Meals/Lodging	Funds for 1 or 2 MNPRO scientists to present research at a scientific conference, once per year for two years of the project.	We are requesting that 1 or 2 scientists working on the proposed research can present their research at a professional conference outside of Minnesota.

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: 5fc649b1-638.pdf

Alternate Text for Visual Component

This visual component demonstrates MNPRO's grassroots accomplishments in Minnesota over the past 2 years and describes the need to establish a multidisciplinary center to continue the work of effectively confronting the statewide, multifaceted health and economic issues presented by prion diseases, now and into the future....

Optional Attachments

Support Letter or Other

Title	File
Dr. Christopher Cramer letter of support	c64dadb3-af5.pdf
Dr. Jason Bartz letter of support	dc136ca7-c7f.pdf
Dr. Joseph Bump letter of support	d2b99ad8-ba1.pdf
Dr. Nicole Neeser letter of support	7b46e2ef-61b.pdf
Dr. Beth Thompson letter of support	c6416ba3-18e.pdf
Schwabenlander et al. preprint - MNDNR collaborative research	d721a4ea-c5e.pdf
Dr. Jonathan Gilbert letter of support	e89e1b19-e99.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

We received approximately $550,000 less than the submitted proposal, but also received an unexpected $732,000 soil specific funding. Therefore, we are focusing this project on 1) validation of the newly developed prion diagnostic tools, 2) development of ultra-sensitive nanobody-based environmental CWD prion detection assay and genotyping of unique prion strains in Minnesota, 3) expanded outreach activities, and 4) the formal establishment of MNPRO as an official center within the UMN with center level operations. Importantly, the research activities described within this workplan have been externally peer-reviewed through an extensive research addendum. This addendum was confidential due to intellectual property and the external review was officially filed with LCCMR staff.

Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?

Yes

Do you agree travel expenses must follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I agree to the UMN Policy.

Does your project have potential for royalties, copyrights, patents, or sale of products and assets?

Yes

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

Yes

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

No

Does your project include original, hypothesis-driven research?

Yes

Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration