

Chronic Wasting Disease: MNPRO Research Update

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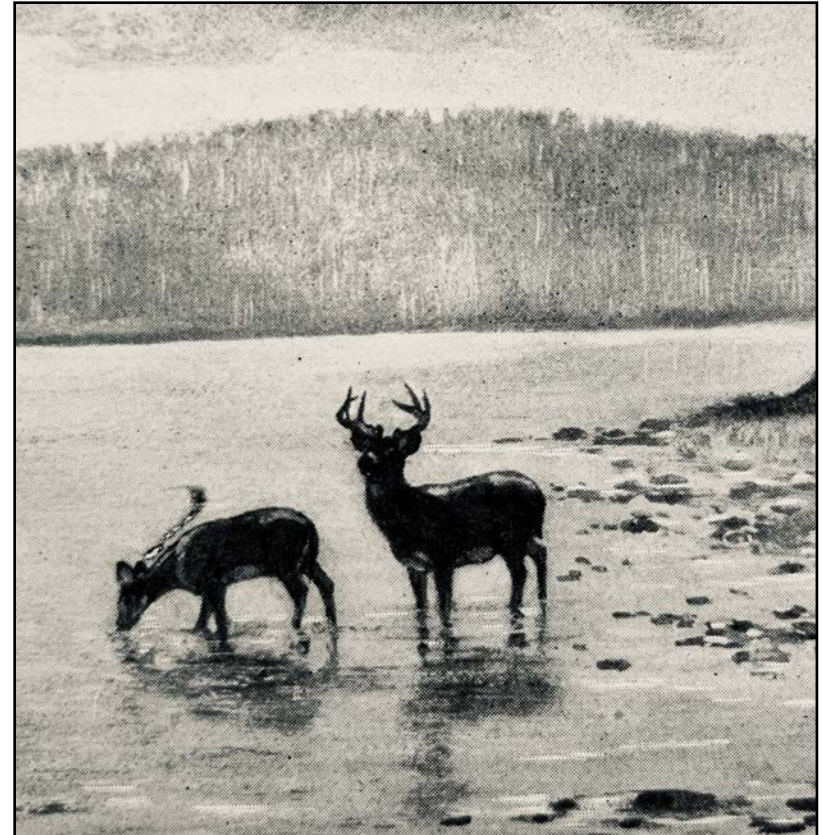


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Background: Chronic Wasting Disease

- Direct threat to Minnesota's white-tailed deer, elk, and moose
- CWD positive deer can pass infectious prions to other deer and shed them into the environment
- Poses a risk to multiple economic sectors in the state and across the USA
- Requires an immediate and sustained research and outreach effort
- Must do all that we can to protect the rich heritage surrounding cervids



Background: Minnesota Center for Prion Research and Outreach (MNPRO)

- Began as a grassroots effort in 2019 to assist the state and nation with CWD research and outreach. Co-Director **Dr. Tiffany Wolf**, Associate Director and Program Manager **Marc Schwabenlander**
- 2019: MNPRO research team awarded ~\$2M by the state (MN Legislature: LCCMR; Minnesota Extension Rapid Ag Response Fund) to develop advanced CWD diagnostic tools
- Immediate need for faster and more sensitive diagnostics with live-animal, harvested animal, and environmental application



Tiffany Wolf, DVM, PhD

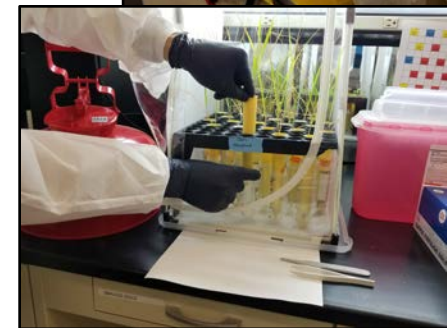
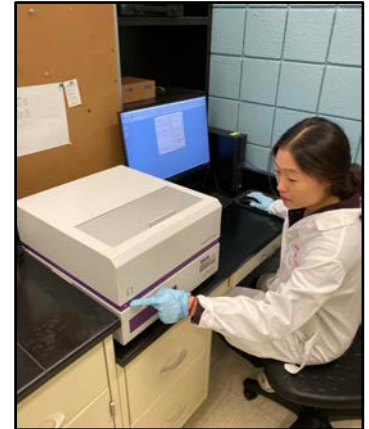


Marc Schwabenlander, MPH



CWD Diagnostic Test Research

- Major milestone reached on 24 Jan 2020
- RT-QuIC functionality:
 - Highly sensitive and robust prion detection assay
 - "Can detect equivalent of ~1 tablespoon of CWD prions in ~400 Olympic-sized swimming pools of water"
 - **Live animal test, harvested animal test, and environmental test**
 - MNPRO lab only lab in state with RT-QuIC
 - Protocols for tissues, blood, feces, water, plants
 - Soil protocol in development (online summer 2021)
 - Assisting USDA with official validation using tissues (lymph nodes, brainstem, rectal biopsy)
 - Working to establish nation-wide RT-QuIC network

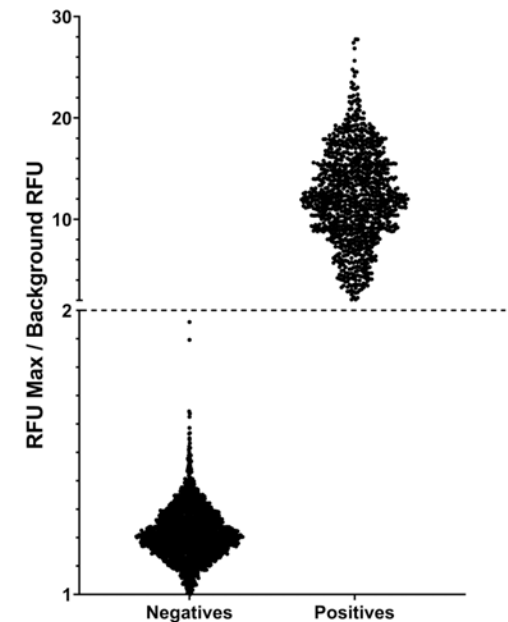


RT-QuIC

- Collaboration with DNR to internally validate RT-QuIC
 - Blinded analysis of ~500 deer. RT-QuIC was 100% accurate using same tissues used for existing diagnostics (ELISA, IHC). Schwabenlander et al. (*In review*)
 - Multiple tissue types (i.e., tonsils, and several lymph nodes) might ID more CWD+ animals
 - **Still in research phase with DNR**
 - Additional staff, equipment, lab space required to expand testing capacity. Epidemiological validation in progress (Dr. Tiffany Wolf)
- Helping to establish self-sustaining Tribal CWD network in MN/WI/MI
 - 2020-2021: Worked with 5 MN tribes + 1854 Treaty Authority to secure tissues (including from Dakota Co. and Beltrami Co.)
- BAH and USDA: environmental samples and tissues from depopulated herds



Michelle Carstensen

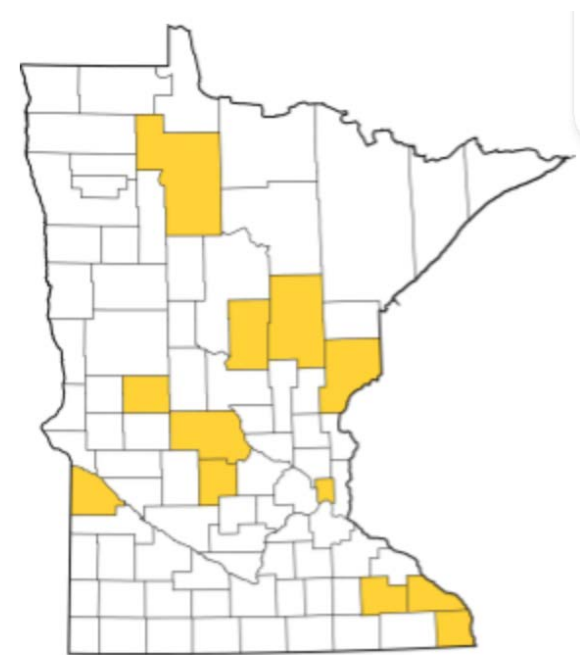


RT-QuIC analysis of over 3,165 datapoints (~790 lymph nodes)



RT-QuIC: opportunity for MN farmed cervid industry and state agencies?

- Beltrami Co. positive farm is furthest north in the state. Wild herd across state and tribal lands could be impacted.
- **We believe that our RT-QuIC-based diagnostics can be leveraged to help prevent farm-to-farm spread.**
- Must work with cervid industry, BAH, DNR, and UMN experts to effectively implement
- **MNPRO envisions a two-year pilot project to examine herd-level surveillance options:**
 - Use tank water, feces, soil to help detect prions early (similar to other livestock disease monitoring)
 - Ante-mortem testing using blood or saliva



Yellow counties with CWD positive farms since 2002.

Our team has developed a field-deployable 24-hour CWD test

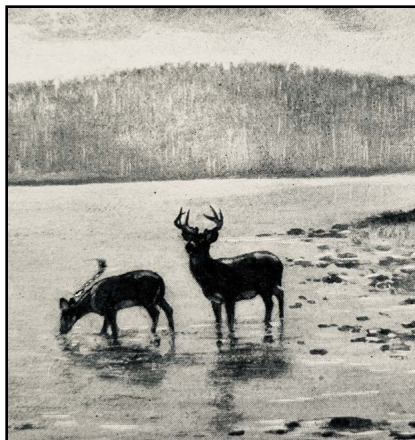
- Breakthrough in MNPRO lab occurred in October 2020
 - Performed dozens of follow-up experiments
- Feb 2021: determined we could deploy the prototype
- March 8th – 13th: deployed new test with DNR help in Rushford, MN
 - Day 1: confirmed that new test was working in the field
 - Day 2: successfully tested DNR tissues on site
 - Days 3 to 6: performed multiple confirmatory experiments
- Filing provisional patent (adhering to LCCMR and UMN policy). Writing manuscript to publish findings.



MNPRO: Moving Forward

- Continue to work with state, tribal, and national partners to advance CWD research and combat the spread of CWD
- MNPRO value system: uphold the tradition of research, service, and outreach associated with a land-grant institution

Thank you!





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