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A New Approach to Combating CWD

MICHIGAN IS SEEKING SCIENTIFIC SOLUTIONS USING COLLABORATION

By Sonja Christensen, Kelly Straka and J.R. Mason

As chronic wasting disease continues to spread across North America, many fear it represents an existential challenge to deer hunting and, as a result, to natural resource agency economics. Because state wildlife agencies depend on hunting licenses for much of their funding, the impacts of CWD extend beyond deer and deer management to affect wildlife and habitat management in general. Finding effective ways to combat the disease have been elusive, though.

State and federal natural resource agencies, academic institutions and other organizations have become intensely interested in understanding and controlling CWD. The management efforts they've attempted, however, are often met with public distrust (MDNR report 2019; Needham et al., 2004). Further, it's difficult to know how effective these techniques have been since data collection to empirically validate them have been sparse. And few attempts have been made to collectively use harvest data across jurisdictions to inform more landscape-level adaptive management.

The development of best management practices by the Association of Fish and Wildlife Agencies in 2018 has been one of the most comprehensive and focused efforts to recommend CWD actions for state fish and wildlife agencies (Gillin and Mawdsley 2018). However, it is too soon to assess what impacts they have had on disease prevention and control within or across jurisdictions.

So how do we find out what works? Last September, Michigan State University and the University of Wisconsin-Madison initiated a new approach to coordinate research across jurisdictions that was informed by resource management needs. This effort was built upon an ambitious wildlife disease initiative developed by the Michigan Department of Natural Resources and MSU to provide resources to innovative research and outreach to address CWD in Michigan and elsewhere.



Credit: Michigan Department of Natural Resources

A growing problem

CWD has been detected in captive or free-ranging cervids in 26 states, four Canadian provinces and Finland, Norway, South Korea and Sweden (Osterholm et al. 2019; cwd-info.org). While there have been several valuable studies into the epidemiology of CWD, the importance of many variables remains unclear.

Uncertainties related to methods of transmission and spread, differences in risk of infection among sex and age classes, the impact of different regulatory and harvest regimes, effective dose for infection and potential differences in transmissibility among CWD strains complicate management of this disease. Human dimensions research to characterize public awareness and willingness to accept disease mitigation strategies is often lacking at various scales of disease management as well.

Concerns about CWD's threat to the future of hunting stem from a variety of reasons, including the disease's effects on deer populations (DeVivo

▲ A Michigan Department of Natural Resources staff member checks a deer carcass as part of an effort to gauge the spread of chronic wasting disease in the state.



Credit: Michigan Department of Natural Resources

A new approach

To address what measures are having success in disease prevention and control, we developed the Michigan approach. Using funds provided by the Michigan state legislature, MSU, MDNR and UW-Madison held a facilitated meeting in East Lansing among 46 invited participants representing 14 universities, seven state agencies, three federal agencies, one Canadian province and one nongovernmental organization.

This first meeting of the CWD Research Consortium also served as the first business meeting of an active multistate project led by the University of Wisconsin-Madison and the Boone and Crockett Quantitative Wildlife Center at Michigan State University.

The consortium was intended to represent both research and management communities from jurisdictions currently affected by CWD in free-ranging cervids and to collectively organize research efforts to address critical disease management needs.

We asked participants to identify common research themes for coordinated action across interdisciplinary teams, avenues for improved communication between research and management within and among states, sources and means of obtaining adequate funding for more diverse and measurably effective research and management efforts and to develop a coordinated outreach approach for disseminating research results across states and agencies and ultimately to the public.

The diversity of perspectives, small group size and facilitated process led the participants to identify critical needs in five thematic areas:

- The establishment of a national CWD tissue database and repository with improved access for transmission and pathogenesis research and validation of CWD prion detection assays.
- The development of large-scale research facilities for controlled CWD research where CWD has been detected.
- The advancement of diagnostic testing for CWD with a focus on facilitating adoption of the RT-QuIC assay and improved sourcing for the recombinant prion protein substrate.
- The development of a multistate adaptive management approach for CWD to evaluate surveillance and management strategies and

▲ Michigan developed an approach to combating CWD by inviting wildlife professionals to come together to prioritize research needs and implementation strategies.

et al. 2017, Edmunds et al. 2016); low hunter acceptance of management actions (e.g., Holsman et al. 2010, MDNR report 2019); evidence that CWD prions may be infective when present in soil, water and possibly plant tissue (Johnson et al. 2006; Marin-Mareno et al. 2016; Ortega 2016); costly and prolonged surveillance regimes (Miller and Fischer 2016; Walsh and Miller 2010; Samuel et al. 2003) and transmission between captive and wild cervids (The Wildlife Society Fact Sheet 2014).

Managers have sought a variety of efforts to try to control the disease. Sharpshooting, bans on baiting and feeding, regulations for and against antler-point restrictions, liberalized hunting seasons and bag limits and movement restrictions on carcasses and animal parts have been implemented together with messaging designed to encourage hunters to test deer. Yet it's uncertain how effective any of these efforts have been.

▼ Managers have sought a variety of efforts to try to control CWD, but the disease continues to spread.



Credit: Michigan Department of Natural Resources



how deer harvest regulatory options impact deer disease dynamics.

- The evaluation of social values, motivations, attitudes and effective communication to inform disease management decision-making and improve engagement and acceptance of management actions at local, state, and regional levels.

A durable partnership

Over the next year and into the future, consortium members will work cooperatively to address these priorities, develop new ones and make their work available to the management community.

Our goal is to develop a durable partnership among diverse organizations and research institutions and form a collaborative platform to address CWD challenges. This multistate consortium will improve the coordination of research efforts and exchange of information among managers and researchers with common goals but different backgrounds and knowledge bases.

Besides providing the funds to host the initial meeting of the consortium, the Michigan state legislature provided additional funding to support other priority CWD research across the Midwest and nationally. These funds were advocated by state, university and nonprofit partners across Michigan. Titles for these other funded efforts include:

1. Influence of deer harvest regulations on antlerless harvest, abundance and sex and age composition: implications for managing deer in the face of chronic wasting disease;
2. CWD extension education;
3. Composting deactivation of CWD prions;
4. A standardized, high-throughput genetic resource to inform white-tailed deer population and disease management;
5. Chemical inactivation of CWD prions on solid surfaces by peroxymonosulfate and hypochlorite acid;
6. Employing collaboration and innovation to develop CWD education and outreach;
7. The next frontier of CWD models in Michigan: an agent-based approach for surveillance and management assessment;
8. Optimizing CWD surveillance: regional synthesis of demographic, spatial, and transmission-risk factors;
9. Chronic wasting disease: field animal-side testing and improving laboratory diagnostic sensitivity.



Credit: Michigan Department of Natural Resources

◀ A check station allows for information sharing and disease sampling regarding CWD in Michigan.

10. Mechanistic understanding of environmental behavior, bioavailability, and persistence of chronic disease wasting prions.

A second request for proposals with the aim of funding additional work of benefit to Michigan as well as the national wildlife management community is already in discussion. This effort at community building to address CWD may serve as a basis for a more substantial network of research and management entities to address emerging wildlife diseases that increasingly threaten North American conservation. ■



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