DEER TRUSTEE QUESTIONS VALIDITY OF WISCONSIN CWD CLAIMS

A White Paper by Dr. James C. Kroll

If you believe recent sensational headlines about Chronic Wasting Disease (CWD), the white-tailed deer is a doomed species and hunters might as well hang up their guns and bows and start playing golf! Detroit Free Press e-reporter, Lydia Lohrer, in an article entitled "*Chronic Wasting Disease Must Be Taken Seriously*," reported the following about CWD: the infection rate in Wisconsin has doubled; it is spreading like "wildfire;" half the bucks in the state are infected; and, mathematical models predict the demise of the herd in the near future. These claims are pretty frightening on the surface, but none of it is true! Science should not be influenced in any way by politics or personal agendas, I was trained by some of the best wildlife scientists in the world and they taught me that another word for scientist is skeptic! Let's take a look at the facts.

I was hired by Governor Scott Walker in 2011 to put together a team to evaluate deer management in the Badger State, particularly its response to CWD. This was the highest honor of my four decade career. The disease was first discovered in a handful of deer in 2002, harvested near Mount Horeb in Dane County. Chronic Wasting Disease, also referred to as a syndrome by early researchers, belongs to a group of diseases known as Transmissible Spongiform Encephalopathies (TSEs) that have been reported for a number of mammalian species including man. With very few exceptions, each appears to be unique to the species being affected. Bovine Spongiform Encephalopathy (BSE) is perhaps the best known of these diseases, because its appearance in Great Britain in 1986 sparked a worldwide panic due its potential to affect humans. Unfortunately, BSE was given the name "Mad Cow Disease" which further heightened public fears about human infection. A mutant form, Variant Creutzfeldt-Jakob's Disease, later was reported in Great Britain and other European countries and connected to BSE. By 2011, about 224 individuals had contracted vCJD with an annual infection rate of 2 individuals (there are an estimated 731 million people in Europe at this time).

You can see why the appearance of CWD in Wisconsin in 2002 created wide spread concern among the public. A prominent outdoor magazine quickly called it "Mad Deer Disease," and falsely reported that 3 hunters had died from eating venison. This created widespread panic among Wisconsin landowners and hunters. The Wisconsin DNR quickly put together an "eradication" program that involved depopulation of an "Eradication Zone," containing 287 square miles of prime deer range in southwestern Wisconsin. Governor Scott McCallum provided $18.5 million in initial funding for these efforts. Eradication would include both sharpshooting and a series of special seasons designed to increase deer harvest. In addition, the WDNR implemented what became known as "Earn-a-Buck," which required hunters to earn a buck tag by harvesting a doe. Initially the eradication program enjoyed enthusiastic public

support; but, as time passed and there seemed to be little progress in eliminating the disease, public support deteriorated.

In 2003, the agency's response plan was reviewed by a "Blue Ribbon Panel" comprised of top wildlife professionals. The panel reported that the plan seemed reasonably sound, but cautioned:

"The DNR should continue to closely monitor the effects of its management strategies on CWD in the state and shift to a more passive plan if the aggressive efforts to eradicate CWD via deer depopulation become clearly unsuccessful." (Fischer, et al. 2003).

By 2006, the WDNR had spent some $35 million dollars on the CWD eradication program. Growing public opposition to the program, especially in the Eradication Zone, eventually led to a legislative audit (Report 06-13) of the program. The WDNR was able to account for only $26.8 million of appropriated funding. [It took the Trustee Committee five years to locate the very expensive carcass digester bought with appropriated funds!] The legislative audit committee ruled that the eradication efforts had not been effective and Wisconsin's approach to CWD should be re-evaluated.

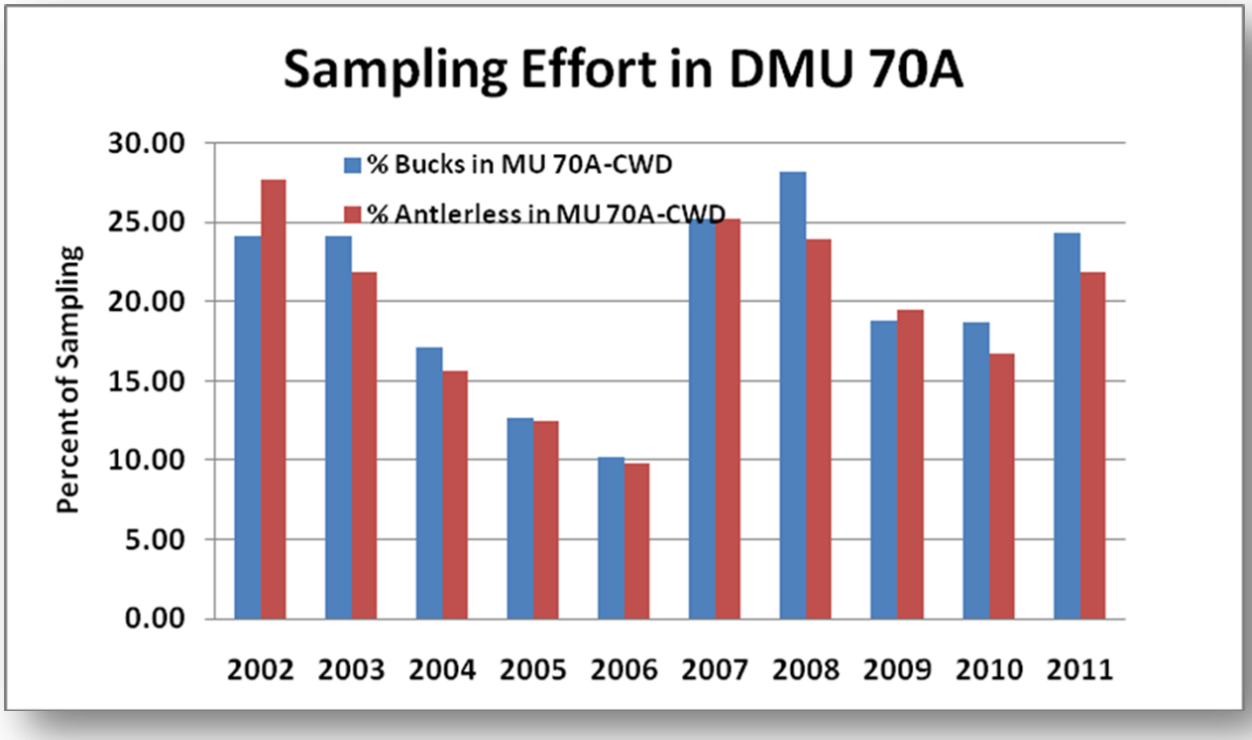
I appointed two additional members of my review team; Drs. David Guynn of Clemson University and Dr. Gary Alt, ex-Whitetail Program Leader for Pennsylvania. The Deer Trustee Review Committee, as it became known, was given a one-year deadline to produce a complete review of the CWD program, and the WDNR's deer management program in general. The budget for the program was established at $125,000, to cover all expenses and committee compensation. The state had previously spent several hundred thousand dollars on public opinion reports and other studies.

We went into this with a great deal of respect for the Wisconsin WDNR. After all, this is the land of Aldo Leopold (Father of American Wildlife Management), and we expected state-of-the-art wildlife management. What the team discovered, however, was that there often was little data to support management decisions. Deer population estimates, which were used to set bag limits, were developed from an Excel spreadsheet model, based primarily on yearling buck harvest with a calculated accuracy rate of ±123%. This was particularly true for the CWD program. We asked for all necropsy (animal autopsy) reports on deer found dead in the CWD Zone and we eventually got a mere handful of reports on dead deer. The surprising outcome was that very few of the reports concluded the deer died from CWD. Much later, the DNR was finally able to produce more reports, which again showed he same results.

During the study, the Trustee Team discovered a flaw in the sampling scheme for CWD. They reported:

"*There appear to be <u>two separate data sets</u> regarding ages of deer harvested or removed from the CWD Zone. One set is designated as from opening weekend harvest data for 1992-2011, with some data missing (1992, 2004-2006). The second represents dataset taken from deer sampled for CWD*."

After analyzing the two data sets, the Team concluded "*…the proportion of samples arising from older age classes has increased over time (2002-2011)*."(Deer Trustee Report, page 51) This is significant since older age classes are more likely to test positive for the disease than a random sample across all age classes. Furthermore, sampling effort began to focus on the heart of the infection, with more samples coming from these areas. The graph below shows how percentage of sampling in DMU 70A (CWD hotspot) increased in 2007.



The Team concluded this introduced a bias in the estimates of CWD infection. New, even more serious questions about sampling bias would arise later. The DTR final report concluded:

- "*There has been a significant sampling bias in the CWD monitoring program, which has affected estimates of infection rates.*
- *There are no significantly valid results which substantiate an exponential increase in the disease in the DEZ*.

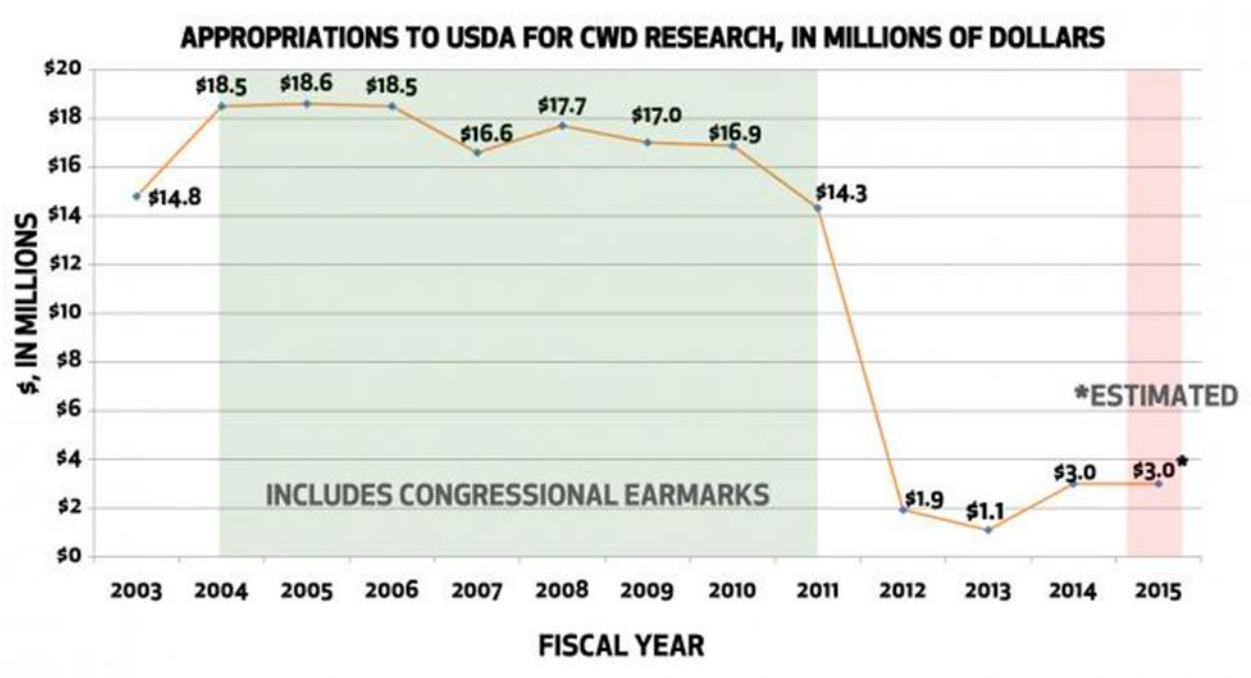
- *Based on aging data, the deer herd within the DEZ has increased in age within some areas, increasing probability of a higher clinical incidence of CWD, and may be an 'unintended consequence of EAB*" (Earn-a-Buck).

Since CWD eradication had indeed not been successful, the Team recommended accepting the original recommendation by the 2003 Blue Ribbon Panel a more passive approach be adopted. A great deal has been written and discussed about the committee's meaning of the word, "passive." Many have declared it means doing absolutely nothing. To the contrary, the Team offered what they felt would be a more effective approach to CWD management:

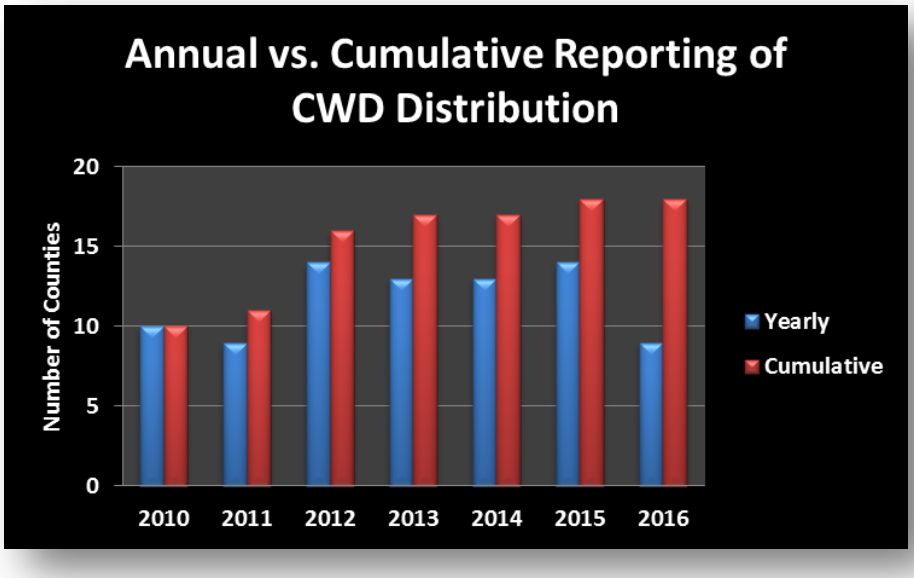
"***Dealing with wildlife diseases is not unlike responding to wild fires, and response plan should be developed on this model, focusing on early detection of "break outs" and citizen involvement.*** *EARLY detection of CWD in the current DMZ may have allowed a focused eradication effort using trained sharpshooters. Yet, no one ever will know. In the wild fire analogy, a fire is controlled easily when it first starts, but uncontrolled there is a point where control is out of the question; leading to a fall back strategy to defend what is in its path. We believe this is the case for the DMZ. Hence, the reaction to the Shell Lake infected deer, although much more reasoned than in 2002, should have included a faster response to determine the extent of distribution. Waiting until deer season in fall of 2012 to sample for CWD is not adequate. A proper approach would have been use of a health check/surveillance team (discussed later) deployed immediately on such a finding. In addition, use of local observers and cooperators to find and report sick or dead deer would have provided a non-lethal first response. Once the geographic context is determined, the appropriate action should be focused, localized eradication. Mistakes were made in this particular case, including leaving an infected carcass on the landscape for some time and delays in testing the suspected animal."*

It has been estimated that, by 2015, more than $50 million has been spent on CWD control or management in Wisconsin; and, the disease is still present. Much of these funds, as well as additional state funds have gone to support research and testing activities. It is safe to say Academia has benefitted significantly from CWD programs since 2002; not to mention state agencies. The graph below shows federal funding for CWD research from 2003-2015. It is instructive to note funding has precipitously declined as more agencies and scientists have come to the realization CWD cannot be eradicated, especially by depopulation. It can only be managed. [Not a single state has been able to control CWD spread! [See Illinois facts later.]

As funding has decreased, those benefitting from such programs have begun to renew claims about the seriousness of CWD. In 2015, some outdoor writers began reporting that CWD infection rates were "skyrocketing." (One of the claims by the Detroit Free Press) It was widely reported that the infection rate had increased to 9.4% statewide, and that the number of "affected" counties had increased to 41. . An "affected" county is one that is within 10 miles of a positive county, and/or has imposed feeding and baiting bans.

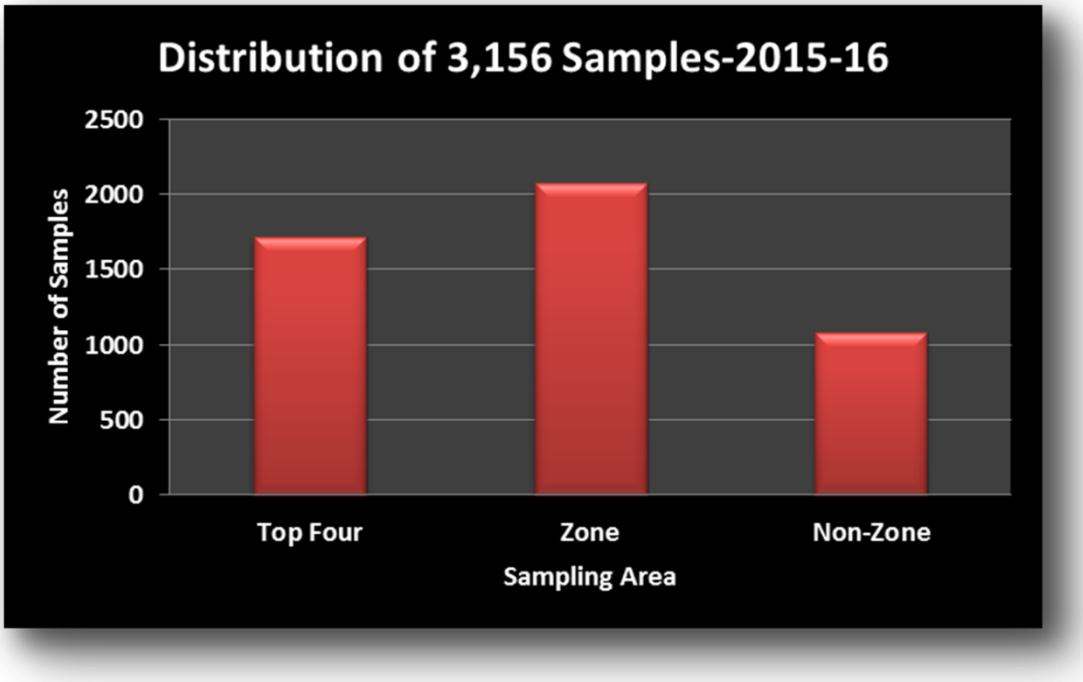


I examined all of the 190,000+ Wisconsin CWD testing results since 2002. There actually are, at this time, 18 counties with a free-ranging CWD positive deer during the 14 year period. When you examine the entire data set, you find the number 18 comes from the cumulative number of counties in which CWD has been found at some time since 2002; not the current count. The often published map of CWD distribution in Wisconsin is a cumulative infection map, not a series of annual maps. The graph below shows the number of annual positive counties, compared to cumulative counties for 2010 to 2016. The 2016 number is probably misleading, since at the time of this report, the 2016 rifle season has not taken place.

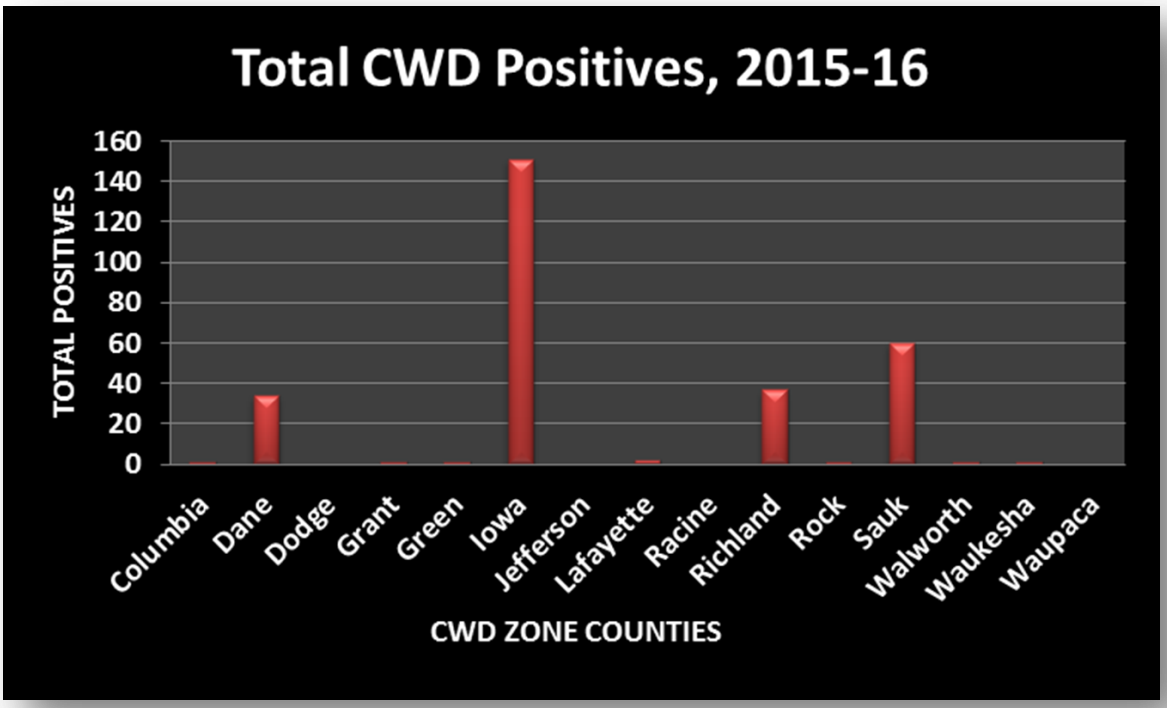


This graph (and the cumulative map) shows two completely different pictures of CWD in Wisconsin, depending on whether it is presented as a cumulative number or an annual number of counties with positives. (The smaller number of 2016 is probably due to incomplete data for the year.) The number of infected counties obviously has not "skyrocketed."

The question arises as to the source of the recent report of significant uptick of statewide infection to 9.4%? Once again, I examined the entire data set for Wisconsin to find an answer. The number of samples has indeed decreased in the last 10 years, but the proportion from CWD infected counties has increased. In 2015-16, there were 3,156 samples taken from the majority of the 72 Wisconsin counties; of which there were 296 CWD positive deer. Apparently, someone divided 296 by 3,156 to obtain the 9.4% figure. This was misleading and irresponsible! However, 2,075 samples (65.7%) came from the 15 CWD Management Zone counties; and, 1,722 (54.6%) came from the top four CWD counties. Since 2010, there have been 34,269 tests for CWD, 79.1% have come from the CWD Management Zone. Furthermore, sampling for older age classes (3.5+ years) has doubled. To put all this into perspective, it is like trying to determine the average height of all basketball players in Wisconsin by measuring the height of 100 professional players and 30 college and high school players and calculating the average! Furthermore, dividing the total number of samples (which have been biased toward the smaller number of infected counties) by the total number taken from all counties is not the statistically appropriate way to determine statewide infection rate. Does anyone actually believe that a random sample of 100 deer anywhere in Wisconsin have 9 infected deer?



A further examination of the data by county within the CWD Management Zone is even more enlightening. When I examined the distribution of positives within the 15 county zone, I discovered the vast majority of CWD positive deer in Wisconsin in 2015 came from only four counties (Iowa, Sauk, Richland and Dane, in order).



In 2015, 97.3% of CWD positives came from four counties; and, 52.1% came from Iowa County. Given all this, one can hardly say that CWD is 'skyrocketing' in Wisconsin!

The conclusion by the Trustee Team that Earn-a-Buck may have had the opposite effect (viz., increasing buck age structure and infection rate), recently was validated by University of Wisconsin-Madison researchers, Jennelle, et al. 2014, who modeled CWD infection rates and transmission modes.

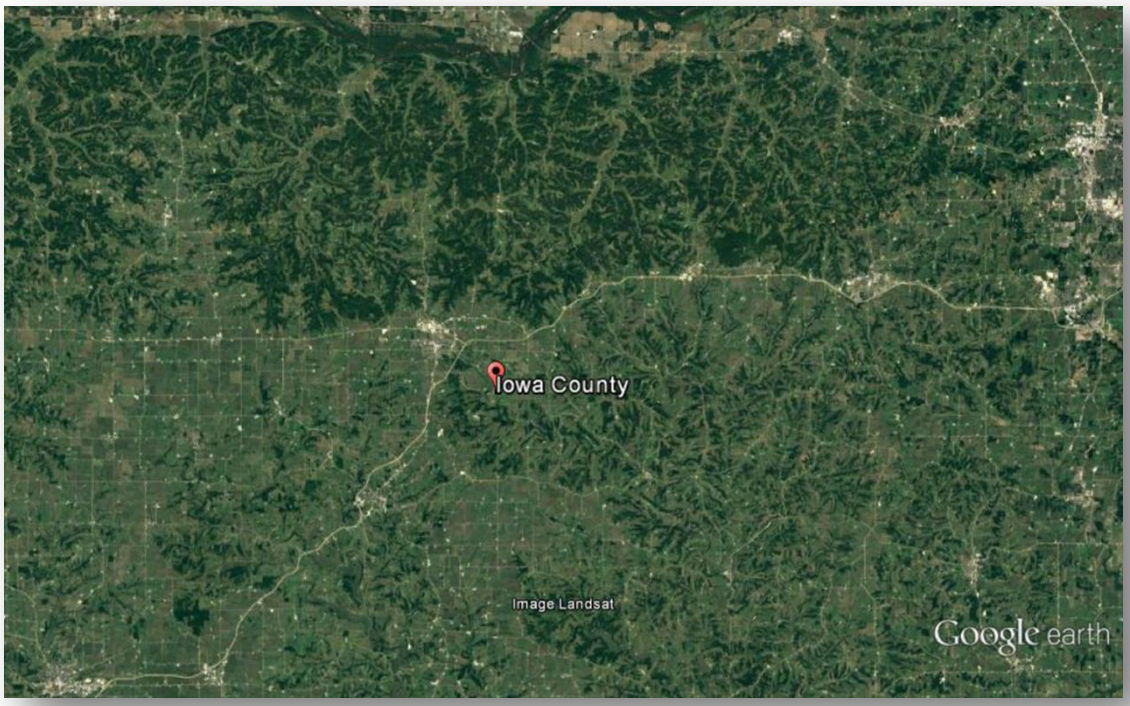
The most important conclusion by Jennelle, et al. (2014) goes directly to the heart of the eradication program, and recent claims by critics that the way to control CWD is by population reduction. In order for this to be true for any disease, there has to be a density-dependent factor in disease transmission. It is based on the concept that the probability of disease transmission is a function of the density of individuals. To the contrary, Jennelle, et al. (2014) concluded:

"*…our work supports the hypothesis of frequency-dependent transmission in wild deer at a broad spatial scale and indicates that effective harvest management can be implemented to control CWD prevalence.*"

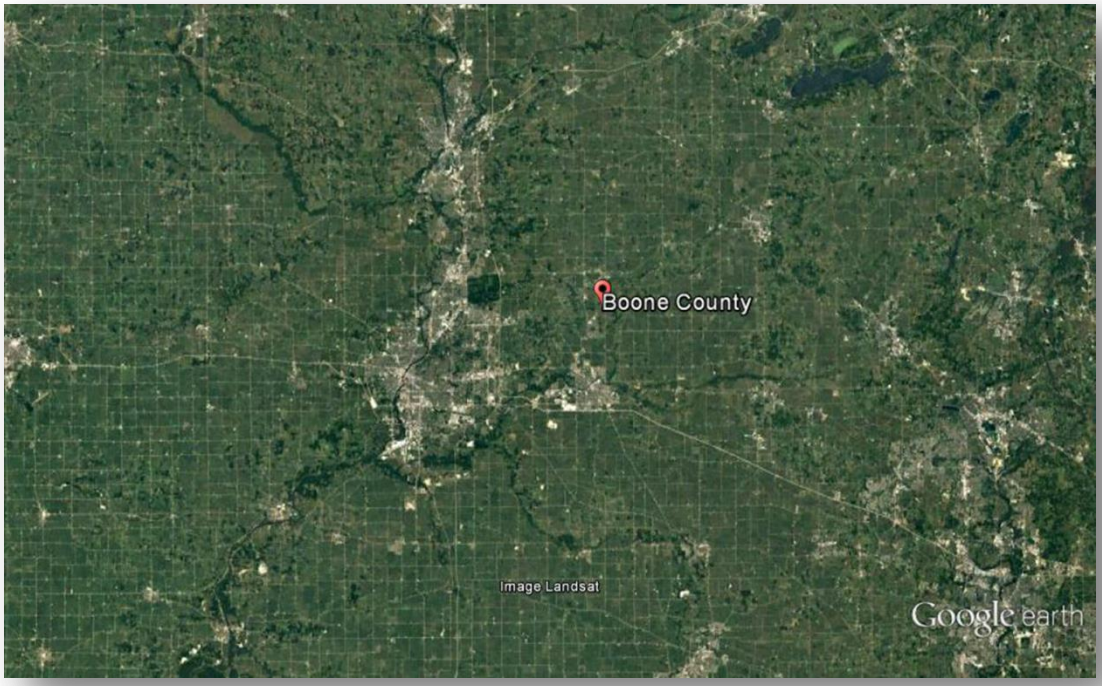
I want to make it clear, the conclusions of Jennelle et al. (2014) do not support depopulation, rather targeted removal of certain demographic segments of the deer herd. A frequency-dependent disease is one in which the contact rate between susceptible and infected individuals does not depend on the density; and, transmission rates are more related to the frequency of contacts between individuals. Although this has been known for two years, there have been few, if any references to these findings. Bottom line, you probably cannot eliminate or reduce CWD by population reduction; but rather by manipulating the demographics of the herd.

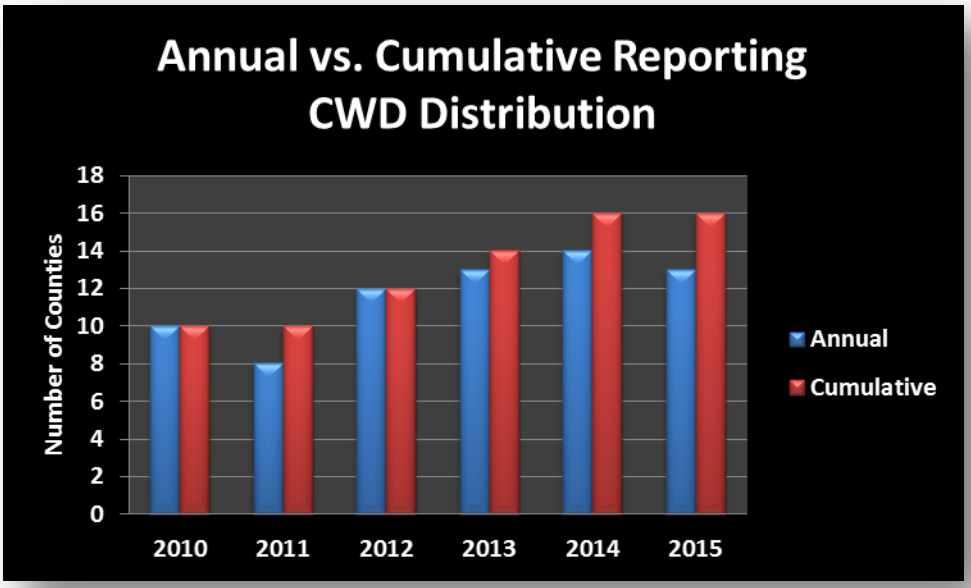
About the same time CWD showed up in southwestern Wisconsin, it also appeared in northern Illinois. The Illinois game department took a different approach to managing the disease; and, often have been used as a "shining" example of how to deal with CWD. I have heard time and again that the Illinois approach to CWD was far superior to that used by Wisconsin; however, comparing the Illinois approach to what Wisconsin did is an apples to oranges comparison. Let me point out that first of all, the landscape of the two areas is vastly different. Aerial photography clearly shows that southwestern Wisconsin is predominately rural, with large acreages in farms and forests. Northern Illinois, on the other hand, is mostly urban with a fragmented landscape. There are 20+ cities with more than 10,000 people, including Rockford and Chicago, totaling 2.8 million people in northern Illinois; while southern Wisconsin only has two large cities (Madison and Milwaukee), totaling about 700,000 people.

Discussions concerning the difference between the Wisconsin and Illinois approaches to CWD management tend to focus on sharpshooting. Illinois touts targeted sharpshooting as one reason for their success; yet, in 2015-16 only 18.4% of tested deer came from sharpshooting, and about half of these from public lands. Whatever the approach, it does not appear the Illinois program is more successful than that of Wisconsin. The total number of Illinois counties with CWD is 16 vs. 18 in Wisconsin. In the last five years, Wisconsin has had no more than 14 counties annually with positives for CWD; Illinois has averaged 12. The cumulative number of



Southwestern Wisconsin (above), especially Iowa County is a rural area, occupied by farms and forestlands. Northern Illinois (below) is an urban area, with two major cities and numerous suburbs fragmenting the landscape.





Numbers of Illinois counties with CWD positives in the last six years on a cumulative and annual basis.

counties with CWD at some time is 18 for Wisconsin and 16 for Illinois. The Illinois DNR points out in their web site:

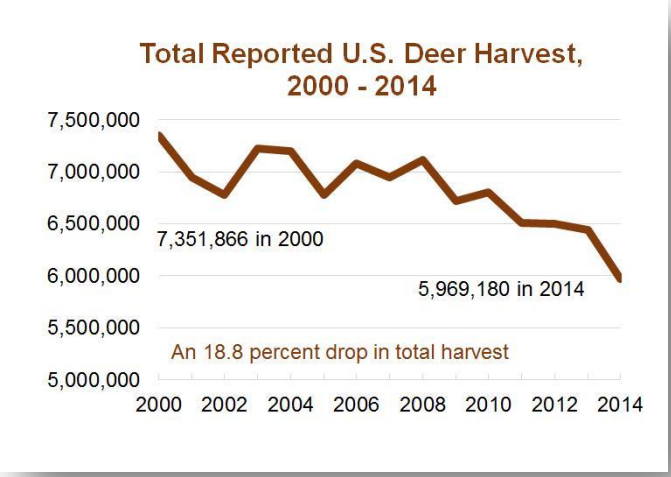
"*During the period 2002-2010, 80% of all CWD-positives identified in Illinois originated from either Boone or Winnebago County. During 2011-2016, only 26% of positives came from those counties, with 74% being found in the more peripheral CWD areas. In FY2016, 83% of CWD-positives came from peripheral counties*."

There appears to be evidence supporting frequency dependence of CWD in Illinois. The two counties (Boone and Winnebago) with the most CWD positives have moderate deer densities, while counties with high densities have the lower number of cases. These two counties have estimated deer density that would be acceptable to WDNR biologists for Wisconsin.

In spite of the claims made in the Detroit Free Press article, Wisconsin estimated deer populations increased from 2014 to 2015 by 87,000 deer; and, a lion's share of trophy bucks taken by bow and rifle come from CWD Zone counties. The average herd growth from 2014-2015 in the Southern Farmland with most of the CWD counties was 8.8%. In fact, ten years

(2012) after CWD was reported in Wisconsin a near state record buck, scoring 202 Boone-and-Crockett was taken from Juneau County.

What about Lohrer's claim about declining hunter harvest? Deer (whitetail, blacktail and mule) harvests are indeed declining in about 30 states, and have declined about 19% since 2000. Yet, not a single one of these states has attributed decline to CWD! Causal factors include deteriorating habitats, over-harvest of does, predation, other diseases and even global warming. However, Wisconsin estimated a total of 309,829 deer were harvested in 2015, compared to 275,735 in 2014; not exactly what I would call declining harvest!



Source: https://4310b1a9-a-823dbec2-s-sites.googlegroups.com/a/deerfriendly.com/home/decline-of-deer-populations/2000-14

What about mortality from CWD? Magle, et al. (2012) reported on a study conducted in the core of the CWD Zone, involving radio-telemetry. Some 179 deer were captured from January 2003 and April 2007 (110 females, 69 males), four (3 females and one male; 2.2%) testing positive to CWD. A total of 71 mortalities were documented, including 6 (8.5%) that were "associated" with CWD (one of which died from terminal CWD). The authors reported: "*We find no evidence that CWD was substantially increasing mortality rates during the duration of our study from 2003 to 2007, though the disease is relatively new to this area.*" They pointed out

their study could serve as a baseline for future studies, but only recently has interest in a follow up study been discussed.

An anecdotal "follow up" study by landowners in the CWD core area is educational. In 2015, trail camera photographs were obtained of a large number of mature bucks, as well as radio-collared does with fawns. Assuming that these does were only yearlings at capture, the range of ages probably is 7-11 years! Numerous times, I have urged the WDNR to conduct a new study

using radio-telemetry to monitor survival over the long term within the CWD Zone. Recent findings about potential genetic resistance to CWD in Wyoming mule deer also creates questions about impacts of CWD on genetics in whitetails; and I have also urged the WDNR to combine this work with a survival study.

Does photographed in the CWD core area that were radio-collared sometime between 2003-2007 as part of a survival study.

So, what do I anticipate the future of CWD in Wisconsin to be? First of all, I must conclude that recent reports that CWD infections are skyrocketing in Wisconsin, and the disease is decimating the deer herd are not warranted, given these facts. There is not a single example of eradicating, controlling or even managing CWD in any state. So, CWD will remain a part of the Wisconsin deer landscape for some time to come. I am not minimizing in any way the seriousness of CWD; however, I am saying that CWD will not devastate our deer herds or deer hunting. The problem is that there are individuals with non-scientific agendas (political and social), who would use this situation to their benefit.

A great deal of money and effort has been spent on eradication of CWD from Wisconsin, and other states. It is my firm opinion much of these funds and effort could have been spent on far more critical knowledge deficits about CWD. Among these are the genetics of CWD resistance

and the true population impacts of the disease. In the DTR, we strongly recommended increased efforts in specific research areas and these have not, for the most part, been heeded! Some critical needs include:

- ✓ The metrics of deer management.
- ✓ Browse preference and survey methodologies.
- ✓ The impacts of predators on Wisconsin deer herds.
- ✓ The impacts of forest management on Wisconsin deer herds.
- ✓ Forest management strategies to assure sustained populations of deer.
- ✓ The potential for genetic manipulation to reduce CWD impacts.

What is my current opinion about the WDNR? I think the Wisconsin DNR has done a pretty good job of handling the situation since 2011; but have not done a good job of publicizing what they are doing! They have made significant steps toward democratization of deer management through DMAP; but still seem to not be able to "get their minds around" what DMAP actually is! They need to take the lead in getting factual information out in a timely manner, not allowing the media and interest groups to sensationalize issues. The Deer Trustee Report specified development of early response teams to new CWD cases. Although these have not been set up exactly as recommended, the **County Deer Advisory Committees** (CDACs) can function in the same manner, and I feel they can be effective. I am proud of what we all did since 2011; and, have great expectations for my adopted state, Wisconsin!