

# CHRONIC WASTING DISEASE DETECTION AND MANAGEMENT: WHAT HAS WORKED AND WHAT HAS NOT?



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## EXECUTIVE SUMMARY

In an effort to provide ongoing, authoritative, and defensible guidance on science-based CWD management for state and provincial wildlife management agencies, The Wildlife Management Institute (WMI), the Chronic Wasting Disease Alliance, and the Association of Fish and Wildlife Agencies (AFWA) partnered on a project titled “National Coordination and Technical Assistance for the Prevention, Surveillance, and Management of Chronic Wasting Disease (CWD).” This project was funded by the AFWA Multistate Conservation Grant program and was administrated by WMI. One of the objectives of this project was to document examples of CWD detection and management approaches that have thus far proven to be successful as well those that have been implemented unsuccessfully. For the purposes of this document, “success” is broadly defined as achieving one or more positive effects on early detection; response to first detection; apparent elimination of newly detected CWD foci; limiting geographic expansion (spread) of CWD foci in free-ranging cervids; limiting growth of or reducing CWD prevalence; and public acceptance, support, and compliance with CWD management efforts.

Reports of CWD detection and management actions were collected, reviewed, and summarized from five states affected by CWD in free-ranging cervids as were peer-reviewed publications describing current management successes or lack thereof. All anecdotal reports and publications referenced in this document, or links to them, are provided. The content and tone of state-submitted reports was retained in their summaries in order to reflect the unique approaches and recommendations emphasized by each agency.

It is critical to note that local circumstances may or may not allow adoption of the successful management approaches documented below. However, the authors believe that documenting the current effectiveness of CWD management approaches is vital to the evolution of more effective and efficient CWD control measures. That said, the below summaries are provided only for reference and should not be considered recommendations for a “one size fits all” approach for CWD management.

To date, the tools, techniques, and practices capable of eradicating CWD remain undiscovered. Consequently, the stated goal of state/provincial wildlife management agencies has shifted from disease eradication to limiting CWD’s negative impacts on wild cervid populations.

This review identifies management techniques that have effectively (or ineffectively) aided in early detection of CWD foci (and the agency response to them), reduced or stabilized CWD infection rates, or slowed the expansion of affected foci. These techniques are consistent with CWD management recommendations of the Association of Fish and Wildlife Agencies’ *AFWA Best Management Practices for the Prevention, Surveillance, and Management of Chronic Wasting Disease* and the Western Association of Fish and Wildlife Agencies’ *Recommendations for Adaptive Chronic Wasting Disease Management in the West*.

Based upon the synthesis of the reports and publications included in this report, there appear to be general best practices that lead to greater success in managing CWD in wild cervids by state and provincial wildlife management agencies. These include, but are not limited to:

- Strong, cooperative, working relationships between state wildlife management and animal agriculture agencies that have or share regulatory authority over captive cervids.
- Rapid implementation of a previously prepared CWD response plan following the first CWD detection within a jurisdiction as well as subsequent detections in additional locations.
- Characterization of geographic distribution and CWD prevalence prior to determination of management approach(s).
- Designation of a CWD Management Zone with special restrictions and regulations under the authority of the state wildlife agency.
- A robust surveillance program capable of detecting CWD when prevalence is low, geographic distribution is limited, and the disease is more amenable to management.
- Effective public education programs that clearly state management goals while facilitating hunter and landowner support for, and compliance with, CWD-related actions, recommendations, regulations, and policies.
- A sustained and sustainable, long-term approach to CWD management, i.e., planning, funding, and implementing CWD management efforts for 10-20 year timelines.

- Harvest pressure and post-season culling that limit epidemic growth and are conducted over 10-20 year timelines.

In addition to the above successful management approaches, other factors were identified that appear to facilitate or contribute to the successes documented in the reports and publications:

- State wildlife agency authority over fenced, shooting facilities with mandatory testing of all animals that die within the enclosures.
- Mandatory participation in a state CWD Herd Certification program for intrastate movement of captive animals.
- Ability to compare and analyze data from several jurisdictions with differing harvest management practices over a long period of time (10-20 years).
- Aerial examination of newly detected areas to determine deer density and factors that confound CWD management such as artificial congregation of deer at baiting, feeding, mineral licks, or other sites.
- Availability of an agency CWD Response Team seven days a week to address concerns and interests of the public, landowners, and hunters.
- One-on-one agency staff interactions at CWD sampling stations to educate and inform hunters submitting animals for sampling.
- Quick turn-around on CWD test results (within three days after submission) to accommodate taxidermists and processors (and ensure their livelihoods) and hunters wishing to consume their venison.
- Participation and remuneration of taxidermists for collection of samples for CWD testing.

The following issues were identified as likely contributors to the apparent failure of some CWD management programs:

- Surveillance programs for first detection of CWD within a jurisdiction that were too short-lived, sampled too few animals, or did not adequately cover the geographic area needed to conclusively determine disease absence.
- Use of inappropriate statistical tables in the analysis of surveillance data that falsely support a conclusion that CWD was absent within an area.
- Implementation of CWD management responses that failed due to inadequate characterization of the prevalence and geographic extent of a newly detected CWD focus.
- Management efforts that were inadequate in scope and scale, were too short-lived, or management effort assessments were made too soon to detect measurable impacts in the target population.

# STATE REPORT SUMMARIES

## COLORADO

2017 - 2021 – Colorado Parks and Wildlife

### SUMMARY

The following summarizes Colorado Parks and Wildlife's (CPW) chronic wasting disease (CWD) findings from the 2021-2022 hunting seasons and, more broadly, lessons learned over the first 5-year rotation of their mandatory testing program (2017-2021 hunting seasons). Overall, annual mandatory testing has been vital to understanding the status of CWD in Colorado, acquiring and communicating reliable prevalence estimates, and laying a foundation to assess herd-specific management actions to combat CWD.

### WHAT WORKED

- Initial implementation of CPW's CWD Response Plan. ([https://cpw.state.co.us/Documents/Commission/2018/Nov/Item\\_19-Chronic-Wasting-Disease-Response-Plan.pdf](https://cpw.state.co.us/Documents/Commission/2018/Nov/Item_19-Chronic-Wasting-Disease-Response-Plan.pdf))
- Improved sample sizes obtained with mandatory sampling provided clearer resolution on CWD distribution & occurrence statewide in deer and elk.
- The 5-year rotation of mandatory testing seems likely to serve as a foundation for sustainable, long-term CWD monitoring.
  - The rotation will allow CPW to periodically assess CWD trends and evaluate the effects of harvest-based management actions at each retest.
  - The first round of statewide testing identified spatial & species targets needing most immediate management attention.

### WHAT HELPED

- A statewide CWD Response Plan was approved in 2019 that included a 15-year mandatory testing plan set on a 5-year rotation. The plan also established a threshold for compulsory but unspecified management action to be taken when CWD prevalence in adult male deer within a herd unit exceeded 5%.
- Hunters seemed generally receptive to submitting heads from harvested deer or elk when required to do so, although compliance was well short of 100%.
- From 2017-2020, mandatory testing focused on deer because prior data suggested deer would have the highest CWD prevalence and the greatest need for disease management.
  - Larger (~10x) numbers of deer and elk were submitted for testing than under voluntary submission.
  - Allowed reliable CWD prevalence estimation at the herd level, in some cases for the first time.
- In 2021, CPW used mandatory submissions to test the 14 highest priority elk herds, with emphasis on those overlapping high-prevalence mule deer herds.
  - Generated reliable estimates of CWD prevalence in elk, confirming prevalence has for the most part remained relatively low statewide.
  - Allowed analysis of CWD prevalence relationships among sympatric mule deer and elk; patterns in elk prevalence generally reflect patterns in adult male mule deer (i.e., higher prevalence among elk seen where prevalence among mule deer is high).
  - Laid foundation for determining if management actions in the highest prevalence deer herds that stabilize or reduce CWD prevalence also will have an effect on CWD prevalence in elk over time.

### LESSONS LEARNED

- Mandatory submissions rotating on a 5-year basis appears to be a sustainable approach for statewide CWD monitoring in Colorado, and for identifying areas of greatest management concern.
- In general, local CWD prevalence among deer is higher than prevalence among elk in the same area. Monitoring CWD prevalence in deer should help identify areas where prevalence in elk also may be growing.

- Uneven and locally poor hunter compliance with mandatory testing limited reliable assessment of some herds, but even small sample sizes (~100 per herd unit) may be sufficient to identify areas of concern.

## IOWA

2022 – Dale Garner (Wildlife Bureau Chief, IA DNR), et al.

### SUMMARY

In 2012, Iowa received its first-ever positive test result for CWD on a hunting preserve in south-central Iowa that had its own separately located breeding facility in north-central Iowa. The Iowa Department of Natural Resources (DNR) first detected CWD in wild deer in 2013 in northeastern Iowa. Since then, CWD has been slowly increasing its footprint to include 12 counties and 163 positive wild deer.

### WHAT WORKED

- In the early 2000s, Iowa law changed to assign hunting preserves to the DNR and captive cervid breeding facilities to the Iowa Department of Agriculture and Land Stewardship (IDALS). The DNR's Wildlife Bureau Chief and IDALS' State Veterinarian recognized CWD's threat to Iowa's public trust resources and private agricultural investments and knew working together would be more efficient and effective than working separately, especially regarding public education and politics.

### WHAT HELPED

- DNR has jurisdiction over free-ranging wild white-tailed deer, taxidermists, and hunting licenses.
- By law, all cervids that die or are killed on hunting preserves must be tested for CWD.
- IDALS oversees farmed cervids (breeding facilities) and other related agricultural industries, as well as meat processors.
  - To move captive animals intrastate, facilities must enroll in the CWD Herd Certification Program administered by IDALS.
  - This program requires full testing and reporting compliance for all cervids at least 12 months of age that die.
  - IDALS also regulates the interstate transport of cervids, ensuring that animals entering legally from out-of-state originate from herds certified by the USDA as being at low risk for having CWD.
- Dual agency response to the 2012 detection of CWD in a hunting preserve. The two agencies were lockstep the entire time, including through subsequent litigation around their respective quarantines.
  - The DNR notified IDALS, which immediately began assisting with the trace back investigation.
  - The positive deer originated from the breeding facility, which IDALS immediately quarantined. DNR likewise quarantined the hunting preserve.
  - When the first positive wild deer was detected, the agencies jointly promoted additional biosecurity in nearby captive cervid herds coupled with increased hunter-harvest surveillance. DNR and IDALS co-hosted public meetings to educate the public and agricultural industry.

### LESSONS LEARNED

- The strong working relationship between the Iowa Department of Natural Resources (DNR) and the Iowa Department of Agriculture and Land Stewardship (IDALS) is something Iowa is proud of and believes other states should emulate to make meaningful progress in addressing CWD.
- The responses to the first CWD detection in a captive deer and later detections in free-ranging and captive cervids in Iowa, have been facilitated and strengthened by the strong working relationship between the DNR and IDALS.

## MINNESOTA

2010 - 2013 – Eric Hildebrand (Wildlife Health Specialist, MN DNR), et al.

### SUMMARY

In November 2010, the Minnesota Department of Natural Resources (MNDNR) detected CWD in a wild white-tailed deer for the first time as a result of hunter harvest surveillance. The case was located within 3 miles of a captive elk facility that first detected CWD in 2009. The MNDNR responded by enacting its CWD Response Plan that included a ban on recreational feeding in a 4-county area and a supplemental surveillance effort that was conducted in February–April 2011. In addition, the MNDNR (1) created a CWD Management Zone (Deer Permit Area [DPA] 602), (2) restricted whole-carcass movements outside of the zone, (3) required mandatory sampling of all adult deer harvested by hunters, and (4) continued aggressive disease surveillance of hunter-harvested deer in the CWD Management Zone for 3 consecutive years (2011–2013). No additional cases of CWD were discovered in wild deer among 5,230 deer sampled. Surveillance efforts were suspended and DPA 602 was dissolved (Hunting Season 2014).

(Note: The CWD Response Plan was updated in 2019 and can be found at

[https://files.dnr.state.mn.us/wildlife/research/health/disease/cwd/cwd\\_responseplan.pdf](https://files.dnr.state.mn.us/wildlife/research/health/disease/cwd/cwd_responseplan.pdf).)

## **WHAT WORKED**

- Public support for all agency efforts was achieved by maintaining an informed public through publishing/reporting updated information as it became available.
- The MNDNR CWD Response Team was available 7 days a week to address concerns and interests expressed by the general public, landowners, and hunters.
- The rapid (3-day) turnaround time for test results eased hunters' concerns regarding spoilage of their harvested animal, gave credibility to the project, and kept MNDNR staff apprised of additional positive results.
- Accommodation of taxidermists and meat processors affected by the result reporting time and carcass movement restrictions allowed these vendors to keep their livelihoods and profession active.
- A special page was created on the MNDNR website for CWD results and updates. Hunters could easily access their results here as soon as they were available.

## **WHAT HELPED**

- Implementation of a pre-existing CWD Response Plan.
  - Initial aerial surveys found high deer density and abundant recreational feeding in the area (MN banned baiting in the early 1990s).
  - Immediate ban on recreational feeding in a 4-county area.
  - Designation of CWD Management Zone DPA 602; whole carcass movements were restricted outside of the zone; testing was required of all adult deer harvested by hunters; aggressive disease surveillance of hunter-harvested deer continued for 3 consecutive years.
    - Within DPA 602, MNDNR had the authority to change hunting season lengths, bag limits, offer special disease management tags, liberalize hunting methods to increase antlerless deer harvest, and mandate presenting the animal for testing upon registration.
  - Deer head collection boxes available during archery and muzzleloader seasons.
  - Registration stations were staffed to collect samples from harvested deer during the regular firearms season.
  - Test results were available by 3 business days following submission.
- Winter 2011 surveillance was conducted via landowner shooting permits, agency-sponsored sharpshooting, vehicle kills, and testing sick deer (1,180 deer were sampled). Subsequent surveillance was facilitated by testing hunter-harvested deer (4,050 deer were sampled).

## **LESSONS LEARNED**

- Public support for MNDNR's strategies to manage the disease in DPA 602 was evident at the beginning of the outbreak, but concerns arose about continued surveillance efforts when the disease was not widely detected in subsequent years.
- The 7-day/week availability of staff is beneficial but not sustainable in many circumstances. Staff fatigue and resentment may build over time. Loss of agency staff support can be just as detrimental as losing public support.
- The high cost of responding to a CWD detection event (\$1.12 million for this 3-year effort) brings added scrutiny to the need for an aggressive response.

# MISSOURI

2021 – Jasmine Batten (Wildlife Health Program Supervisor, MDC)

## SUMMARY

The Missouri Department of Conservation (MDC) implemented its CWD Response plan in 2012 following detection of five CWD-positive deer within two miles of two affected captive facilities. Since 2012, CWD has been detected in a total of 18 counties in several regions across the state. The pattern of CWD in Missouri appears unique compared to what has been reported in other states with numerous noncontiguous clusters, each with a low percentage of infected deer. The reason for this pattern is unknown, but it could be due to multiple introductions. Key surveillance, monitoring, and management activities have evolved since detection of the index case, but the recommended management tenets remain constant: detect CWD early, monitor changes, apply interventions to minimize epidemic growth in prevalence and distribution, and provide accurate information to stakeholders.

## WHAT WORKED

- Mandatory testing and samples provided by taxidermists resulting in repeated detections of CWD in new locations before infection rates become high and geographic distribution becomes extensive.
- Apparent elimination of a CWD introduction prior to its establishment in Cole County by rapid response to the new detection.
- Maintenance of low annual CWD prevalence in wild deer in northeast-central Missouri through deer herd management and post-season, targeted culling.
- Hunter satisfaction in affected areas (maintained through public education, information, and interactions with agency staff at sampling stations) suggests that CWD and associated regulations are not affecting hunting quality overall in Missouri.

## WHAT HELPED

- Availability of a CWD Response Plan prior to detection of the first case.
- Implementation of aggressive management actions, including the establishment of CWD Management Zones (CMZ).
  - Regulations to mitigate risk factors such as supplemental feeding, dispersal of young bucks, and carcass movement.
  - Post-season, targeted culling within 2 miles of CWD detection.
  - Liberalization of harvest regulations.
- Mandatory sampling on opening weekend of the firearms season in CMZs.
  - Large numbers of samples obtained (~20,000/year).
  - Several new core areas detected.
  - Hunters overwhelmingly satisfied with their experience visiting sampling stations where one-on-one interactions occurred with MDC staff.
- Statewide sample collection by participating taxidermists (117 statewide in 2012).
  - Primarily conducted surveillance outside of CMZs
  - Targets adult male deer with highest CWD prevalence (older age classes).
  - Several new core areas detected.
- In Cole County, designation of a surveillance zone with a 5-mile radius of the index case in March 2015, with targeted culling in January - March, 2016 and 2017, and mandatory countywide sampling during opening weekend of the firearms seasons from 2016-2018.

## LESSONS LEARNED

- Extensive surveillance and management activities are costly and may lead to fatigue among agency staff.

# NEW YORK

2005 - 2021 – James Farquhar (Wildlife Bureau Chief, NY DEC)

## SUMMARY



In March 2005, routine sampling of a presumably healthy captive deer in Oneida County detected the state's index case. A second case soon was found in a deer that died from pneumonia in a nearby captive facility that was directly linked to the herd with the index case. The NY Department of Agriculture and Market (DAM) facilitated depopulation of both herds; a total of five cases were detected. By early May, the NY Department of Environmental Conservation (DEC) announced two wild cases in Oneida County from 292 deer sampled, established a containment zone, and added restrictions on movement of deer from the zone. No additional cases have been detected in wild or captive deer since the spring of 2005, despite extensive sampling.

## **WHAT WORKED**

Apparent elimination of a CWD introduction in Oneida County prior to its establishment in the wild deer population due to planning, rapid response, and interagency cooperation.

## **WHAT HELPED**

- Upon confirmation of CWD in Wisconsin in 2002, NY began steps to prepare for the eventuality of CWD in the state.
- The DEC and DAM already had a good relationship in 2002, but the prospect of CWD in wild or captive herds fostered a cooperative tone; each agency agreed to take steps jointly and within individual areas of responsibility.
- DAM initiated herd testing protocols, DEC began sampling wild deer statewide, and restricted practices that might introduce CWD from outside NY.
- Cooperatively, discussions between the DEC and DAM related to how a response might be administered resulted in each agency understanding their respective roles and responsibilities and potential actions to be taken. While the response plan was still a draft, it served as a basis for what followed in April 2005.
- The DEC initiated a wild deer sampling plan (based on the draft plan already developed) for the surrounding area which became operational by mid- April.
- Through cooperation between DAM and DEC, the state's CWD response went from an index case to a fully operational response within days.
- Following announcement of the first case, DEC, DAM and the NY State Dept. of Health were in front of the public explaining CWD, known risks to humans, and implications to the health of the deer herd.
- Through public meetings and regular media outreach and availability, the agency explained the initial response efforts and gained public support by emphasizing that the primary objective was to characterize the scope of the situation, not manage the disease.
  - We were aware that deer hunters and others wanted assurance that the goal was not to eradicate deer locally nor even initially to eliminate the disease.

## **LESSONS LEARNED**

- Any success New York had in limiting or eliminating CWD from wild deer probably began three years prior to the first detection in central NY in 2005. The working relationship between DEC and DAM prior to detection no doubt helped and may have been the key factor in the success of the state's CWD response.
- DAM's relationship with deer farmers resulted in good compliance with the then- voluntary testing protocols leading to initial detection.
- New York may have just gotten lucky. But, contributing to that luck was early awareness/actions taken to minimize risk and assess captive and wild cervid populations.

# SUMMARIES OF SELECT CWD MANAGEMENT-FOCUSED PEER-REVIEWED PUBLICATIONS

## CWD MANAGEMENT REVIEW

### **THE FIRST FIVE (OR MORE) DECADES OF CHRONIC WASTING DISEASE: LESSONS FOR THE FIVE DECADES TO COME**

M Miller and J Fischer; [https://cwd-info.org/wp-content/uploads/2018/12/81st-NAWNRC-Transactions\\_FINAL-CWD-Excerpt.pdf](https://cwd-info.org/wp-content/uploads/2018/12/81st-NAWNRC-Transactions_FINAL-CWD-Excerpt.pdf)

#### **SUMMARY**

Surveillance programs for first detection of CWD foci within a jurisdiction may have been too short-lived, sampled too few animals, or did not adequately cover the geographic area to provide reliable information on disease absence.

Surveillance (and monitoring programs that track disease following initial detection) must be undertaken at biologically relevant spatial scales, and inferences should be drawn in view of the very patchy CWD distribution in wild cervids, as well as the patchy distribution of the wild cervids. Analysis of surveillance data based on available statistical tables that indicate the number of animals to be sampled often are inadequate to support the conclusion that CWD is absent within an area or is present below a specified infection rate. A common flaw has been initial underestimation of the duration of an outbreak and consequent misinterpretation of newly detected foci as being very recent occurrences. This has led to implementation of a CWD management response prior to adequate knowledge of the geographic dimension and infection rate of cervids in the affected area. Consequently, such management actions appear to have failed because the efforts may have been too small or too short-lived, even though they may have been effective if they had been conducted at a larger scale over a longer time.

## MULE DEER

### **THE RELATIONSHIP BETWEEN HARVEST MANAGEMENT AND CHRONIC WASTING DISEASE PREVALENCE TRENDS IN WESTERN MULE DEER (*ODOCOILEUS HEMIONUS*) HERDS (2021)**

MM Conner et al; *J. of Wildl Dis* 2021 57(4):831-843. <https://doi.org/10.7589/JWD-D-20-00226>

#### **SUMMARY**

We analyzed retrospective data on harvest management practices and corresponding CWD prevalence trends in 36 western US and Canadian mule deer management units.

There was strong evidence that the amount of harvest was related to CWD prevalence trends among adult male mule deer in the 32 units where prevalence at the start of the analysis period was  $\leq 5\%$ . All competitive models included the number of male deer harvested or number of hunters 1–2 yr prior as an explanatory variable, with increasing harvest leading to lower prevalence among males harvested in the following year. Although less definitive than the number harvested, median harvest dates falling closer to breeding seasons were associated with lower prevalence in the following year. Our findings suggest harvest—when sufficient and sustained—can be an effective tool for attenuating CWD prevalence in adult male mule deer across western ranges, especially early in the course of an epidemic. Evidence of a broad relationship between the amount of harvest and subsequent changes in CWD prevalence among adult male mule deer provides an empirical basis for undertaking adaptive disease management experimentation aimed at suppressing or curtailing CWD epidemics.

### **HUNTING PRESSURE MODULATES PRION INFECTION RISK IN MULE DEER HERDS (2020)**

MW Miller et al; *J. of Wildl Dis* 2020 56 (4): 781–790. <https://doi.org/10.7589/JWD-D-20-00054>

#### **SUMMARY**

Here, we describe long-term, spatially replicated relationships in CO mule deer herds that show hunting pressure can modulate apparent epidemic dynamics as reflected by prevalence trends.

Across 12 areas in CO studied between 2002–18, those with the largest declines in annual hunting license numbers (pressure) showed the largest increases in CWD prevalence in adult ( $\geq 2$ -yr-old) male deer killed by

hunters. Prevalence trends were comparatively flat in most areas where license numbers had been maintained or increased.

The mean number of licenses issued in the 2 yr prior best explained observed patterns: increasing licenses lowered subsequent risk of harvesting an infected deer, and decreasing licenses increased that risk. Our findings suggest that harvesting mule deer with sufficient hunting pressure might control CWD—especially when prevalence is low—but that harvest prescriptions promoting an abundance of mature male deer contribute to the exponential growth of epidemics.

### **EVALUATION OF A TEST AND CULL STRATEGY FOR REDUCING PREVALENCE OF CHRONIC WASTING DISEASE IN MULE DEER (*ODOCOILEUS HEMIONUS*) (2018)**

LL Wolfe et al; *J of Wildl Dis* 2018 Jul;54(3):511-519. <https://doi.org/10.7589/2018-01-015>

#### **SUMMARY**

We evaluated a test and cull strategy for lowering CWD prevalence in a naturally-infected, free-ranging mule deer herd wintering in the town of Estes Park, CO and in nearby Rocky Mountain National Park. Among males, CWD prevalence during the last 3 yr of selective culling was lower (one-sided Fisher's exact test  $P=0.014$ ) than in the period prior.

In contrast, CWD prevalence among females before culling and after culling were equivalent ( $P=0.777$ ). Relatively higher annual testing of males (mean 77%) compared to females (mean 51%) might have contributed to differences seen in responses to management.

A more intensive and sustained effort or modified spatial approach might have reduced prevalence more consistently in both sexes. Limitations of this technique in wider management application include cost and labor as well as property access and animal tolerance to repeated capture. However, elements of this approach potentially could be used to augment harvest-based disease management.

## MULE DEER AND WHITE-TAILED DEER

### **SPATIO-TEMPORAL CHANGES IN CHRONIC WASTING DISEASE RISK IN WILD DEER DURING 14 YEARS OF SURVEILLANCE IN ALBERTA, CANADA (2021)**

Peter Smolko et al; *Prev Vet Med* 197. <https://doi.org/10.1016/j.prevetmed.2021.105512>

#### **SUMMARY**

Following detection of the first CWD case in wild deer, a herd reduction program was implemented during 2005–2008 and in 2006 the ongoing hunter-based CWD Surveillance Program became mandatory in high-risk Wildlife Management Units (WMU). We used data collected during the CWD surveillance program to 1) document growth in sex-specific CWD prevalence in hunter-harvest deer in 6 WMUs consistently monitored from 2006 to 2018,

2) document landscape features associated with where CWD-positive compared to CWD-negative deer were removed during hunter harvest and herd reduction in an early (2005–2012) and in a late period (2013–2017) 3) to map the spatial risk of harvesting a deer infected with CWD in the prairie parklands of Alberta. In the 6 continuously monitored WMUs, risk of a harvested deer being CWD positive increased from 2006 to 2018 with CWD prevalence remaining highest in male mule deer whereas overall growth rate in CWD prevalence was greater in female mule deer, but similar to male white-tailed deer. We found no evidence that the 3-year herd reduction program conducted immediately after CWD was first detected affected the rate at which CWD grew over the course of the invasion. Our results indicate that a targeted-removal program will remove more CWD positive animals compared to hunter harvest. However, the discontinuation of targeted removals during our research program, restricted our ability to assess its long-term impact on CWD prevalence.

## WHITE-TAILED DEER

### **CONTROL AND SURVEILLANCE OPERATIONS TO PREVENT CHRONIC WASTING DISEASE ESTABLISHMENT IN FREE-RANGING WHITE-TAILED DEER IN QUEBEC, CANADA (2020)**

M Gagnier et al; <https://pubmed.ncbi.nlm.nih.gov/32059390/>

#### **SUMMARY**

The first cases of CWD in Québec were detected in 2018 on a red deer farm. To assess CWD prevalence and control the disease in the free-ranging white-tailed deer population, a response plan was deployed by the Ministry of

Forests, Wildlife, and Parks. In the 401 km<sup>2</sup> white-tailed deer control area, a total of 750 free-ranging deer were culled over 70 days, from September to December 2018. Of the culled deer, 534 were tested for CWD. We also tested 447 deer hunted from the enhanced surveillance zone and 2,584 free-ranging white-tailed deer harvested outside this zone. Regulations were applied to prevent the spread of the disease through movements of infected hunter-harvested deer carcasses. Although no CWD was detected in free-ranging cervids in Québec in 2018, this does not confirm the absence of the disease in these populations.

## **THE IMPORTANCE OF LOCALIZED CULLING IN STABILIZING CHRONIC WASTING DISEASE PREVALENCE IN WHITE-TAILED DEER POPULATIONS (2014)**

MB Manjerovic et al; <https://doi.org/10.1016/j.prevetmed.2013.09.011>

### **SUMMARY**

Culling of game species by government agencies is one approach to control disease in wild populations but is unpopular with hunters and wildlife enthusiasts, politically unpalatable, and erodes public support for agencies responsible for wildlife management. When IL and WI were actively culling from 2003 – 2007, there were no statistical differences between state CWD prevalence estimates. WI government culling concluded in 2007 and average prevalence over the next five years was  $3.09 \pm 1.13\%$  with an average annual increase of 0.63%. During that same period, IL continued government culling and there was no change in prevalence throughout Illinois. Despite its unpopularity among hunters, localized culling is a disease management strategy that can maintain low disease prevalence while minimizing impacts on recreational deer harvest.

## **EVALUATING THE ABILITY OF A LOCALLY FOCUSED CULLING PROGRAM IN REMOVING CHRONIC WASTING DISEASE INFECTED FREE-RANGING WHITE-TAILED DEER IN ILLINOIS, USA, 2003-2020 (2020)**

C Varga et al; <https://doi.org/10.1111/tbed.14441>

### **SUMMARY**

To reduce CWD transmission rates in IL, wildlife biologists have conducted locally focused deer culling since 2003 in areas where CWD has been detected. Retrospective spatial, temporal and space-time scan statistical models were used to identify areas and periods where culling removed higher than expected numbers of CWD-positive deer. A negative binomial regression model compared the proportion of CWD positive cases removed from sections with at least one CWD case detected in the previous years, “local area 1 (L1),” to the proportion of CWD cases in adjacent sections—L2, L3, and L4—designated by their increasing distance from L1. Focusing culling efforts on accessible properties closest to L1 areas results in more CWD-infected deer being removed, which highlights the value of collaborations among landowners, hunters, and wildlife management agencies to control CWD. Continuous evaluation and updating of the culling and surveillance programs are essential to mitigate the health burden of CWD on deer populations in IL.

**ADDENDUM:** Doug Dufford and Patrick McDonald indicate in the *2020-21 Illinois Surveillance and Management Report* that, “So far, disease management strategies in IL have been successful in minimizing CWD prevalence rates and keeping them at relatively low levels, but increasingly the number of deer removed by sharpshooters in many management units is insufficient to impact the disease at desired levels. Continuing this management program will slow increases in prevalence rates and also slow spread to the remainder of the state, but managers will need new tools and the continued cooperation of hunters and landowners in the future if we are to successfully fight this disease... IL DNR staff must continue to work to educate Illinoisans about CWD and its potential to negatively impact our white-tailed deer herd. Only through an educated public can the DNR continue to receive support for CWD management, even though our program is viewed as a model for disease management by professionals in many other states.” (<https://www2.illinois.gov/dnr/programs/CWD/Pages/default.aspx>)

## ADDITIONAL RESOURCES

### **AFWA BEST MANAGEMENT PRACTICES FOR PREVENTION, SURVEILLANCE, AND MANAGEMENT OF CHRONIC WASTING DISEASE**

[https://www.fishwildlife.org/application/files/5215/3729/1805/AFWA\\_CWD\\_BMPS\\_12\\_September\\_2018\\_FINAL.pdf](https://www.fishwildlife.org/application/files/5215/3729/1805/AFWA_CWD_BMPS_12_September_2018_FINAL.pdf)

### **AFWA TECHNICAL REPORT ON BEST MANAGEMENT PRACTICES FOR PREVENTION, SURVEILLANCE, AND MANAGEMENT OF CHRONIC WASTING DISEASE**

[https://www.fishwildlife.org/application/files/9615/3729/1513/AFWA\\_Technical\\_Report\\_on\\_CWD\\_BMPs\\_FINAL.pdf](https://www.fishwildlife.org/application/files/9615/3729/1513/AFWA_Technical_Report_on_CWD_BMPs_FINAL.pdf)

### **RECOMMENDATIONS FOR ADAPTIVE CHRONIC WASTING DISEASE MANAGEMENT IN THE WEST**

<https://wafwa.org/wpdm-package/recommendations-for-adaptive-management-of-chronic-wasting-disease-in-the-west/?wpdmdl=5531&refresh=632c72fc0441b1663857404>

## APPENDIX A: FULL STATE REPORTS

# Colorado



## COLORADO

### Parks and Wildlife

Department of Natural Resources

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#### MEMORANDUM

To: Members of the Colorado Parks and Wildlife Commission

From: Dan Prenzl, Director

Date: April 22, 2022

Subject: Chronic Wasting Disease Update for Parks and Wildlife Commission

Dear Commissioners,

This briefing summarizes CPW's mandatory chronic wasting disease (CWD) findings from the 2021-2022 hunting seasons and, more broadly, things we have learned over the first 5-year rotation of mandatory testing (2017-2021 hunting seasons). Overall, the decision to commit to annual mandatory testing has been resoundingly important to understanding the status of this disease in Colorado, acquiring and communicating reliable prevalence estimates, and laying a foundation to assess herd-specific management actions to combat CWD. It is my pleasure to present this current information to keep you apprised on the status of CWD in our big game herds.

#### Background

Chronic wasting disease, a fatal neurological disease found in deer, elk, and moose, is well established in herds throughout much of Colorado. We have detected CWD in 40 of our 54 deer herds, 17 of 42 elk herds, and 2 of 9 moose herds. Disease prevalence (percent infected) is highest in deer and lowest in moose. This disease is always fatal and animals die from the disease within about 2-2.5 years of infection. CWD infection shortens the lifespan of infected animals. If infection rates become too high, CWD can affect a herd's ability to sustain itself.

In response to increasing CWD prevalence, the Parks and Wildlife Commission approved a statewide CWD Response Plan in 2019. One element was a 15-year mandatory testing plan. Pilot work in 2017 and 2018 had shown that the number of deer and elk submitted for testing is much higher through mandatory testing than for voluntary submissions, which allows CPW to generate reliable estimates of CWD prevalence at the herd level.

In addition, the CWD Response Plan establishes a compulsory management threshold, which means when prevalence exceeds 5% in adult (>2 years) male deer then some form of



management actions will be taken to reduce prevalence until it falls below the 5% threshold. CPW identifies various management actions in the plan that are available to local managers to prescribe in herd management efforts, all of which have the potential to help reduce prevalence in deer herds.

From 2017-2020, CPW focused mandatory testing on deer because deer have the highest disease prevalence and greatest need for disease management. All 54 deer herds were assessed within this period. CPW focused on elk in 2021 (Figure 1), which provided the first reliable prevalence estimates for elk since the mid-2000s. In 2022, CPW will restart the 5-year rotation and refocus on deer. Resulting data will provide the first indication of whether the management actions taken so far have affected disease prevalence.

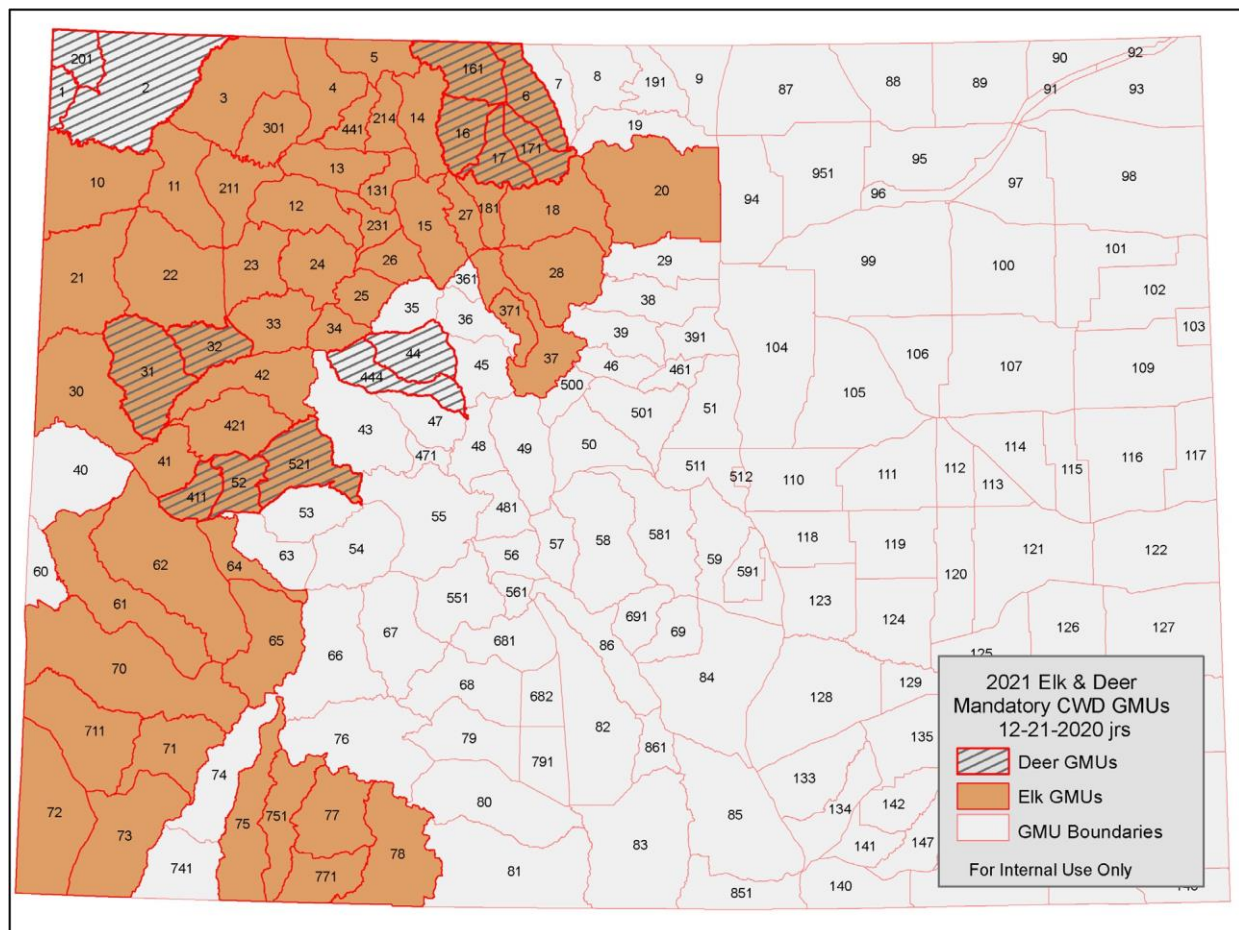


Figure 1. Map of Game Management Units where specific 2021 deer and elk hunt codes were selected for mandatory CWD testing.

### 2021 Mandatory CWD Testing Summary

CPW tested our 14 highest priority elk herds, with special emphasis on those that overlap high-prevalence mule deer herds (Figure 1 and Figure 2). Not only were we interested in generating reliable estimates of CWD prevalence in elk, but we also wanted to analyze relationships of CWD prevalence among mule deer and elk harvested in the same areas. If



management actions prescribed in our highest prevalence deer herds successfully maintain or reduce CWD prevalence, there may also be an effect on CWD prevalence in elk over time. We would not be able to determine this relationship and response to disease management efforts in deer without knowing prevalence status of both deer and elk in overlapping herds. In addition, CPW retested 6 mule deer herds that would benefit from a second consecutive year of mandatory testing because harvest or submission returns from a single year were too low.

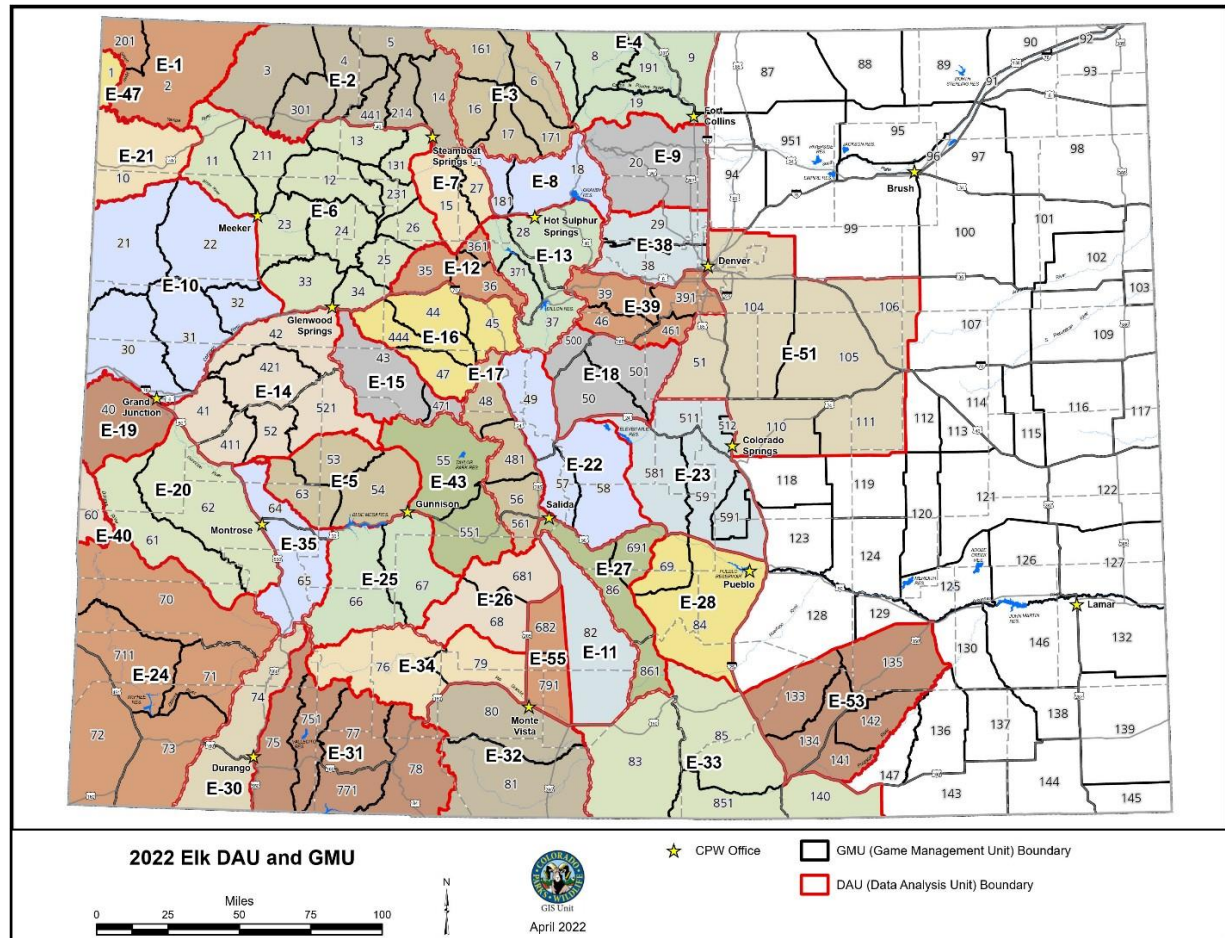


Figure 2. Map of Colorado elk herds (Data Analysis Units) and associated Game Management Units.

### Findings Derived from 2021 Mandatory CWD Testing - Top 5 Points:

1. CWD prevalence is still relatively low in elk herds statewide.

None of the 14 elk herds targeted for mandatory testing had prevalence above 5% (1 or fewer elk in every 20 infected) based on pooled submissions of adults and yearlings of both sexes (Figure 3). Elk prevalence did exceed 5% in GMUs 12 and 211, but was just under 5% across the entire White River (E-06) herd. Similarly, prevalence in deer is higher in GMUs 12 and 211 than the surrounding GMUs (Figure 4). Elk herd E-23 (Eleven Mile Herd) was not included in mandatory testing because harvest is too low, but the herd prevalence estimate is strongly influenced by GMU 591 (Fort Carson) as it is for deer. Further assessment seems warranted.

2. Detections of CWD positive yearling elk is higher than expected.

Four GMUs (004, 005, 012, 211) yielded infected yearling elk (6 positive results total). Overall prevalence in adults and yearlings did not differ based on analysis of pooled data from those GMUs, which is different from the pattern seen in deer. Additional investigation and larger sample sizes are needed to fully evaluate prevalence of yearling elk relative to adult elk.

3. Spatial patterns in elk prevalence generally reflect patterns in adult male mule deer.

CWD prevalence in harvested elk appears to track prevalence in mule deer bucks harvested in the same Game Management Units. Highest prevalence among elk should be expected where prevalence among mule deer is also high (Figure 3 and Figure 4). As a general rule, prevalence is locally higher among mule deer than among elk.

4. Uneven and locally poor hunter compliance with mandatory testing limited reliable assessment of some herds.

Lower than expected overall compliance (estimated at ~40%; range ~14-55%) contributed to inadequate sample sizes (<100) in five of the 14 targeted elk herds. Future monitoring planning should assume poor compliance (e.g., 25%) to assure adequate sampling in elk herds with expected harvest <1,000 in the seasons targeted for mandatory testing.

5. For deer herds retested in 2021, the 2-year prevalence estimates confirmed the herd-level prevalence estimates generated in 2020.

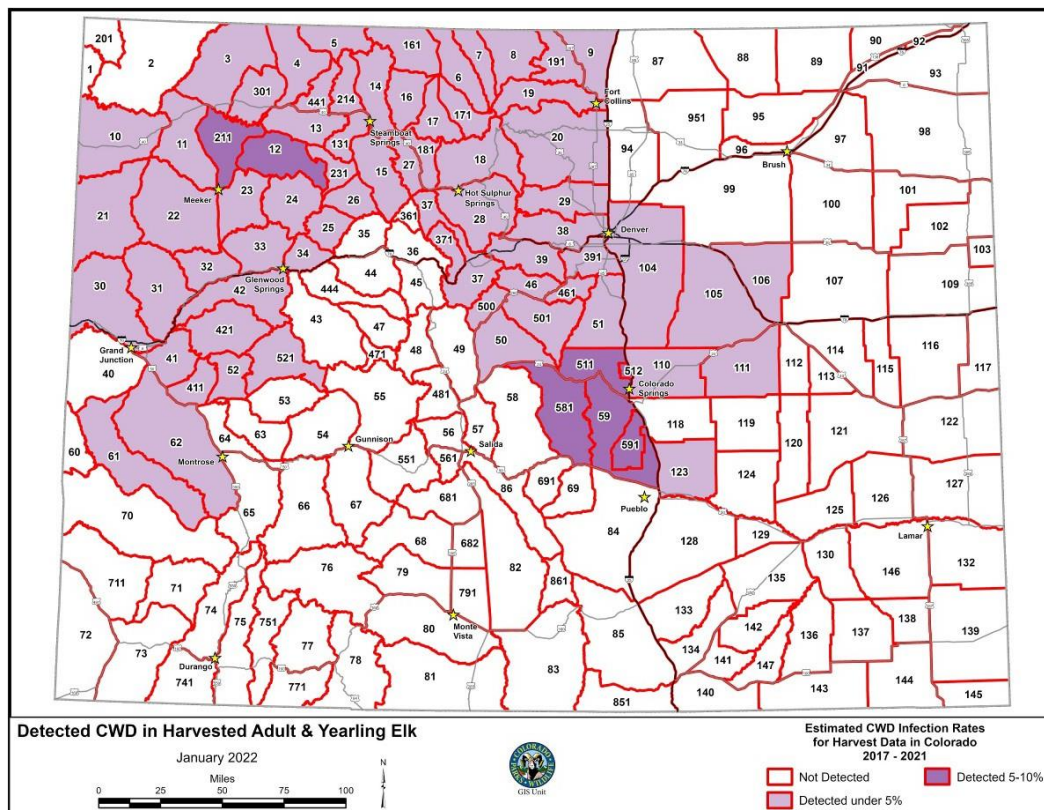


Figure 3. Map of CWD Prevalence in harvested adult and yearling elk in Colorado, 2017-2021.



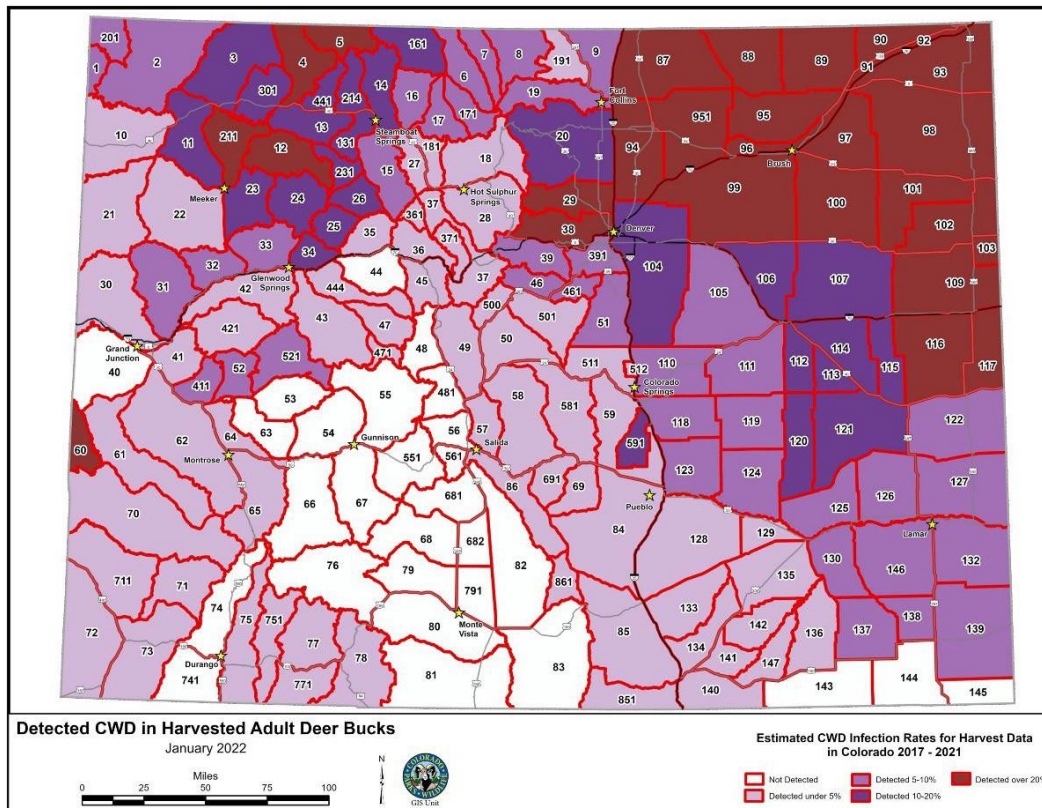


Figure 4. Map of CWD Prevalence in harvested adult male deer in Colorado, 2017-2021.

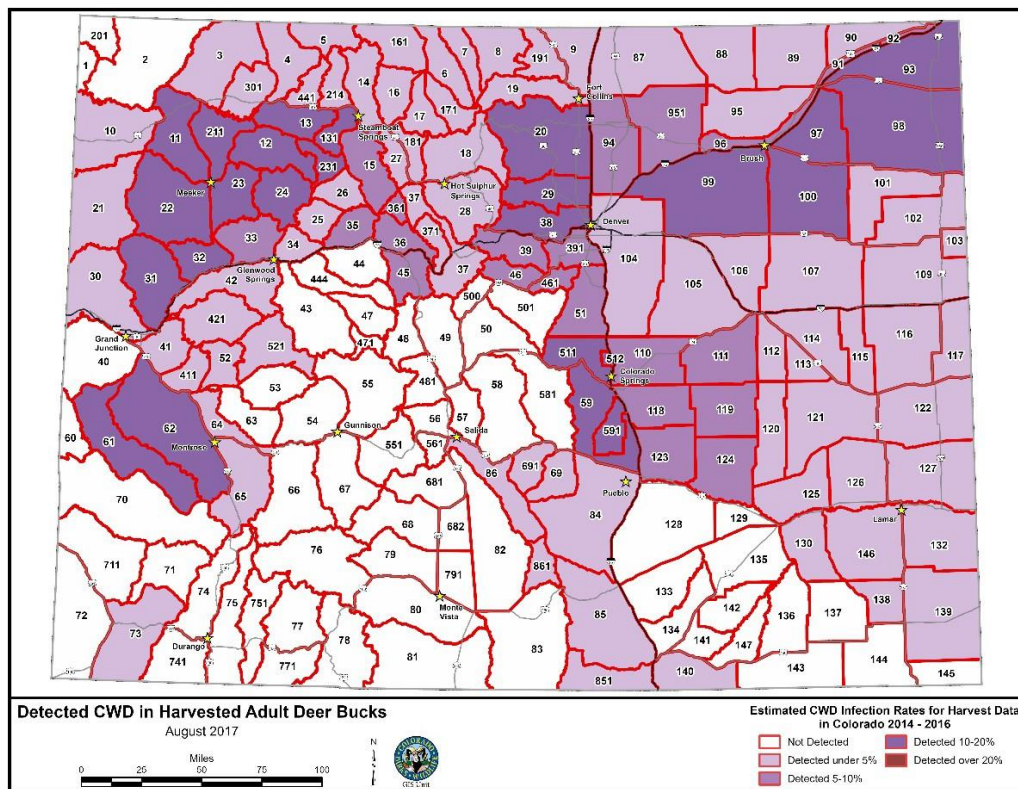


Figure 5. Map of CWD Prevalence in harvested adult male deer in Colorado, 2014-2016.

## 5-Year Mandatory CWD Testing Summary - Top 5 Points:

1. We now have a clearer statewide understanding of CWD distribution & occurrence.

Mandatory testing has generated more precise estimates of CWD prevalence and a more complete picture of statewide CWD distribution. Figures 4 and 5 compare what we knew about CWD in deer in May 2017 (Figure 5) to May 2022 (Figure 4). The change in prevalence between the two maps does not indicate an increase in CWD prevalence or spread since 2017, but rather a greater understanding of CWD prevalence in every herd. This demonstrates the knowledge gained from larger sample sizes acquired through mandatory testing.

2. We showed that a 5-year rotation of mandatory testing can serve as a foundation for sustainable, long-term CWD monitoring.

A 5-year testing rotation piloted during 2017-2022 worked well to distribute annual submission volumes and costs. CPW has mapped out the next 10-years of monitoring, which will continue this rotation with only minor adjustments. The 5-year rotation puts Colorado in a unique position to test, implement harvest-based management actions, and then evaluate those management actions at each retest.

3. We are set up to assess harvest-based CWD control strategies.

Mandatory testing every deer herd and 14 priority elk herds refreshed our baseline understanding of prevalence to learn trends and responses to management actions taken by CPW. We have already revealed strong relationships between license numbers and CWD trends in mule deer bucks, with more licenses equating to less growth of CWD over time. Over the next 5-10 years, we will continue to report what management actions were most effective at maintaining or reducing CWD prevalence. This is the most important knowledge gap to fill in present day deer management.

4. We now have spatial & species targets for most immediate management attention.

Mule deer appear to be most affected by CWD statewide, with especially high prevalence (1 of every 5 or fewer tested) in some northeast and northwest units. Several plains white-tailed deer herds also suffer high prevalence similar to that in the local mule deer. Elk are less frequently infected but have higher prevalence in areas with high prevalence in mule deer. CPW has targeted these severely affected deer herds for relatively aggressive CWD management actions and will monitor prevalence changes over time.

5. We are effectively implementing Colorado's CWD Response Plan.

CPW is taking CWD management seriously and continues to incorporate CWD management strategies into herd management plans. Between 2018 and 2021, management actions were taken and have been sustained in half of Colorado's deer herds. The statewide CWD Response Plan continues to influence deer management in Colorado.

## Chronic Wasting Disease Research Publications 2018-2022

Over the past ~5 years, Colorado Parks & Wildlife staff published ten peer-reviewed papers on studies of chronic wasting disease. These works contributed to broadening our understanding about the limits of CWD's host range, herd monitoring data interpretation, management strategies, and factors that may be influencing epidemic behavior in infected mule deer herds.

Here are the highlights and the links to each original paper:

- Mountain lions resisted exposure to CWD prions despite consuming portions of well over 400 infected deer and elk carcasses in captivity over a nearly 18-year period. [Journal of Wildlife Diseases, January 2022](#)
- Boulder's Table Mesa mule deer herd appears to be holding its own despite carrying a heavy CWD burden since at least 2005, although older aged bucks and does have become scarce. A genetic rescue for this herd does not seem likely, but mountain lion predation may be helping keep CWD in check. [Communications Biology, January 2022](#)
- Passage through a mountain lion's digestive tract reduced the original amount of ingested CWD prions by over 95%. [mSphere, December 2021](#)
- Relationships between CWD infection risk and prior amount and timing of harvest seen in data gathered from mule deer herds in Colorado and four other Western jurisdictions further support hunting as a potentially useful tool in efforts to control this disease. [Journal of Wildlife Diseases, October 2021](#)
- A new analysis of data from past field studies showed how monitoring CWD prevalence (the percent of sampled animals infected) in mule deer can also help in tracking the annual rate of new infections (incidence). [Journal of Wildlife Diseases, July 2021](#)
- Bighorn sheep showed no evidence of natural susceptibility to CWD. [Journal of Wildlife Diseases, April 2021](#)
- Analysis of annual hunting license and CWD prevalence data demonstrated long-term, spatially replicated relationships between hunting pressure and CWD dynamics in Colorado mule deer herds that show hunting can modulate disease emergence. Increasing licenses lowered subsequent risk of harvesting a CWD infected deer while decreasing licenses increased that risk. [Journal of Wildlife Diseases, October 2020](#)
- Copper supplementation did not affect white-tailed deer susceptibility to CWD or survival after natural exposure to CWD. [Journal of Wildlife Diseases, July 2020](#)
- A 5-year test and cull effort to reduce CWD in a Colorado mule deer population resulted in a trend toward decreased prevalence among males while female prevalence did not change. Cost, labor, and access to animals were major limitations of this strategy. [Journal of Wildlife Diseases, July 2018](#)
- Cattle showed no evidence of CWD after oral inoculation or after prolonged exposure to contaminated environments. [Journal of Wildlife Diseases, July 2018](#)

# IOWA

Dale Garner, David Schmitt, Tamara McIntosh, and Rachel Ruden

Chronic Wasting Disease (CWD) poses an insidious threat to cervid health globally, but response authority and protocols are locally defined and controlled. In Iowa, CWD is addressed by two state agencies: the Iowa Department of Natural Resources (DNR) and the Iowa Department of Agriculture and Land Stewardship (IDALS). It is often difficult to recognize victories in a CWD context; however, the strong working relationship between DNR and IDALS is something Iowa is proud of and believes other states should emulate in order to make meaningful progress in addressing CWD.

DNR has jurisdiction over free-ranging wild white-tailed deer, hunting preserves (white-tailed deer, elk, and non-native cervids), taxidermists, and hunting licenses. IDALS oversees farmed cervids (breeding facilities) and other related agricultural industries, as well as meat processors.

Iowa's cross-agency CWD partnership began in earnest in the early 2000s. Iowa law changed to assign hunting preserves to DNR and breeding facilities to IDALS. DNR's Wildlife Bureau Chief at the time, Dr. Dale Garner, and IDALS' State Veterinarian at the time, Dr. David Schmitt, individually recognized CWD's threat to Iowa's public trust resources and private agricultural investments; this was an issue of shared concern. They knew working together would be more efficient and effective than working separately, especially when it came to public education and politics. They sought each other out and intentionally cultivated open and frequent communication. Each agency incorporated the other into their CWD response policies. This proved providential.

There are several jurisdictional touchpoints between DNR and IDALS. In Iowa, breeding facilities often provide stock for hunting preserves. In order to move animals within the state, facilities must enroll in the CWD Herd Certification Program administered by IDALS. This program requires full testing and reporting compliance for all cervids at least 12 months of age that die. IDALS also regulates the inter-state transport of cervids, ensuring that those individuals entering hunting preserves from out-of-state also originate from herds certified as being at low risk for having CWD. Once inside a hunting preserve, jurisdiction shifts to DNR. By law, all cervids that are harvested or die on hunting preserves must be tested for CWD.

Another agency CWD touchpoint exists between hunters, licensed by DNR to harvest wild game, and meat processors, licensed by IDALS to process wild game. Recently, the DNR's Wildlife Bureau has worked with IDALS' Meat & Poultry Inspection Bureau to improve message delivery about CWD in Iowa. DNR and IDALS are collaborating on ways to promote CWD testing without hamstringing meat lockers when a test result is still pending. For instance, the agencies are jointly encouraging hunters to hold onto venison until results have been released to prevent positive animals from entering the human food chain. The agencies are also encouraging processors to accept tested deer so that hunters are not inadvertently penalized for assisting with CWD surveillance efforts.

DNR and IDALS' partnership was put to the test in 2013. Iowa received its first-ever positive test result for CWD on a hunting preserve that had its own separately-located breeding facility. Among DNR's initial steps was to notify IDALS, which immediately began assisting with the trace back investigation.



Ultimately, it was determined that the positive white-tailed buck originated from the breeding facility, which IDALS immediately quarantined; DNR likewise quarantined the hunting preserve. DNR established special CWD surveillance hunting zones around both the hunting preserve and the breeding farm. IDALS coordinated the breeding facility's depopulation with USDA. The two agencies were lock-step the entire time, including through subsequent litigation around their respective quarantines. Subsequent positive tests at other preserves and breeding facilities have been disconcerting but never disorientating: each agency knows what to do and when and why to notify the other.

DNR and IDALS remain engaged partners even now that CWD has been detected in Iowa's wild herd. When the first wild test results were received, the agencies jointly promoted additional biosecurity vigilance in captive cervid herds in the area coupled with increased hunter-harvest surveillance testing. And they hosted public meetings to educate the public and agricultural industry. Drs. Garner and Schmitt were a common team at the state capitol, giving joint presentations to the General Assembly. Their message was united at all times: CWD is a threat to the health and welfare of this state. When questions arose regarding CWD and human health, Drs. Garner and Schmitt elicited the expertise of the Iowa Department of Public Health to address the human side of CWD and that working partnership still exists today.

Time and time again, DNR and IDALS have felt the benefits of working closely together. It is a model that the agencies have transferred to other issues, such as Epizootic Hemorrhagic Disease, Highly Pathogenic Avian Influenza, bovine tuberculosis traces, and Emergency Planning.

## MINNESOTA

### **CHRONIC WASTING DISEASE MANAGEMENT IN A MINNESOTA DEER HERD: COORDINATED RESPONSE TO THE SOUTHEAST DETECTION, 2010–2013.**

Erik Hildebrand<sup>1</sup>, Michelle Carstensen, Lou Cornicelli, David C. Pauly, and Margaret H. Dexter

#### **INTRODUCTION**

In November 2010, the first chronic wasting disease (CWD) positive wild white-tailed deer (*Odocoileus virginianus*) was detected through hunter-harvested surveillance by the Minnesota Department of Natural Resources (MNDNR) in southeastern Minnesota. Surveillance efforts were focused within an area surrounding a CWD-positive captive elk facility in Pine Island, which was discovered infected with the disease in early 2009. This captive elk herd, comprised of about 600 animals, was subsequently depopulated through federal indemnification, and a total of 4 elk were confirmed with the disease. Epidemiological investigations conducted by the United States Department of Agriculture (USDA) and Minnesota Board of Animal Health (BAH) concluded that there was an apparent longstanding infection within this captive elk facility. This wild deer index case was located within 3 miles of the CWD-positive captive elk facility. In response to this disease detection, MNDNR enacted its CWD Response Plan (available at: [http://files.dnr.state.mn.us/fish\\_wildlife/wildlife/disease/cwd/cwdresponseplan.pdf](http://files.dnr.state.mn.us/fish_wildlife/wildlife/disease/cwd/cwdresponseplan.pdf)). Initial aerial survey results indicated a high density of deer in the area near Pine Island (31 deer/km<sup>2</sup>) as well as abundant recreational feeding activity. The combination of these two factors

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heightened concern about disease transmission potential. A ban on recreational deer feeding was immediately enacted in a 4-country area, and a supplemental surveillance effort was conducted in February–April 2011 to improve our understanding of disease prevalence and distribution in the local deer herd. To prevent further disease spread the MNDNR (1) created a CWD Management Zone (Deer Permit Area (DPA) 602), (2) restricted whole-carcass movements outside of the zone, and (3) required mandatory sampling of all adult ( $\geq 1.5$  years of age) deer harvested by hunters (4) continued aggressive disease surveillance of hunter-harvested deer in the CWD Management Zone for 3 consecutive years (2011–2013). No additional cases of CWD were discovered in wild deer. Surveillance efforts are now suspended and DPA 602 is dissolved (Hunting Season 2014). In this paper, we describe how MNDNR responded to this detection of CWD in wild deer, including surveillance methods, management strategies, costs, and lessons learned.

## **METHODS**

### **Hunter-harvested Surveillance**

Chronic Wasting Disease testing of hunter-harvested deer in DPA 602 was mandatory and included Special Youth, Archery, Firearm, and Muzzleloader hunting seasons. To accomplish this, MNDNR placed deer head collection boxes at high-volume registration stations during archery and muzzleloader seasons. These were checked daily, tissue samples were extracted twice weekly by trained MNDNR staff and shipped overnight to a certified testing laboratory. Test results were available on-line to hunters within 3 business days of submission. During the regular firearm season, MNDNR personnel staffed 5 registration stations daily to collect samples from harvested deer, with assistance from veterinary and natural resources students on weekends. Within DPA 602, each registration station collected:

- Retropharyngeal lymph nodes (RLN) from all deer  $\geq 1.5$  years of age, and a small amount of muscle tissue was collected and placed in 95% ethanol for future genetic work.
- A front incisor was extracted from all deer  $\geq 2.5$  years old for aging by cementum annuli.
- Both fawn and adult deer were issued carcass tags by authorized MNDNR staff.
- MNDNR shipped RLN samples daily to the receiving laboratory in order to achieve a 3- business day turnaround time for test results.
- Adult carcasses were prohibited from being taken out of DPA 602 until they were confirmed CWD-negative.

All samples were inventoried, entered into a database, and sent to either the University of Minnesota's Veterinary Diagnostic Laboratory (St. Paul, MN) or Colorado State University (Fort Collins, CO) for enzyme-linked immunosorbent assay (ELISA) testing. Any presumptive positive samples from ELISA testing would be confirmed using immunohistochemistry (IHC) testing at the National Veterinary Services Laboratory in Ames, Iowa.

Hunters were able to check their test results on the MNDNR website using either their MNDNR number or the carcass tag number issued. At the time of sample collection, hunter information was recorded, including the hunter's name, a telephone number, MNDNR number, and location of kill. Maps were provided to assist the hunters in identifying the location (Township, Range, and Section) of the kill. Cooperating hunters were given a cooperator's patch and entered into a raffle to win a .50 caliber muzzleloader donated by the Minnesota Deer Hunter's Association (MDHA).



Carcass movement restrictions within DPA 602 prevented local venison processors outside the zone from processing deer until negative CWD test results were obtained; this affected taxidermists as well. To accommodate hunters seeking a taxidermy mount from deer harvested within DPA 602, we provided local area taxidermists with necessary training and supplies to collect the retropharyngeal lymph node sample needed to test for CWD. At times, taxidermists came into the CWD management zone to cape the deer head for hunters, then the cape and antlers (with cleaned skull cap) were able to leave the zone immediately.

### **Aerial Deer Survey, Recreational Feeding Activity, and Winter 2011 Sampling**

Prior to beginning an intensive sampling effort, MNDNR used a fixed-wing aircraft to conduct an aerial survey of the CWD surveillance area to assess deer numbers and distribution. This survey was conducted in late January-early February 2011, with estimates of 6,200 deer within the 793-km<sup>2</sup> (306-mi<sup>2</sup>) winter surveillance area, equating to an estimated 7.3 deer/km<sup>2</sup> (19 deer/mi<sup>2</sup>) density (Figure 1). Deer densities were highest within a 23-km<sup>2</sup> (9-mi<sup>2</sup>) area surrounding the wild index case; 600 deer were counted using a helicopter census and estimated >31 deer/km<sup>2</sup> (80 deer/mi<sup>2</sup>) (Figure 2). This information was used to guide sharpshooting activities and estimate the percentage of deer removed from the area through these subsequent targeted surveillance efforts.

Another key step in preventing further spread of CWD was to ban the recreational feeding of deer. On February 14, 2011 MNDNR issued a special rule that made recreational deer feeding illegal in a 4-county area (Dodge, Goodhue, Olmsted and Wabasha), surrounding the location of the CWD-positive deer (Figure 3). During the aerial surveys (fixed-wing and helicopter), there were a total of 35 recreational feeding sites observed. The ban was aimed at reducing the potential for the disease spread by eliminating artificially-induced deer concentration sites. MNDNR Enforcement staff began education and enforcement of the new rule immediately and compliance was extremely high.

CWD samples were obtained through landowner shooting permits (LSP) February 1-28, 2011, agency-sponsored culling conducted by USDA-Wildlife Services, (USDA-WS) February 22-early April 2011, and opportunistic sampling (e.g., vehicle-killed, sick or found dead deer) in this area. Car-killed deer disposition permits were not given to public persons who hit deer and wanted the carcass in DPA 602; local, county, and state enforcement personnel implemented these guidelines year-round.

## **RESULTS AND DISCUSSION**

### **Winter 2011 Sampling**

Following a well-attended public meeting of >400 landowners, hunters, and concerned citizens in the Pine Island area, a winter sampling effort was initiated to gain a better understanding of disease prevalence and distribution in the local deer herd. Landowners within the boundaries of the winter surveillance area were able to obtain an authorized shooting permit through MNDNR for culling deer on their property during February 2011. More than 300 LSP were issued, with each landowner allowed to take an unlimited number of deer, designate up to 15 additional shooters under their LSP, use of high-powered center-fire rifles, and the use of artificial lights to enhance shooting at night. This area is historically regulated as a shotgun-only zone during the firearm season, so the ability to use rifles during this sampling effort was viewed as a unique opportunity by many landowners. Once deer were shot, the landowner was required to contact MNDNR staff within 24 hours of harvesting; samples were then collected in the field at

private residences by trained MNDNR staff, each carcass was given a unique identification tag, and landowners were directed not to transport carcasses outside the winter surveillance area until MNDNR staff contacted them with a negative CWD test result. Meat that was boned out or cut and wrapped either commercially or privately, and quarters or other portions of meat with no part of the spinal column or head attached were allowed to leave the zone immediately.

Late February 2011 through early April 2011, MNDNR contracted with USDA-Wildlife Services to use sharpshooting at bait piles to obtain additional deer samples. Deer were targeted during late evening and overnight hours, and then intact carcasses were transported to the central MNDNR-leased processing facility located within the winter CWD surveillance area by sharpshooters. MNDNR and USDA-WS disease biologists eviscerated carcasses immediately upon delivery, collected medial retropharyngeal lymph nodes, a central incisor tooth for aging, muscle sample, recorded pregnancy rates and issued a unique carcass tag to each individual animal. Entrails were deposited in a lined dumpster. All carcasses were held in a MNDNR-leased refrigerated trailer at 33-35°F until test-negative results were reported (typically within 3 business days). Once negative results were received, MNDNR was able to distribute carcasses to the public from a venison disposition list which consisted of more than 400 people. Notified recipients arrived at the facility daily to load, transport and process one or two deer for consumption.

Through this combined winter surveillance effort, a total of 1,180 deer (752 adults, 428 fawns) were sampled within 16 km (10 miles) of the index wild deer case; all deer were negative for the disease (Figure 4). Sampling included deer taken by landowner shooting permits ( $n = 491$ ), agency-sponsored sharpshooting ( $n = 603$ ), vehicle-kills ( $n = 59$ ), and opportunistic sick deer ( $n = 27$ ). Shooting permits were issued to 323 landowners. Of those, 47% of permit-holders harvested  $\geq 1$  deer. The majority of permittees (57%) took 1 or 2 deer and approximately 5% took  $>10$  deer from their properties.

The estimated total cost of the winter sampling effort was \$419,000. The majority (\$229,000) resulted from the USDA-WS sharpshooting contract, staff overtime (\$82,000), and diagnostic testing (\$30,000). The remaining expenditures were related to staff travel, building leases, and equipment leases or rentals.

### **Hunter-harvested Surveillance**

Following the winter 2011 sampling effort, hunter-harvested surveillance became the primary method for obtaining adequate samples for continued monitoring and management of this disease outbreak. Fortunately, MNDNR had been conducting hunter-harvested CWD surveillance throughout the state since 2002, with increased focus in southeastern MN due to the infection rate in wild deer in adjacent counties of southern Wisconsin. A recent, intensive surveillance effort in 2009-2010 (which included the discovery of the one positive wild deer in 2010), in which over 3,200 deer were tested for CWD (Figure 5), demonstrated no widespread infection in the region. These data, in combination with historical data from 2002-2008 and the winter 2011 sampling, gave us increased confidence that the disease was not widespread or present at prevalence  $>0.5\%$ .

The creation of CWD Management Zone, DPA 602, was an important step in efforts to manage the disease, as it provided an enforceable boundary to restrict the potential flow of prions out of the area. Within DPA 602, MNDNR had the authority to change hunting season lengths, bag limits, offer special disease management tags (unlimited amount at a reduced cost of \$2.50/each) to increase harvest of antlerless deer, and make it mandatory to present the animal for CWD testing upon registration.

From 2011–2013, a total of 4,050 deer ( $n = 1,125, 1,195,$  and 978 for 2011, 2012, and 2013, respectively) were sampled for CWD within DPA 602 (Figure 6). All deer were negative for the disease. Approximately \$703,000 was spent in efforts to collect and test these hunter-harvested samples over the 3-year period. These results provide strong evidence that Minnesota was on the front end of a CWD outbreak in wild deer. Our inability to detect any additional infected deer in the immediate vicinity of the index case or in surrounding DPA's is encouraging. It is plausible that this disease is recent on the landscape in southeast MN, and that few additional wild deer have been exposed.

### **Lessons Learned**

The MNDNR had recently responded to an outbreak of bovine tuberculosis (bTB) in cattle and wild deer in northwestern Minnesota (2005-2012) and experiences gained from the management of that disease were very relevant to this CWD outbreak. While bTB and CWD are different diseases with unique transmission routes, initial strategies to manage these outbreaks were similar. Most importantly were efforts to reduce potential transmission pathways by restricting recreational feeding (hunting over bait has been illegal in MN since 1991) and reducing local deer numbers. Some of the tools used in the bTB outbreak, such as agency culling, proved to be highly successful at reducing deer numbers in high-risk areas in both disease outbreaks.

Numerous successes were attained throughout this entire CWD monitoring and response effort, which include:

- Gaining public support for all agency efforts was achieved by maintaining an informed public through publishing/reporting updated information as it became available.
- Having the MNDNR CWD Response Team availability 7 days a week to address concerns and interests expressed by the general public, landowners and hunters.
- The 3-day turnaround time for CWD test results eased hunters' concerns regarding spoilage of their harvested animal.
- The rapid test result time also gave credibility to this project and kept MNDNR staff apprised of additional positive results.
- Accommodating taxidermists and meat processors affected by both the test result reporting time and the carcass movement restrictions, allowed these vendors to perform their work and keep their livelihood and profession active.
- A special page was set up on the MNDNR website for CWD results and updates. Hunters were given a business card with the web address and instructions on how to access their results using either the carcass tag number assigned to their deer or their MNDNR number. Results were posted on the website as soon as they were made available.
- Hunters had the ability to access their results via computer at any time or by phone Monday-Friday during office hours.

While public support for MNDNR's strategies to manage the disease in DPA 602 was evident at the beginning of the outbreak, we did detect rising concerns about continued surveillance efforts once the disease was not widely detected in subsequent years. This "CWD Fatigue" syndrome has been described in other states that have long-standing efforts to manage the disease where public tolerance of control efforts fades over time. Moreover, the high cost of responding to a CWD detection event, which totaled \$1.12 million for this 3-year effort, brings added scrutiny to the need for an aggressive response. The MNDNR believed these efforts were

necessary to manage and monitor this CWD outbreak and was thankful for the public and agency support to ensure the health of the local deer herd in southeast MN.

### **Future Surveillance Plans**

Disease surveillance in the CWD Management Zone has been discontinued and DPA 602 will be dissolved by fall 2014. Targeted CWD surveillance of deer exhibiting clinical signs of illness will continue statewide. The MNDNR plans to sample 450 hunter-harvested deer for CWD in DPAs 348 and 349 during the regular firearm season in fall 2014. This effort is in response to a recent detection of CWD in a free-ranging white-tailed deer in Alamakee County, Iowa.

### **ACKNOWLEDGEMENTS**

We would like to thank all the MNDNR Wildlife and Enforcement staff, who volunteered to assist with this disease outbreak surveillance project. Specifically, we'd like to recognize the support received from Rochester Wildlife Staff -- Don Nelson, Mike Tenney, Barb Perry, Nancy Reber, Clint Luedtke, Conservation Officers -- Dan McBroom, Kevin Prodzinski, Phil George and Dean Olson. We also wish to thank the students and faculty from the University of Minnesota, Colleges of Veterinary Medicine and Natural Resources, for assisting in our fall sampling efforts. Special thanks to Julie Hines and Bob Wright for fulfilling our GIS mapping needs and Pete Takash for his efforts in communications and internet-related work. We would also like to thank Beth Martin, Tom Enright, Amanda McGraw, Katie Pilarski, Claire Bagniewski, and Jennifer Dippel for their help through this effort. We appreciate the support of the USDA-Wildlife Services disease biologist Paul Wolf and Danny Storlie and USGS Epidemiologist LeAnn White, along with DNR Pilots Brad Maas and Tom Bucker with flying deer survey work.

Figure 1. Fixed-wing, aerial survey results for 793-km<sup>2</sup> (306-mi<sup>2</sup>) area surrounding the location of the white-tailed deer that tested positive for chronic wasting disease (CWD), southeastern Minnesota, January–February 2011.

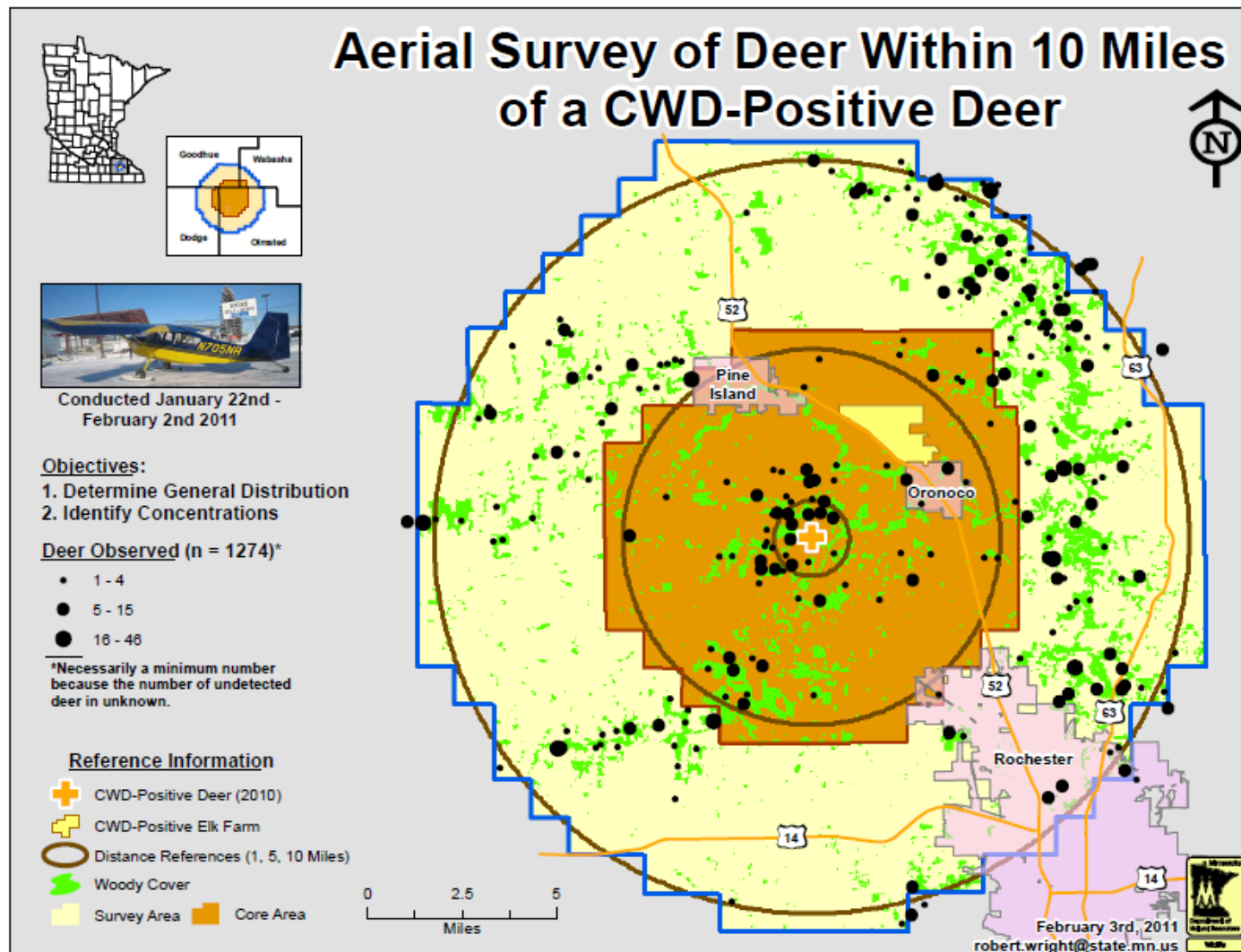
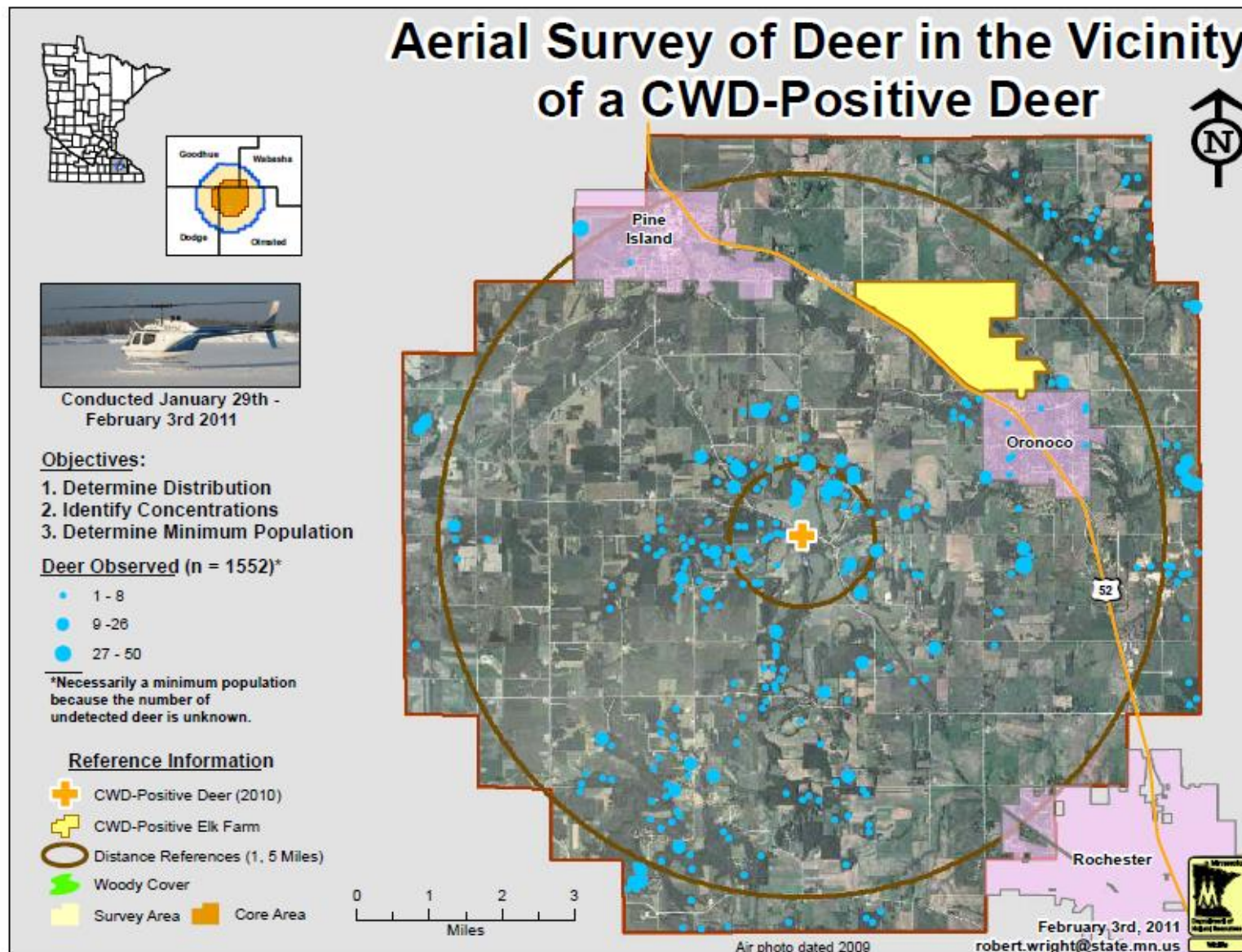




Figure 2. Helicopter white-tailed deer census for the 259-km<sup>2</sup> (100-mi<sup>2</sup>) Core Area within the winter 2011 chronic wasting disease (CWD) surveillance area, southeastern Minnesota, January–February 2011.





**Figure 3. Four-county area in southeastern Minnesota where recreational feeding of wild white-tailed deer was banned in January 2011, following the discovery of chronic wasting disease in Olmsted County.**

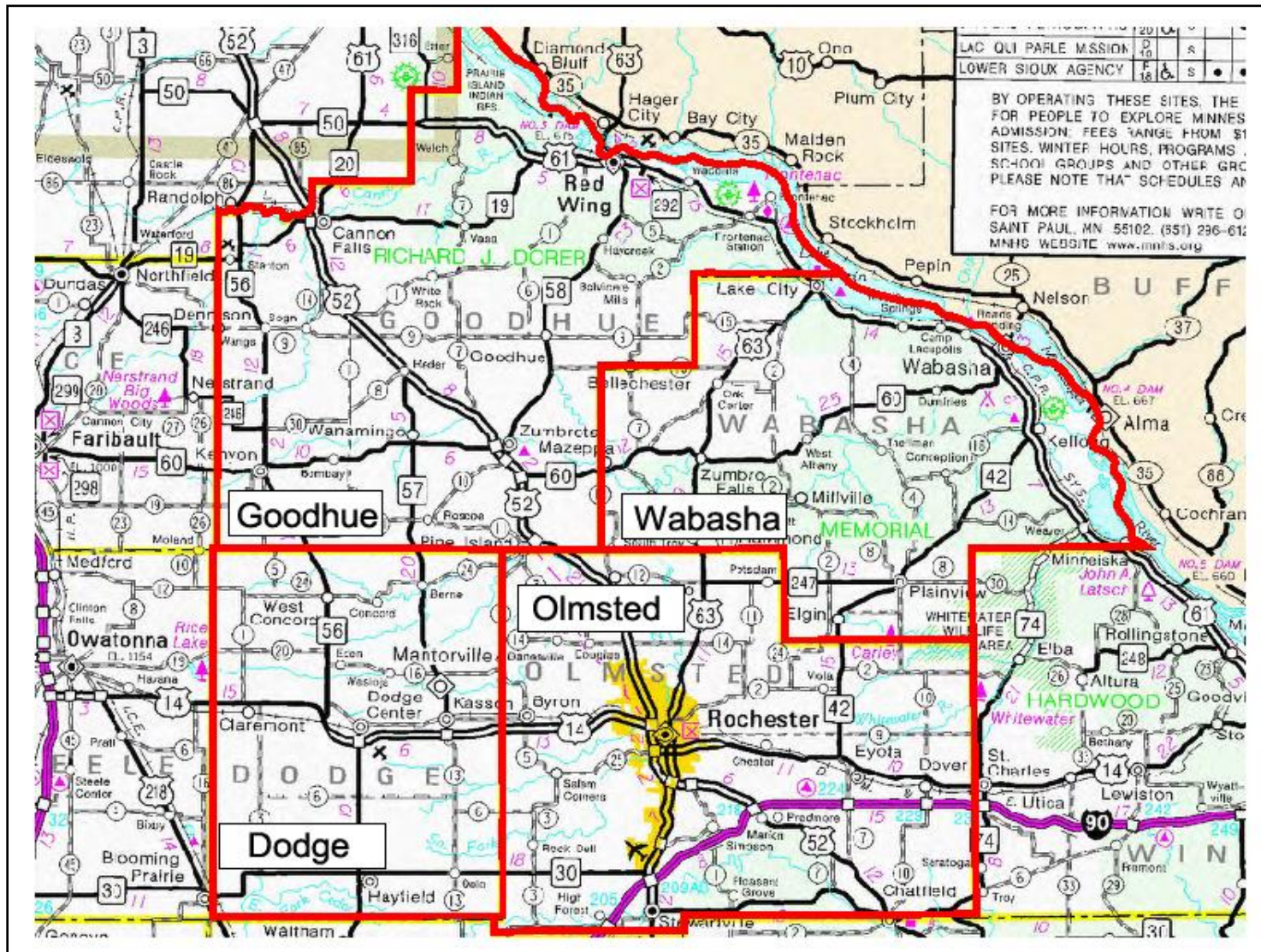


Figure 4. Section totals and distribution of adult (>1 year old) white-tailed deer ( $n = 752$ ) sampled for chronic wasting disease (CWD) during winter 2011, southeastern Minnesota.

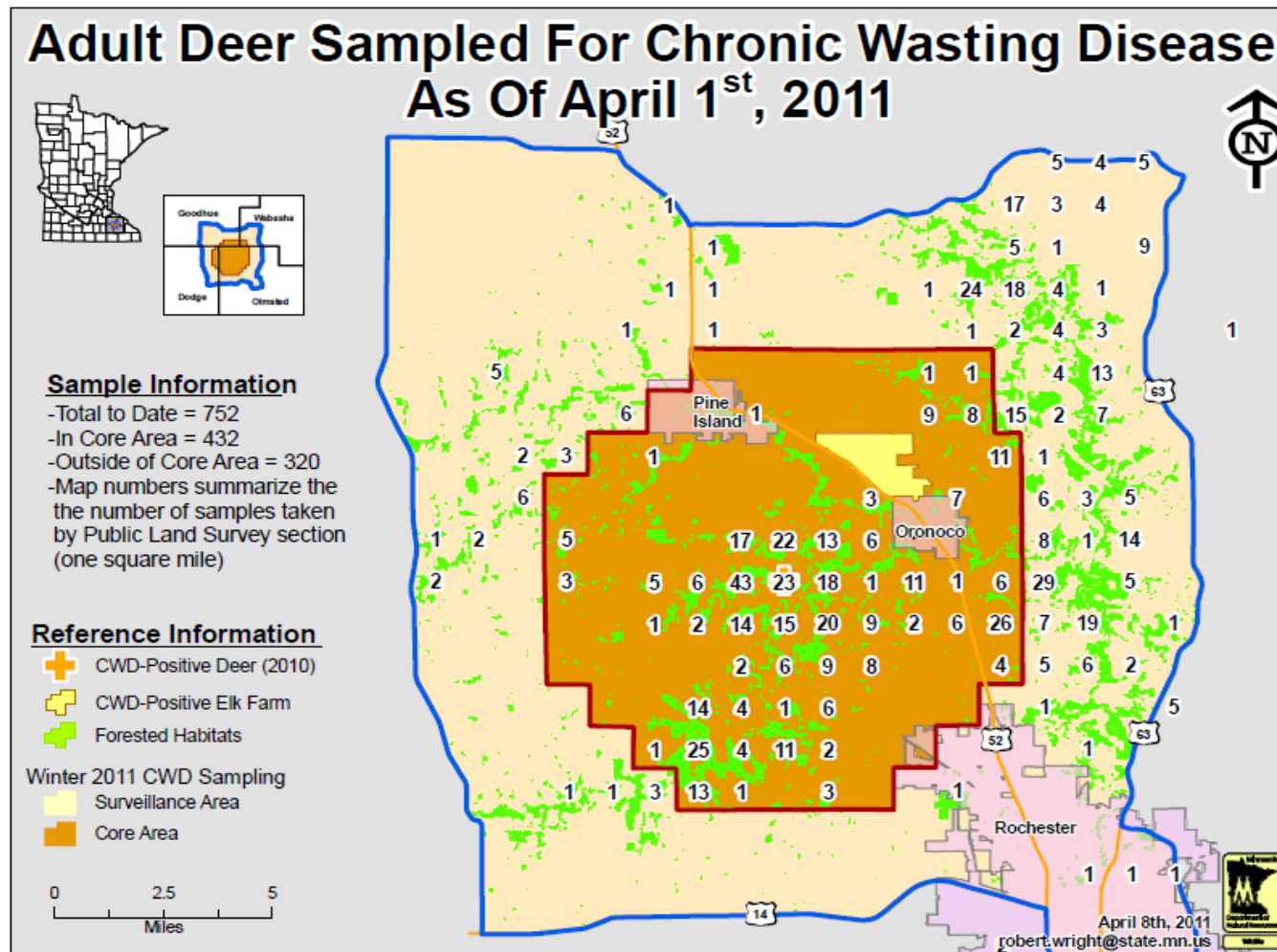




Figure 5. Sampling distribution for all hunter-harvested white-tailed deer ( $n = 3,209$ ) tested for chronic wasting disease (CWD) in southeastern Minnesota, falls 2009 and 2010, in relation to the location of CWD-positive deer.

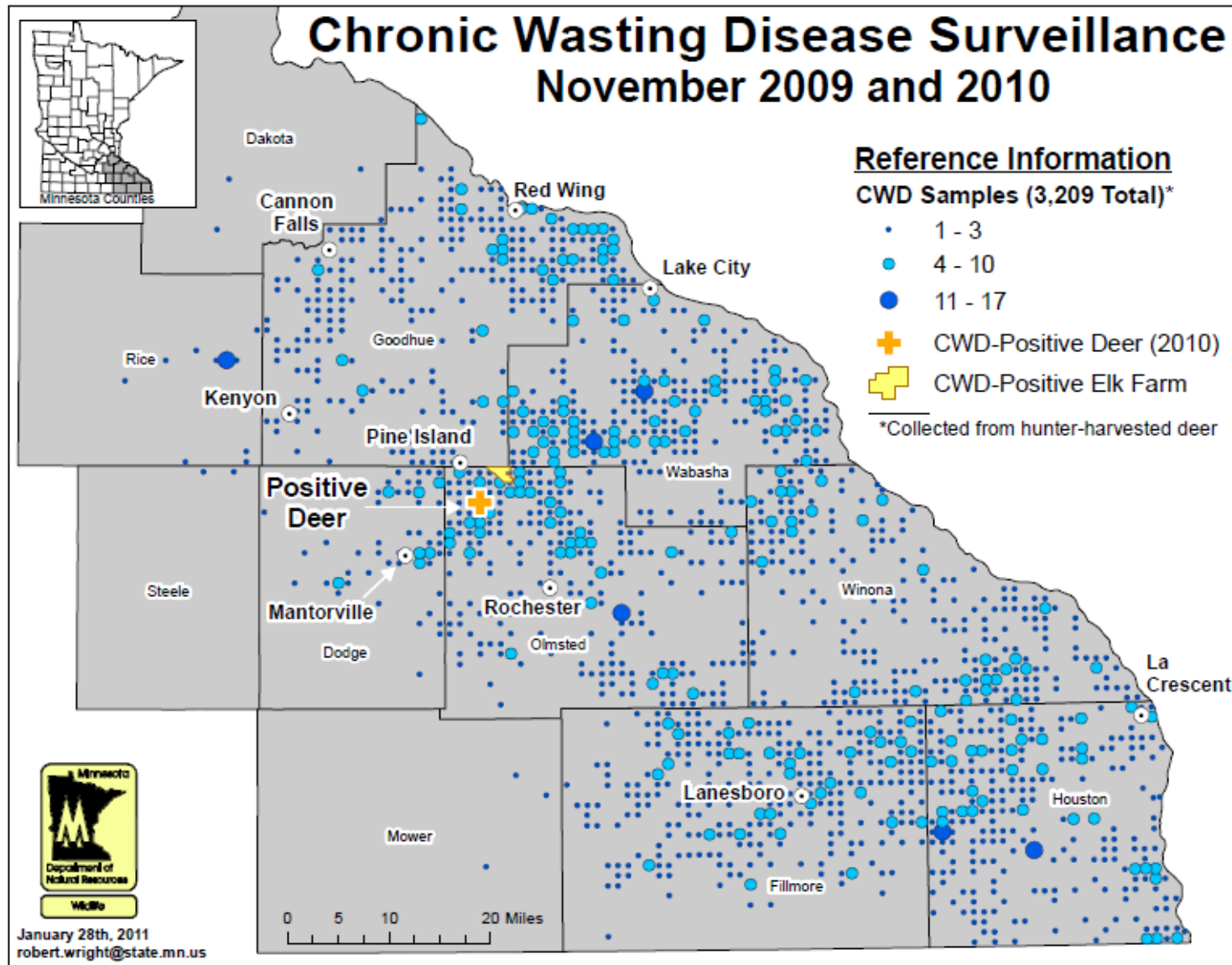
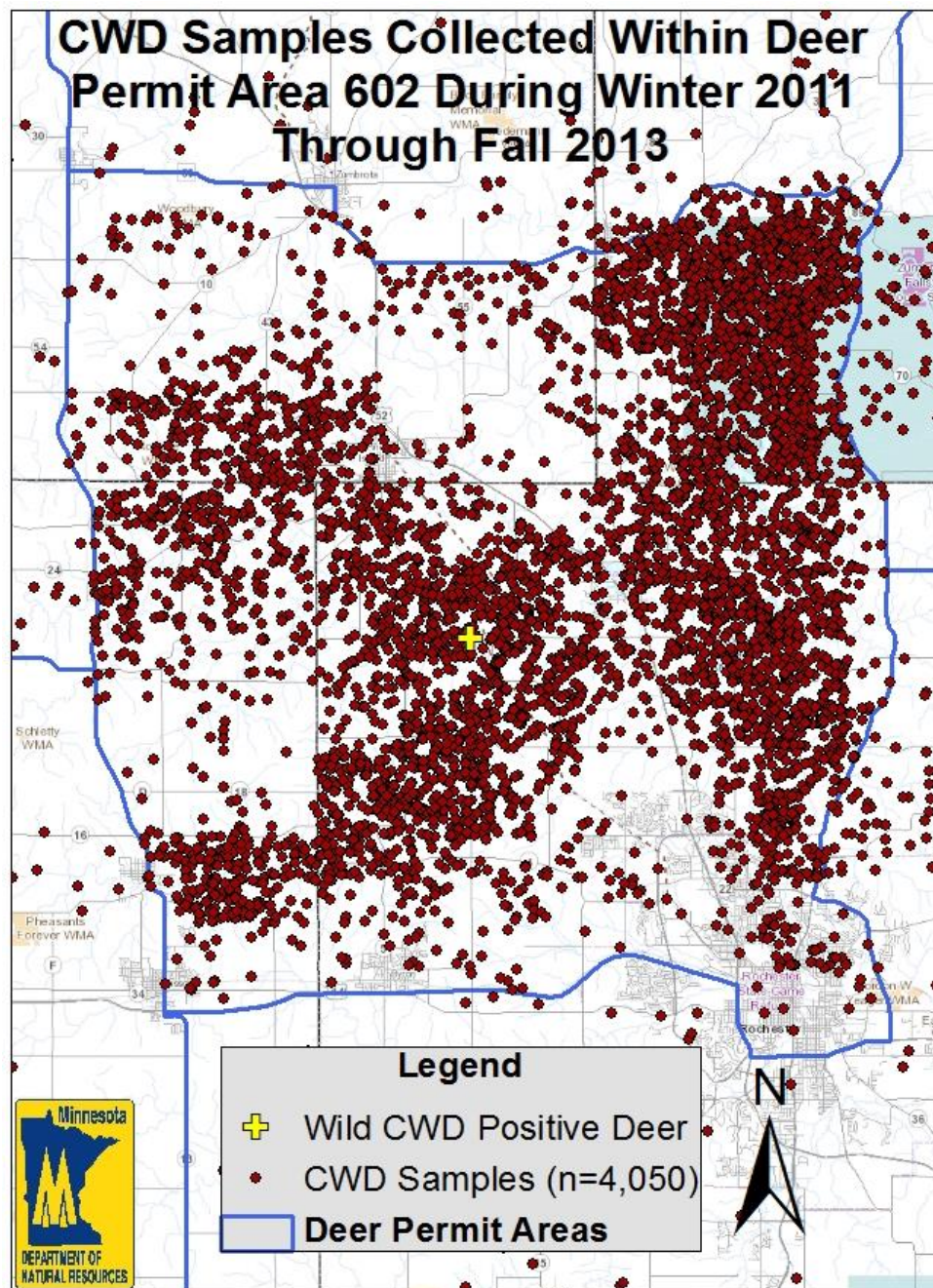


Figure 6. Sampling distribution of deer ( $n=4,050$ ) sampled for chronic wasting disease in deer permit area 602, winter 2011 through fall 2013.



# MISSOURI

## **CWD SURVEILLANCE AND RESPONSE IN MISSOURI: SUCCESS STORIES**

Jasmine Batten (Wildlife Health Program Supervisor, MDC)

The Missouri Department of Conservation (MDC) initiated routine, statewide chronic wasting disease (CWD) surveillance in 2002. The disease was first detected in two big game hunting preserves in Northeast Missouri, the first in Linn County in 2010 followed by a second positive preserve in Macon County in 2011. Increased surveillance was immediately initiated in free-ranging deer surrounding these facilities, and the first five CWD-positive free-ranging deer were detected in the state, all within 2-miles of one of the positive hunting preserves.

The Missouri Department of Conservation implemented its CWD response plan in 2012. Since that time, key surveillance and management activities have evolved, but the tenets of the original plan remain unaltered: find the disease early, monitor changes, apply interventions to minimize spread, and provide accurate information to stakeholders.

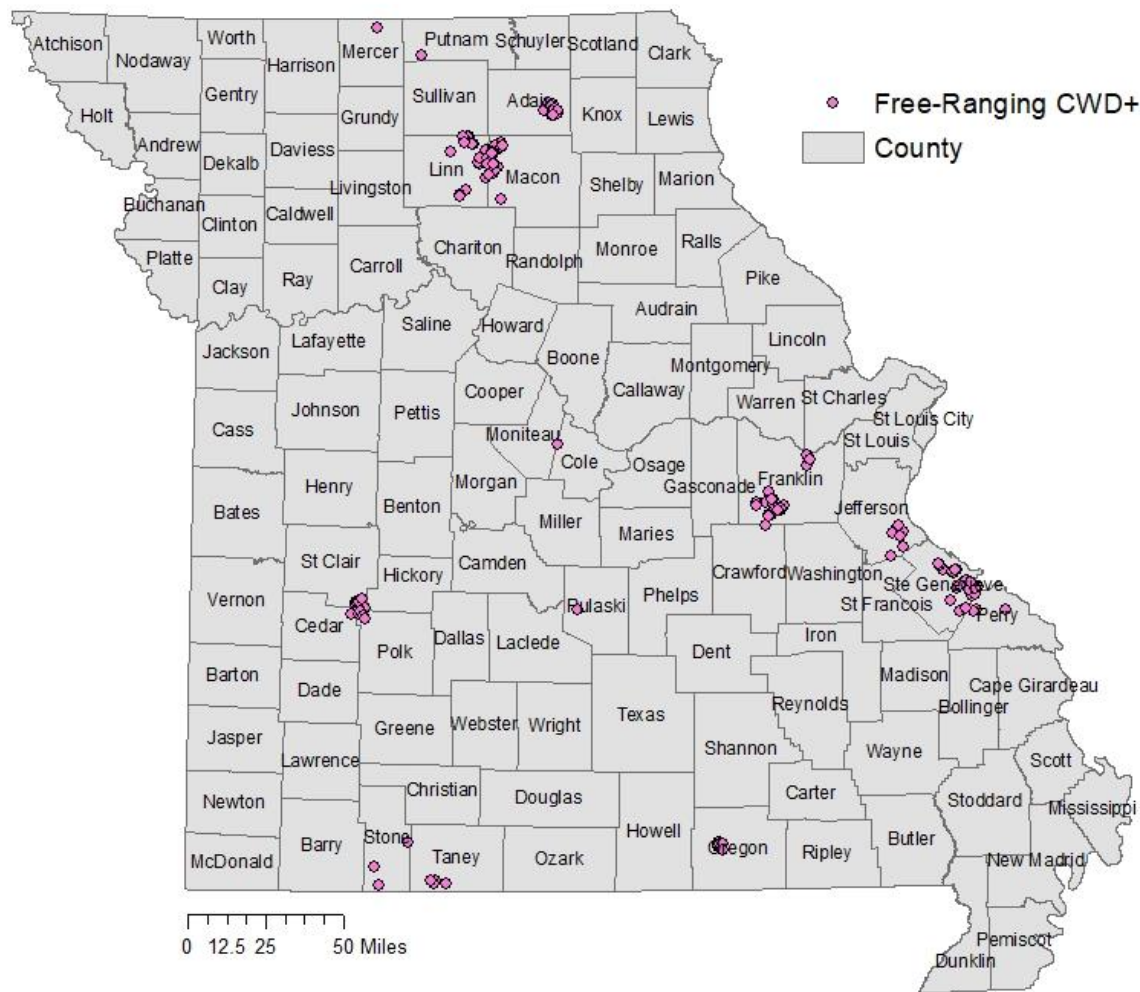
Today, CWD has been detected in 206 free-ranging deer in 18 counties throughout the state. The continued detection of CWD in new areas of the state is not only disappointing but challenging. However, despite challenges, there have been a number of successes, and today, MDC remains committed to protecting the state's deer herd and slowing CWD spread. The following summary provides a few of Missouri's successes in CWD management and surveillance to date.

### **EARLY DETECTION**

Missouri is fortunate that at the time routine statewide CWD surveillance was initiated in 2002, the disease was not detected. Surveillance prior to the first confirmation of CWD in wild deer sampled in late 2011 (nearly 30,000 deer tested throughout the state from 2002-2010), and the limited rate of infection and distribution of initial detections, suggests that CWD was likely a relatively recent introduction to the state. Luck aside, having a robust surveillance plan in place prior to the introduction of the disease gave MDC an opportunity to implement a number of aggressive management actions, including the establishment of a "CWD Management Zone" (initially encompassing all counties within 25-miles of detections, now including all counties within 10 miles), a suite of disease management regulations, and importantly, post-season targeted culling.

Although surveillance strategies have changed overtime, early detection has remained an important goal. Since 2012, CWD has been detected in a total of 18 counties in several regions across the state. The pattern of CWD in Missouri appears unique compared to what has been reported in other states, with numerous noncontiguous clusters, each with a low percent of deer infected (Figure 1). The reason for this pattern is not yet understood, and we cannot rule out at this time the possibility that the disease has been introduced multiple times into Missouri.

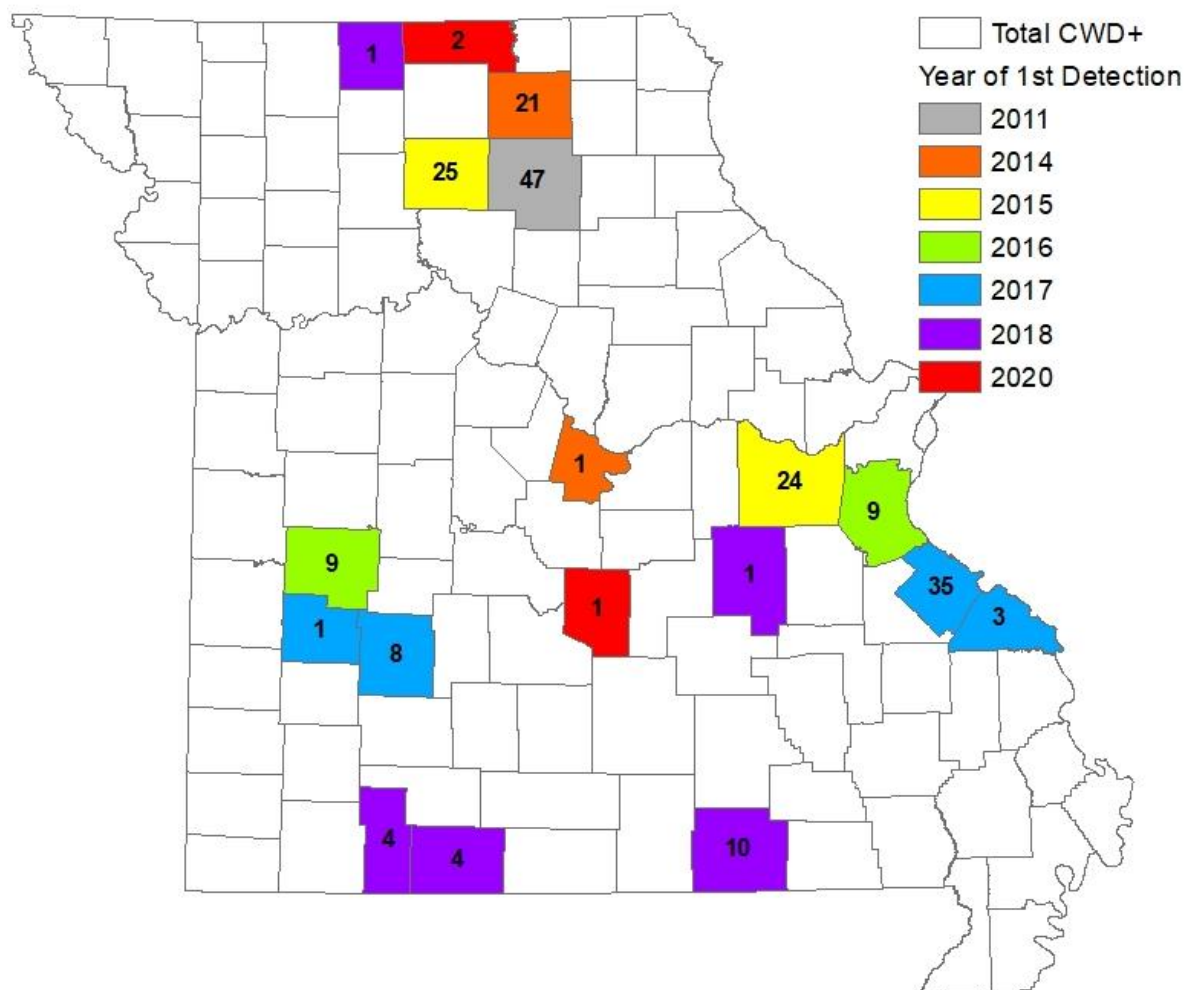
**Figure 1. Locations of Free-Ranging CWD Detections in Missouri as of 9/15/2021**



Data suggest that surveillance in Missouri is successfully detecting CWD spread and/or introduction relatively early. In five of the 18 counties, a single CWD-positive deer has been detected (Figure 2). In the remaining counties, the average annual positivity rate within adult and yearling hunter-harvested deer at the time of detection was 0.45%. The continual detection of CWD before infection rates are high and geographic distribution extensive has been an important success.



**Figure 2. Year of 1<sup>st</sup> County Detections and Total CWD+ Countywide Detections to Date**



### **COOPERATING TAXIDERMISTS**

Since 2010, the taxidermist collection program has been one of MDC's CWD surveillance and management success stories. Initially, MDC recruited taxidermists in ½ of the state each year to collect samples from their customer's deer. The program has been expanded to include 117 participants across the state in 2021, and sampling occurs statewide each year. Participants are offered reimbursement of \$10 per sample that they collect. Within CWD Management Zone counties (counties within 10-miles of CWD detections), taxidermists receive an additional \$5 per sample if they also agree to be listed publicly as a location that hunters can bring their deer for testing. For counties outside of the CWD Management Zone, taxidermist-sampled deer are the primary surveillance tool. County-specific numbers are low annually in these counties.

In 2021, non-CWD Management Zone county sample numbers ranged from 5-190, with an average of 74 samples per county. However, these samples target the highest priority animals, adult males, and yield a reasonably good geographic distribution. By repeating surveillance

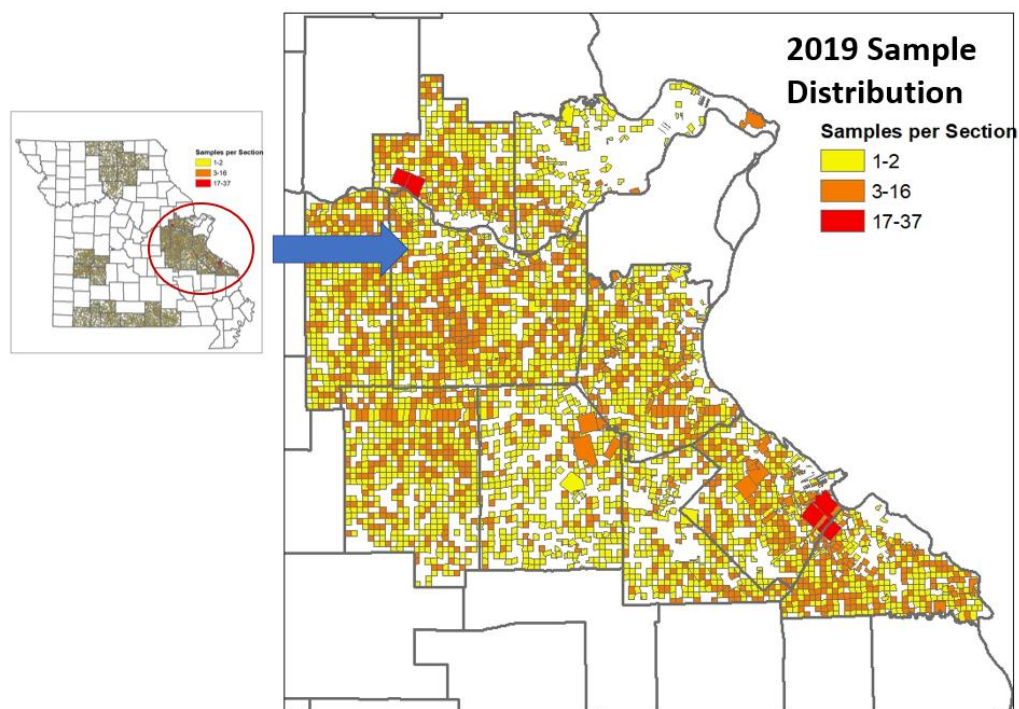
annually, taxidermist samples have detected 8 out of 17 “CWD Core Areas” (localized clusters where CWD is detected), and prevalence in these areas at the time of detection has been very low, showing this surveillance to be successful in detecting CWD relatively early despite small sample sizes.

### **MANDATORY SAMPLING**

Within CWD Management Zones, implementing and sustaining mandatory sampling on the opening weekend of the main portion of the fall firearms season has been widely successful. Put in place in 2016, there has been high compliance with the regulation and hunters overwhelmingly report satisfaction with their experience visiting a sampling station. Sampling 20,000 or more deer in just two days is no small task and the number of staff involved and time invested in planning is significant. However, in Missouri the effort has provided the detection of 7 of 17 “CWD Core Areas” (localized CWD clusters). The volume of samples collected provides data at a resolution to provide confidence in the understanding of CWD distribution in the CWD Management Zone as well as disease statistics overtime. See Figure 3 for an example of mandatory sampling distribution in one region of the state.

An unexpected benefit of this regulation is the heightened awareness that has come with interacting with nearly 30,000 hunters directly at sampling stations. This has provided an opportunity for many one-on-one conversations with MDC staff and given a venue for providing targeted information about the disease.

**Figure 3. 2019 Mandatory Sampling CWD Sample Distribution in Eastern Missouri.**



## **SINGLE CWD-DETECTION- COLE COUNTY, MISSOURI**

In March of 2015, MDC confirmed a single CWD-positive adult male deer in Cole County, Missouri. To date, no additional CWD-positive deer have been detected in this area, possibly providing evidence that early detection coupled with rapid intervention can prevent a CWD introduction from becoming endemic.

Following the response plan at the time, a surveillance zone encompassing a 5-mile radius was designated. Within this area, targeted culling was conducted between January and March of both 2016 and 2017. In total, 266 deer were removed. Mandatory CWD sampling opening weekend of the fall firearms seasons took place throughout the county from 2016-2018. Considering only samples collected from adult and yearling deer, and considering one year to be July 1<sup>st</sup>-June 30<sup>th</sup>, the probability of detecting zero CWD cases within the Surveillance Zone was calculated. These calculations assume a simple binomial distribution, and the results should be interpreted cautiously. The results do suggest that if CWD was at 5% within the five-mile radius, the probability of detecting an additional positive deer was very high. Detection probability decreases as you assume a lower infection rate, but even at 1% prevalence the likelihood of detecting additional positive deer remains high (Tables 1 and 2)

**Table 1. The probability of detecting at least one CWD-positive deer within the Cole Surveillance Area, utilizing binomial probability, if 5% (table 1a) and 1% (1b) of the deer were infected.**

*Table 1a.*

<i>Year</i>	<i>Sample Size</i>	<i>Probability of detecting at least one CWD+ deer if 5% of deer are infected</i>
2015	205	99.997%
2016	216	99.998%
2017	197	99.996%
2018	200	99.996%

*Table 1b.*

<i>Year</i>	<i>Sample Size</i>	<i>Probability of detecting at least one CWD+ deer if 1% of deer are infected</i>
2015	205	87.26%
2016	216	88.59%
2017	197	86.19%
2018	200	86.60%

Baseline surveillance was returned to in 2019, and to date no additional CWD-positives have been detected within Cole or adjacent counties.

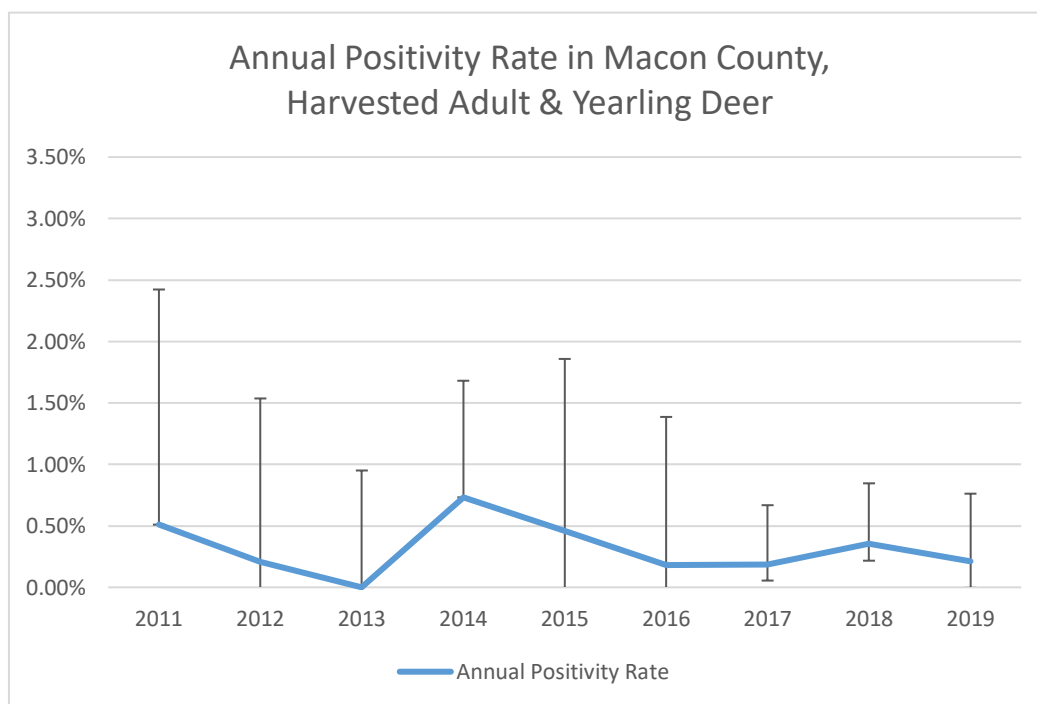
## **MAINTENANCE OF LOW ANNUAL POSITIVITY RATES IN NORTHEAST MISSOURI**

Missouri's CWD response plan is designed to slow CWD spread. Broad preventative measures include regulations designed to decrease significant known risk factors, such as feeding, dispersal of young bucks, and carcass movement. The major direct intervention deployed is the application of post-season targeted culling in areas within 2-square miles of CWD detections. The goal of targeted culling is to increase the number of CWD-positive deer removed from the landscape and therefore slow transmission rates and minimize

environmental contamination over time. Culling efforts have been heavily modeled after those implemented in Illinois by the Illinois Department of Natural Resources.

CWD is a slow spreading disease, and data from other states suggest that prevalence rates may not increase measurably for a pro-longed number of years. This characteristic makes the evaluation of management interventions in the long-run challenging. Macon County is the county where the earliest detections occurred and where targeted culling has been implemented the longest. However, encouragingly the number of infected deer detected has remained relatively stable and limited. Considering hunter-harvested adult and yearling deer as an index, countywide annual positivity rate for Macon County has remained below 0.50%, with the exception of 2014 (Figure 4). MDC is currently engaged in several efforts to explore the impacts of targeted culling to date, but this trend is a good indication that management interventions may be successful in limiting CWD transmission rates.

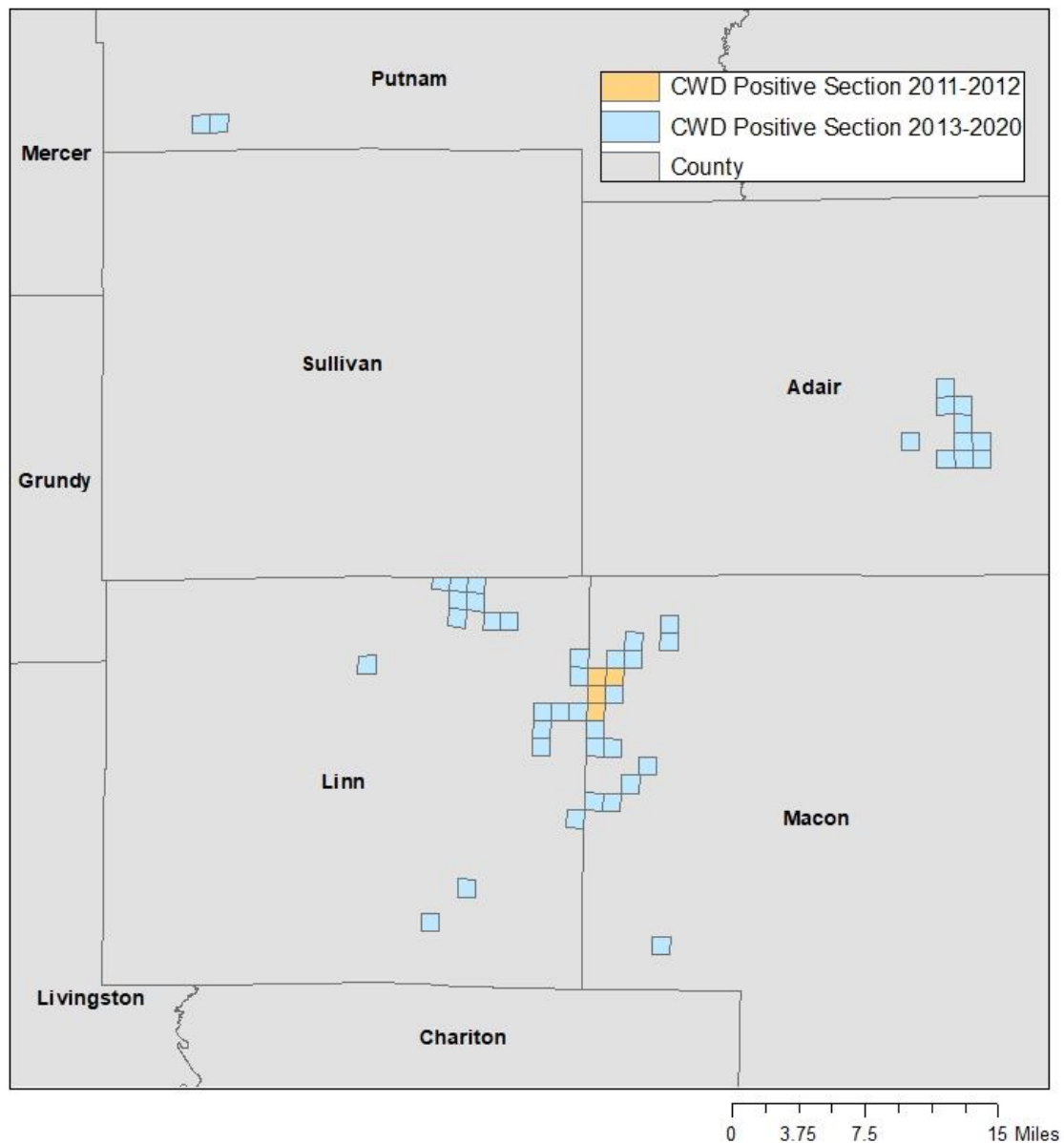
**Figure 4. Annual Positivity Rate for Adult & Yearling Hunter-Harvested Deer in Macon County, Missouri. Note, 95% confidence intervals were calculated using Wilson's Score methodology.**



It is important to note that despite low infection rates, the geographic area where CWD cases have been confirmed in Northeast Missouri continues to grow. Figure 5 shows the one-square mile locations of CWD-positive deer in 2011 compared to the locations where CWD has been detected from 2012-2020.



**Figure 5. Square-mile PLSS “section” where CWD has been detected in Northeast Missouri. Orange squares depict locations that were confirmed initially in 2011-2012. Blue squares show sections where CWD confirmations have occurred from 2013-2020.**

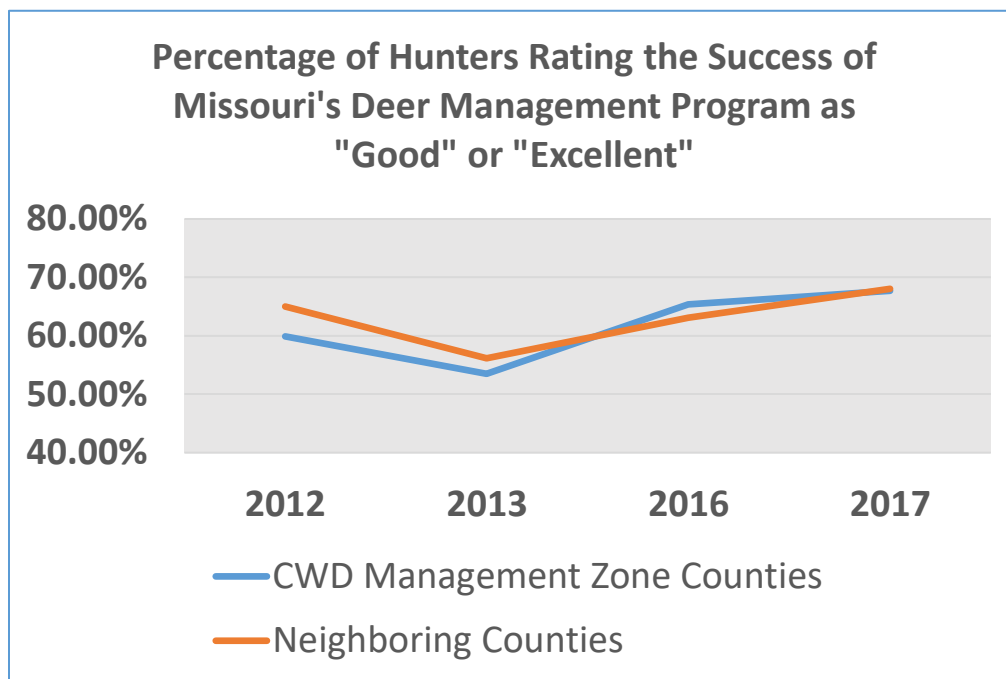


### **HUNTER SATISFACTION AND BUY-IN**

Successful CWD response would not be possible without the support and participation of hunters, and surveys indicate that Missouri’s hunters are concerned about CWD. Previous surveys showed that 74% of hunters in Missouri agree that CWD is a serious threat to the state’s deer herd. Hunters in CWD Management Zone counties (previously, counties within 25 miles of CWD detections; beginning fall of 2019, counties within 10 miles), reported similar satisfaction with Missouri’s deer management from 2012-2017 as hunters in neighboring counties (Figure 6). This data suggests that CWD and associated regulations are not overall

negatively impacting the quality of hunting in Missouri, though follow-up data analysis is needed to consider if this trend still holds true. Regardless, having the majority of hunters across the state aware of and concerned for CWD and being able to respond aggressively to the disease without dissuading hunters is undoubtedly an important achievement.

**Figure 6. Comparison of hunter satisfaction with Missouri's Deer Management Program between hunters in CWD Management Zone counties versus surrounding counties.**



## NEW YORK

### **NEW YORK SUCCESS**

James Farquhar (Wildlife Bureau Chief, NY DEC)

Any success New York had in limiting or eliminating CWD from wild deer probably begins three years prior to the first detection in Central NY in 2005. Upon confirmation of CWD in Wisconsin in 2002, New York began steps to prepare for the eventuality of CWD in the state. DEC and sister agency the Department of Agriculture and Markets (DAM) already had a good relationship, but the prospect of CWD in either wild or captive herds fostered a cooperative tone in which each agency agreed to take steps jointly and within individual areas of responsibility. We worked together. Thus, DAM began initiating herd testing protocols, DEC began statewide sampling of wild deer, and regulations were put into place restricting practices which might introduce CWD from outside New York. Cooperatively, discussions related to how a response might be administered resulted in each agency having understanding of respective roles and responsibilities and potential actions to be taken. While that "response plan" was still a draft, it served as a basis for what did follow in April 2005.

In March 2005, routine sampling of a presumably healthy captive deer resulted in our index case. A second deer at a location nearby that died from pneumonia was quickly sampled to reveal a second farmed cervid case. Both facilities were secured, soon depopulated and additional cases were subsequently identified. Concurrently, DEC began to initiate a wild deer sampling plan (based on the draft plan already developed) for the surrounding area which became operational by mid- April. Thus, through cooperation between DAM and DEC, we went from an index case to a fully operational response inside of several days. While CWD was undoubtedly present on the index farm for some period prior to detection as typically experienced in other examples, this rapid mobilization ensured continued risk from the captive facilities was quickly minimized, and an assessment of CWD presence and prevalence in the wild population could be determined without delay. By the end of April, we had confirmed 2 wild cases from 292 samples and established a containment zone and additional restrictions on movement of deer from the zone.

From the beginning, public outreach was an integral part of the response. In early April following announcement of the first CWD case, we (DEC, DAM and the NYS Dept. of Health) were in front of the public explaining the disease, known risks to humans and implications to the health of the deer herd. Through public meetings, regular media outreach and availability, we were able to describe the initial response effort about to take place and gain public support for the action, which was not to control the disease, rather to determine the scope of the issue. The scope of the issue would be the basis for actions to follow and would be communicated openly as determined next steps (Containment Area [CA], testing of all deer taken in the CA, restrictions of movement of deer or deer parts from the CA, etc.). This outreach early, was likely important in developing local public trust. Aside from engaging the entire community, we were also aware from the Wisconsin experience that deer hunters and others wanted assurance that the goal was not to eradicate deer locally nor even initially to eliminate the disease.

It was to determine presence and prevalence from which to inform a longer-term disease response.

To summarize, we got lucky. Contributing to that luck was earlier awareness/actions taken to minimize risk and begin assessment of captive and wild cervids. The working relationship between DEC and DAM prior to detection and post detection no doubt helped and may have been key. DAM's relationship with deer farmers resulted in good compliance with the then voluntary testing protocols which ultimately led to presumably early (relatively) discovery of the disease in two captive herds in proximity to each other. (I should side note here DEC also cooperated with DAM to get captive samples when needed prior to first detection. Speaking from personal experience, I sampled several captive deer from several facilities in a portion of the state where DAM veterinarian coverage was absent). Our ability to get on the ground intensively sampling wild deer within days perhaps minimized the potential for further spread from those deer in the wild. We got lucky!