



COLORADO

Parks and Wildlife

Department of Natural Resources

Director's Office
6060 Broadway
Denver, CO 80216
P 303.291.7461

MEMORANDUM

To: Members of the Colorado Parks and Wildlife Commission

From: Dan Prenzlou, 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.

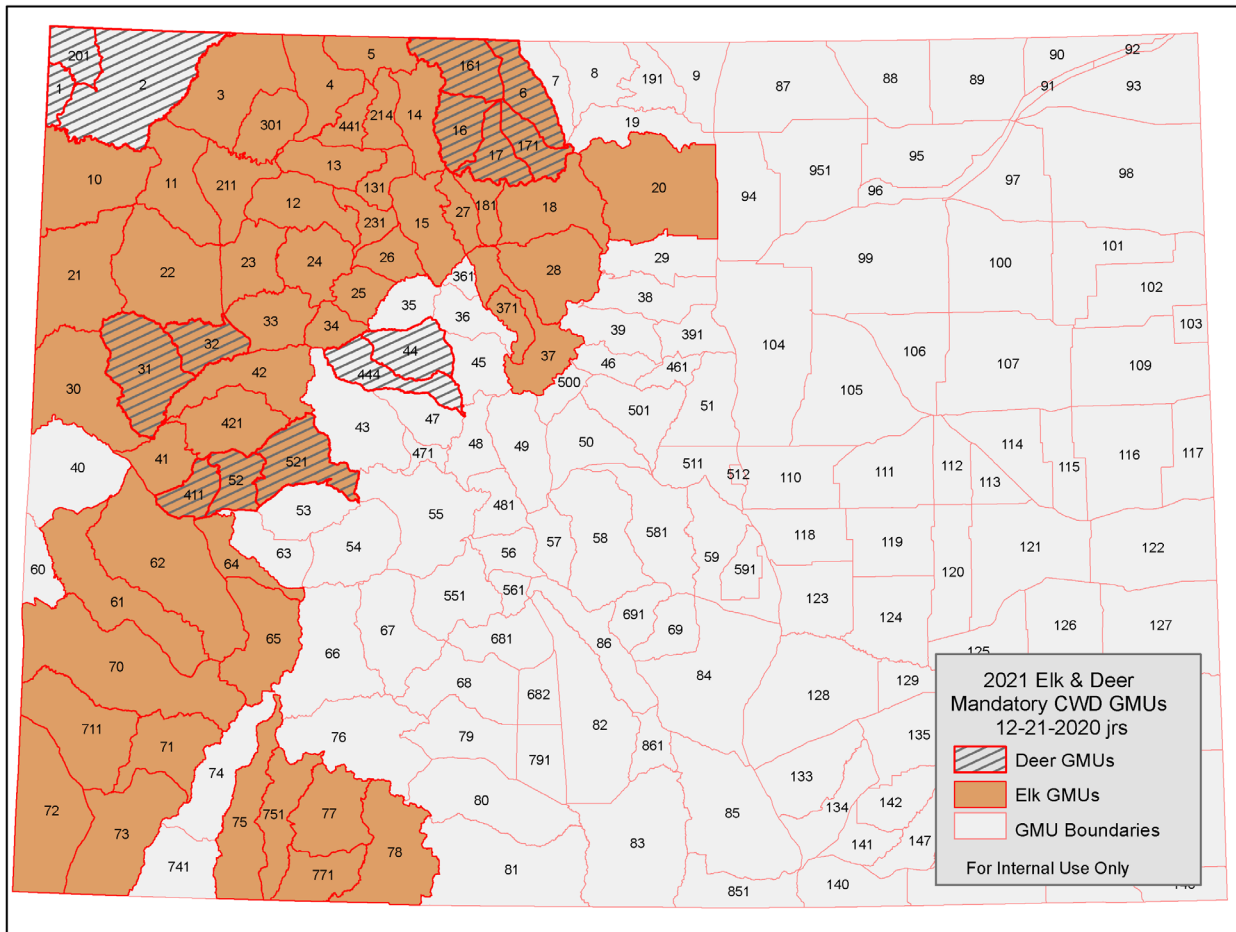


Figure 1. Map of Game Management Units where specific 2021 deer and elk hunt codes were selected for mandatory CWD testing.

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.

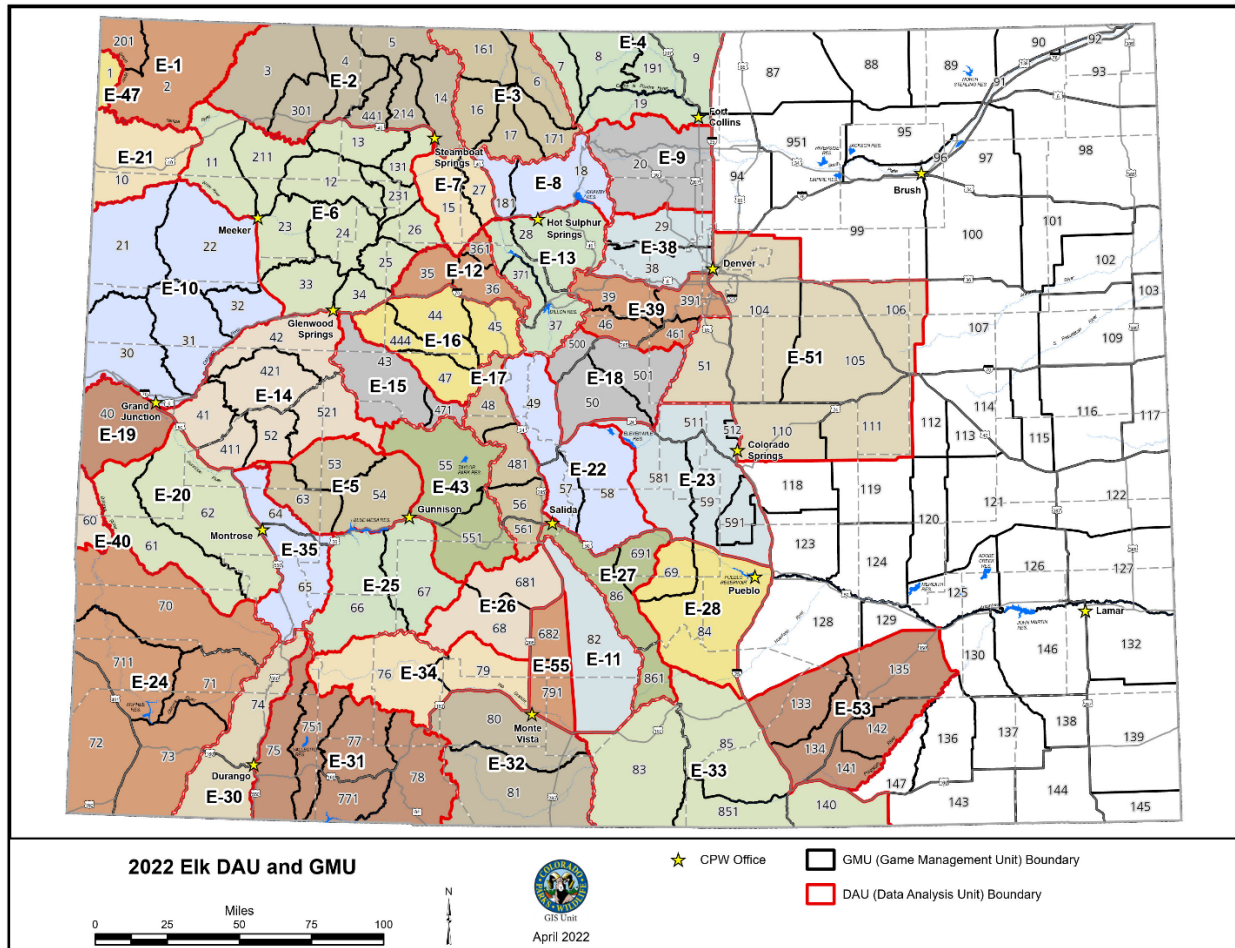


Figure 2. Map of Colorado elk herds (Data Analysis Units) and associated Game Management Units.

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.

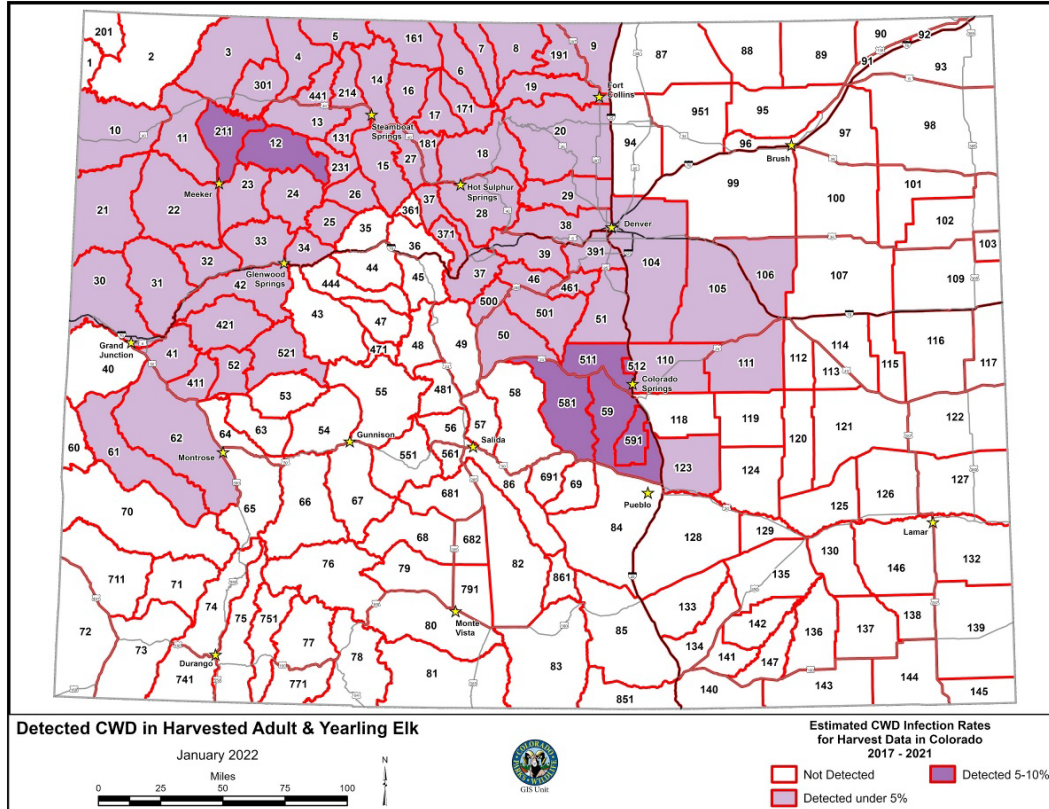


Figure 3. Map of CWD Prevalence in harvested adult and yearling elk in Colorado, 2017-2021.

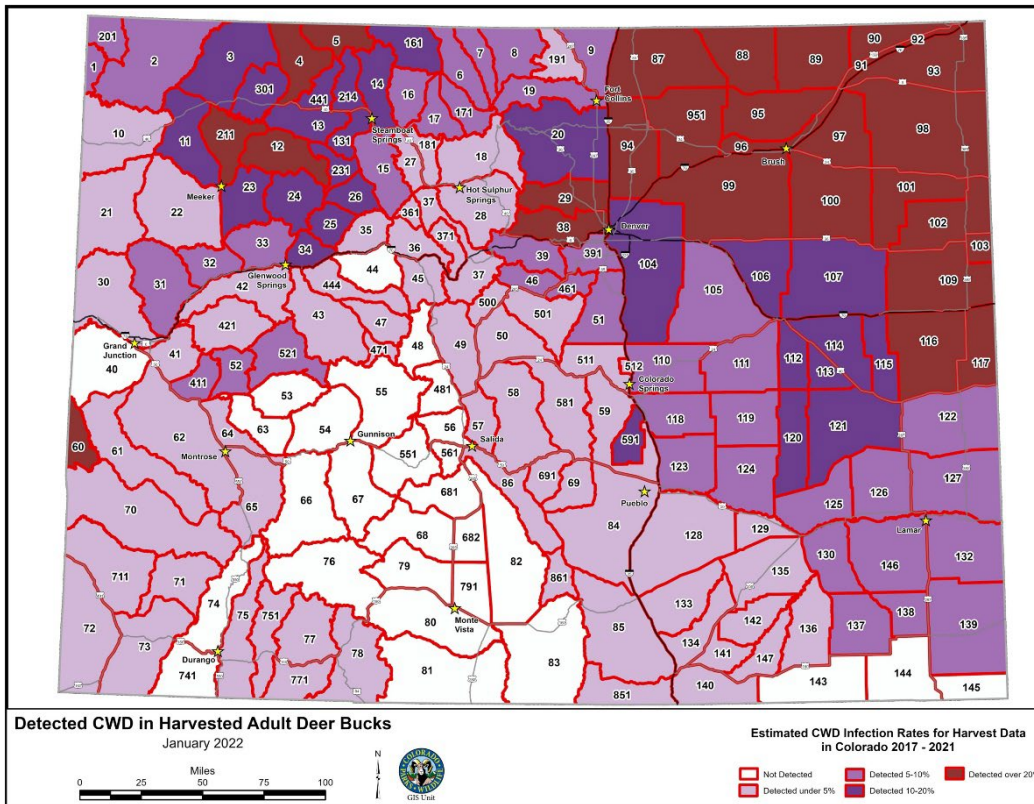


Figure 4. Map of CWD Prevalence in harvested adult male deer in Colorado, 2017-2021.

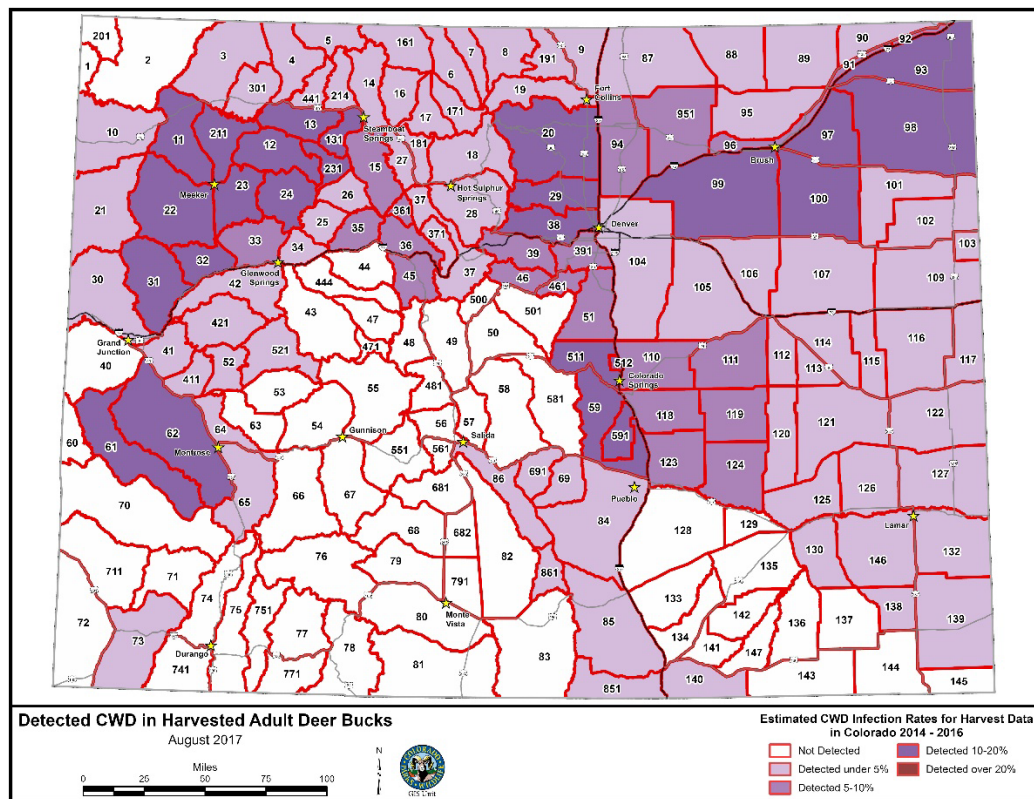


Figure 5. Map of CWD Prevalence in harvested adult male deer in Colorado, 2014-2016.

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](#)