Tennessee Wildlife Resources Agency
Chronic Wasting Disease Annual Report
2023-2024

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Acknowledgements

Special thanks are extended to the many TWRA staff involved in CWD program efforts. Staff work long hours during the deer hunting season to collect CWD samples, travel hundreds of miles throughout the state, respond to sick deer reports, enter numerous lines of data, make countless phone calls to verify harvest data, process test results with data quality assurance, answer questions from the public, communicate TWRA messages, and create partnerships with stakeholders. These efforts involve staff from the Wildlife, Law Enforcement, Communications & Marketing, Biodiversity, and Information Technology Divisions.

Special thanks are also extended to TWRA partners that support, participate in, or help carry out CWD programs. The voluntary submission of CWD samples from hunter harvested deer are invaluable to achieving surveillance goals in many parts of the state and would not be possible without hunter support and partnerships with processors, taxidermists, and other business owners. The targeted removal program is conducted through working relationships with USDA Wildlife Services and participating landowners who are both vital for the success of the program. Sample quota development and data processing support would not be possible without the insights provided by the Cornell Wildlife Health Laboratory, Surveillance Optimization Project for Chronic Wasting Disease. The turn-around time for CWD test results has remained low due to efforts in the field, data processing efficiency, and the indispensable collaborations with the Mississippi Veterinary Research and Diagnostic Laboratory and the C.E. Kord Animal Health Diagnostic Laboratory. The partnership with the Tennessee Department of Agriculture is vital in coordinating efforts regarding captive cervid facilities. The many research partners keep TWRA on the forefront of CWD management as new information and potential tools become available; especially Justin Kosiewska and Jacob Wyrick (University of Tennessee Institute of Agriculture) for providing a summary of their work on the UT-USDA SARS-CoV2 study in white-tailed deer for this report.

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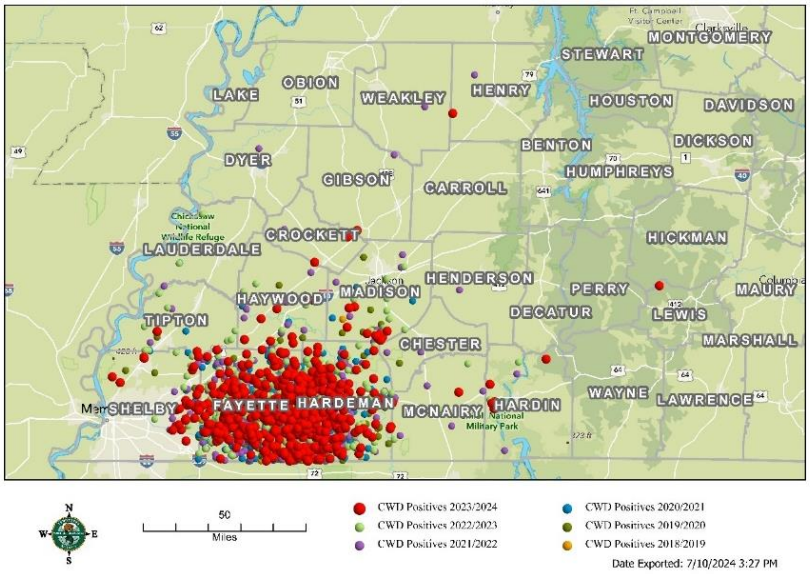
Executive Summary

This document serves as the annual report depicting chronic wasting disease (CWD) related activities during fiscal year 2024 (July 1, 2023 – June 30, 2024) and includes information on surveillance, monitoring, management, research, and outreach and communications efforts. TWRA began testing deer and elk in Tennessee for CWD in 2002 and has since tested approximately 96,000 samples statewide.

The first CWD detection in deer in Tennessee was in December of 2018 in Fayette and Hardeman Counties and has since been detected in a total of 17 counties, including Chester, Crockett, Dyer, Fayette, Gibson, Hardeman, Hardin, Haywood, Henderson, Henry, Lauderdale, Lewis, Madison, McNairy, Shelby, Tipton, and Weakley. One CWD detection was made in Lewis County during the 2023–24 season and is the most eastward detection in Tennessee and the first detection east of the Tennessee River.

The total CWD positive detections through June 17, 2024, was 3,521, all of which were in white-tailed deer. No elk have been detected with CWD in Tennessee. The total number of CWD positive detections in deer during the 2023–24 season was 741.



Cumulative CWD positive detections in Tennessee through June 30, 2024. Map created by Lynn Barrett, TWRA.

The current surveillance strategy used by TWRA for sampling white-tailed deer is a statewide, risk-based model that focuses on the locations and demographic classes most likely to have the disease using a weighted county level quota system. A sample quota goal is established for each county based on factors that might increase the risk of CWD introduction. Sample quotas are updated each year to reflect the changes in risk factors including distance to known positives in other states. Previously, adjustments were made to account for detections in North Carolina and Alabama. In the 2019–20, the quotas for Fayette and Hardeman Counties were shifted to reflect monitoring goals. Monitoring goals are set to detect a change in prevalence and geographic distribution of the disease at the county level. For the current sampling season, county surveillance goals were met or exceeded in all but six counties

which were Campbell (99% achieved), Cocke (99% achieved), Macon (95% achieved), Polk (80%), Trousdale (50%), and Wayne Counties (69%).

Sample sources for meeting the established sample quotas are primarily from voluntary submissions of hunter harvested deer. Approximately 98% of CWD samples from the 2023–24 season came from hunter harvest submissions. These samples are obtained from check stations, strategically placed drop-off freezers, and partnerships with meat processors and taxidermists. Additional sample sources include collections in response to sick or dead deer reports received either through direct calls or the online sick deer reporting system, roadkill deer, deer removed under CWD management permits, and all deer removed through the targeted removal program.

A CWD Management Zone for carcass transportation and wildlife feeding restrictions was implemented during the 2023–24 season (TWRA Rule Chapter 1660-01-34). This management zone includes 23 counties in the CWD affected area with Lewis County being the newest addition following the detection of CWD in the county. Within the zone wildlife feeding is not allowed, and only approved carcass parts may be taken out of the zone. The CWD management zone simplifies previous iterations of the rule and map.

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Introduction

Chronic wasting disease (CWD) poses a serious threat to the free-ranging white-tailed deer and elk populations in Tennessee. The disease is caused by an abnormally formed prion protein that accumulates in the central nervous system causing degradation of brain tissue. White-tailed deer have been shown to develop clinical signs around 12 to 18 months post-infection with death occurring within weeks of the onset of clinical signs. The most noticeable CWD clinical signs in adults being weight loss and uncharacteristic display including altered stance, lowered head, and drooping ears. Although these clinical signs may not show until a year or more post-infection, the animal may begin shedding infectious prions as soon as three months post-infection through urine, saliva, feces, blood, and other bodily tissues. The disease is transmissible through direct contact or through prions deposited into the environment where the prions may persist for several years to decades.

To date, there have been no reported cases of CWD infection in humans, however CWD is similar to other transmissible spongiform encephalopathies that can affect humans. Since 1997, the World Health Organization has recommended that the agents of all known prion diseases be prevented from entering the human food chain. Furthermore, the Centers for Disease Control and Prevention (CDC) recommends to not consume meat from an animal that tests positive for CWD (Centers for Disease Control 2021). Through human dimensions research in Tennessee, perspectives of stakeholders were examined with regard to CWD. Initial hunter concerns were significantly related to human health implications and regulatory changes (Meeks et al. 2021). Furthermore, a statewide opinions study of deer management in Tennessee showed respondents ranked CWD within the top three concerns (of eight choices) for deer management.

TWRA began testing deer and elk in Tennessee for chronic wasting disease in 2002 and has since collected approximately 96,000 samples. The first positive detection occurred in December of 2018 in free-ranging white-tailed deer in Fayette and Hardeman Counties. Through consistent and systematic surveillance efforts, TWRA has been able to develop an understanding of the extent of the disease across the landscape. As of June 30, 2024, CWD had been found in a total of 3,521 white-tailed deer from 17 counties in western and middle Tennessee (Figure 1). No elk have been detected with CWD in Tennessee.

With the detection of CWD in western Tennessee white-tailed deer and the threat to elk and white-tailed deer populations in other parts of the state, TWRA is continuing to conduct surveillance and implement regulatory strategies to slow the spread of the disease and minimize the impacts to Tennessee's landscape and culture. The CWD programs currently in place are guided by the CWD Response and Management Plan 2023–2027, which contains five overarching goals to address CWD in Tennessee: prevention, surveillance and monitoring, response and management, research, and outreach and communications. This document serves as the annual report depicting CWD related activities during fiscal year 2024 (July 1, 2023 – June 30, 2024).

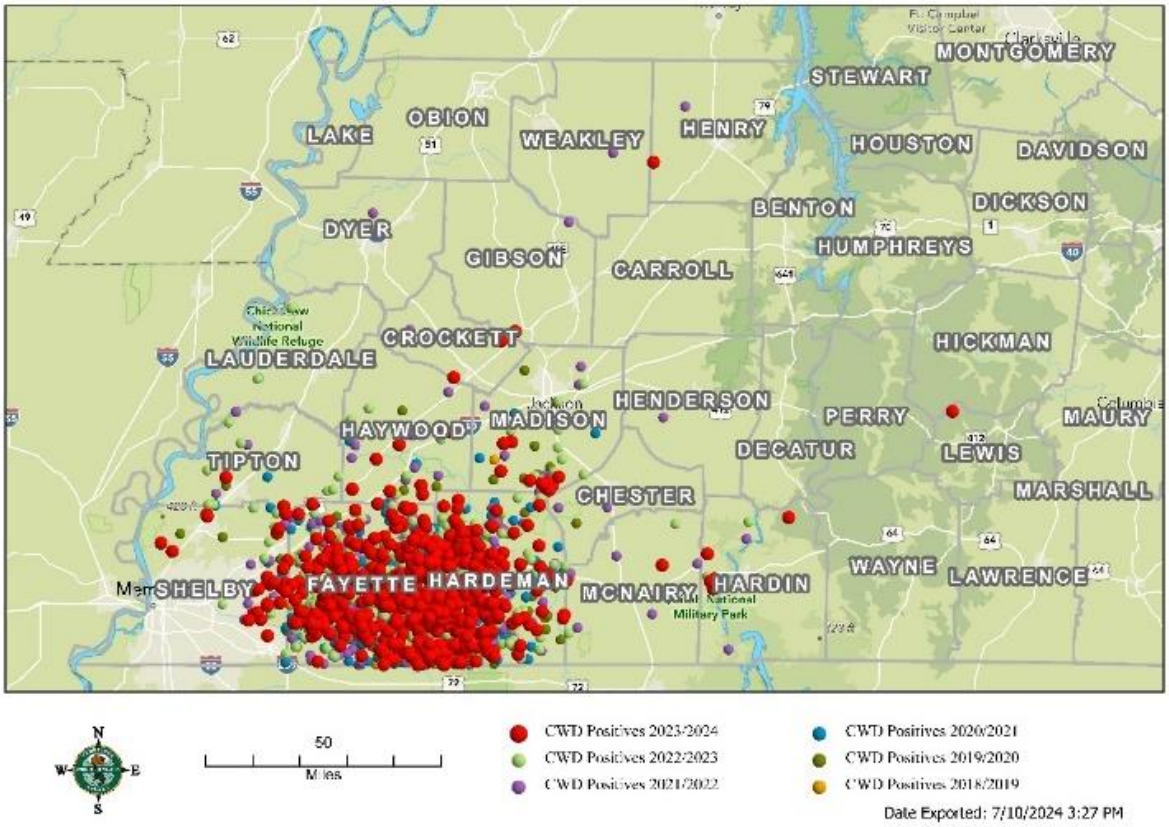

Figure 1. Cumulative CWD positive detections in Tennessee through June 30, 2024. Map created by Lynn Barrett, TWRA

Surveillance and Monitoring Goals

The current CWD surveillance strategy used by TWRA was developed in conjunction with Cornell University Wildlife Health Lab (Schuler et al. 2018) and initiated during the 2018–2019 season. This surveillance strategy for sampling white-tailed deer is a risk-based model that focuses on the locations and demographic classes most likely to have the disease using a weighted quota system. A quota goal is established for each county based on factors that might increase the risk of CWD introduction. Risk factors considered for developing quotas include deer population density, proximity to CWD occurrences, CWD prevention efforts in neighboring states, and the number of facilities that may increase the likelihood of prion movement into the county (e.g., processors, taxidermists, and captive cervid facilities, etc.).

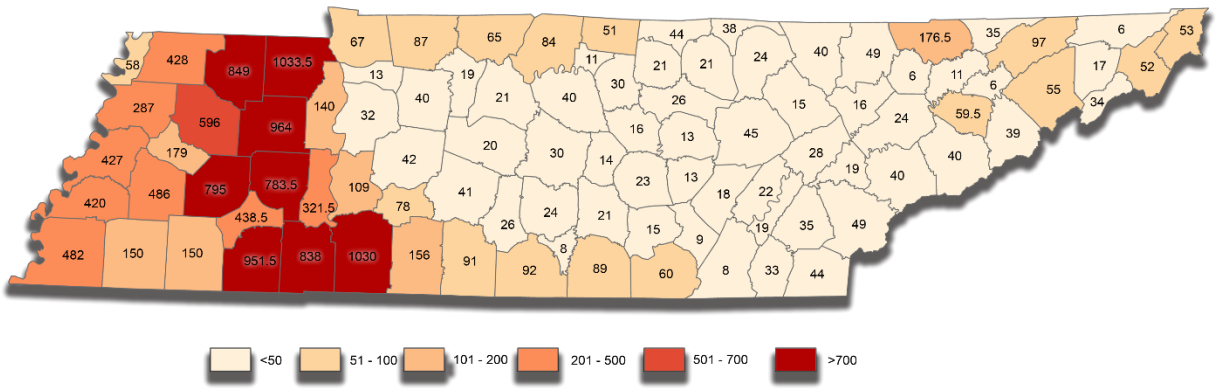

Figure 2. Map of CWD county surveillance quota goals for 2023–24. Map created by Lynn Barrett, TWRA.

Surveillance quota adjustments for the project period were made to southwestern border counties, particularly Wayne and Lawrence Counties, in response to additional positive CWD detections located in Lauderdale County, Alabama within 10 miles of the Tennessee border. Surveillance quota adjustments were also made to Claiborne County in northeastern Tennessee in response to a “Suspect, Not-confirmed" case from the 2021–22 surveillance season. These adjustments were made to enhance surveillance in these areas and detect the disease if it should exist there.

Surveillance points are achieved by collecting samples from various sex and age classes of deer. Adult bucks (≥2.5 years) have the highest value at 3 points, adult does (≥2.5 years) have the next highest value at 1.5 points, and yearlings of either sex (1.5 years) have a value of 1 point each. Fawns of either sex are not assigned any points. It is important to note that although fawns are not assigned quota point values, they are still sampled. Assessing prevalence amongst this age group helps managers assess the extent of the disease and potential impacts on the recruitment of animals into the population.

Sample sources for meeting the established sample quotas are primarily from voluntary submissions of hunter harvested deer. Hunter harvested samples are obtained from check stations, strategically placed drop-off freezers, and partnerships with meat processors and taxidermists. Samples may also be collected in response to sick or dead deer reports and all deer removed through the targeted removal program are sampled.

Tennessee's elk population is currently not known to be affected by CWD. TWRA remains vigilant in its efforts to keep the disease out of Tennessee's elk herd and continues surveillance efforts to ensure early detection if it were to occur. Sample sources for elk include all hunter harvests, roadkill, removal through depredation permits, and any elk targeted for removal due to display of clinical signs. All carcasses collected from non-hunter harvested sources, are also submitted for complete necropsy to the University of Tennessee, School of Veterinary Medicine for further investigation.

Tissues collected for testing are primarily the medial retropharyngeal lymph nodes (RPLN). In addition, obex was collected from all elk sampled and in some cases of clinical white-tailed deer. Testing was conducted by the Mississippi Veterinary Research and Diagnostic Lab (MVRDL) and the C.E. Kord Animal Health Diagnostic Lab (TN State Veterinary Diagnostic Laboratory). Enzyme-linked immunosorbent assay (ELISA) was used as the primary diagnostic test for all samples while immunohistochemistry (IHC) was used when additional confirmation of results was needed. See CWD Response and Management Plan 2023-2027, Appendix F: Updated CWD Testing and Reporting Protocol (CHRONIC WASTING DISEASE RESPONSE AND MANAGEMENT PLAN 2023-2027 (tn.gov)).

Deer density monitoring in CWD-affected area was conducted via fixed-wing aircraft to understand the impacts of CWD and CWD management in Tennessee. The TWRA partnered with Tennessee EcoSystems Testing Solutions, LLC, and the Tennessee Wildlife Resources Foundation to conduct thermal aerial surveys on thirteen (13) focal areas in western Tennessee. The survey was initiated in 2021 and occurs annually after the close of the deer hunting season (TWRA Technical Report 24-2).

Surveillance and Monitoring Results

The total number of white-tailed deer sampled in 2023–24 statewide was 16,271. Surveillance goals were met or exceeded in all but six counties which were Campbell (99% achieved), Cocke (99% achieved), Macon (95% achieved), Polk (80%), Trousdale (50%), and Wayne Counties (69%). Approximately 98% of CWD samples collected during the 2023–24 season came from hunter harvest submissions (16,051 hunter harvested samples). The proportion of harvest sampled by county within the CWD Management Zone ranged from 12% to 60% (Figure 3). Additional white-tailed deer sample sources included 86 from the targeted removal program, 50 from roadkill, 23 from clinical deer, 16 from research, 12 from removals under depredation permits, 9 from removals under CWD management permits, 9 found dead, and 15 listed as other (i.e., no additional information provided or sampled through case).

The total number of CWD positive white-tailed deer identified in 2023–24 was 741. One new CWD positive county was added during the project period bringing the total number of positive counties in Tennessee to seventeen (17). This positive detection was made in Lewis County and is the most eastward detection of CWD in Tennessee. Also of note is the positive detection east of the Tennessee River in Hardin County. Although Hardin County was already a positive county from detections made in the 2021—-22 season, this was the first detection within the county on the east side of the Tennessee River. During the 2023–24 season, positive CWD detections were found in Chester (3), Crockett (2), Fayette (370), Gibson (1), Hardeman (301), Hardin (6), Haywood (10), Henry (1), Lewis (1), Madison (12), McNairy (2), Shelby (29), and Tipton (3) Counties (Table 1). Since the discovery of CWD in Tennessee in 2018, a total of 3,521 white-tailed deer have tested positive.

The total number of elk sampled in 2023–24 was 30. No elk tested positive for CWD. Sources of elk samples included 12 hunter-harvested, 4 clinical, 4 capture myopathy, 5 found dead, 3 depredation removals, and 2 illegally taken.

A total of 29 hunter harvested white-tailed deer samples were unable to be tested. An untestable sample may be due to several reasons including a lost sample, improper sample collection, or the necessary tissues were damaged, missing, or decomposed when received by TWRA.

The estimated CWD prevalence for counties with positive detections during 2023–24 season (Figure 5) ranged from 0.13% (Henry County) to 24.03% (Fayette County). Most positive counties remained under 2% prevalence except Shelby, Fayette, and Hardeman Counties. The CWD prevalence in Shelby County increased from just under 2% in the 2022–2023 season to just under 4% during the 2023–24 season. Fayette and Hardeman counties remain the counties with the highest prevalence (24.03% and 18.86%, respectively) with Fayette County showing the most drastic increase of approximately 5.5% in comparison to the 2022–23 project period.

Deer density estimations in CWD-affected area were conducted at a total of thirteen (13) sites. Sites were roughly 36 mi^2 in size and were surveyed from February 13, 2024, through February 23, 2023. The sites were in Chester (1), Decatur (1), Dyer (1), Hardeman (1), Haywood (1), Lauderdale (1), Lewis (1), Madison (2), and Fayette (3) Counties with one site split between McNairy and Hardin Counties (Figure 6). Densities were estimated to range from 15.0 deer/mi^2 in Lauderdale County to 64.4 deer/mi^2 in Hardeman County. Eight of the sites have density estimates for the previous four years and offer

opportunity to compare changes over time (Figure 7). Three of four sites in the area containing the highest prevalence of CWD (sites 5-8 in Fayette and Hardeman Counties) have generally been stable across time. The Chester County site (site 4) density declined in 2023 and is stable or increasing; at least one more year of monitoring data is needed to determine if the trend will continue upward. Northwestern Fayette County (site 7) density declined in 2022 and has remained stable since. Eastern Fayette County (site 5), where CWD is centered at the highest prevalence, has been stable through time. Lewis County (site 13) was sampled in 2024 for the first time and has only one density estimate. Please refer to the TWRA Technical Report 24-2 for more detailed results.

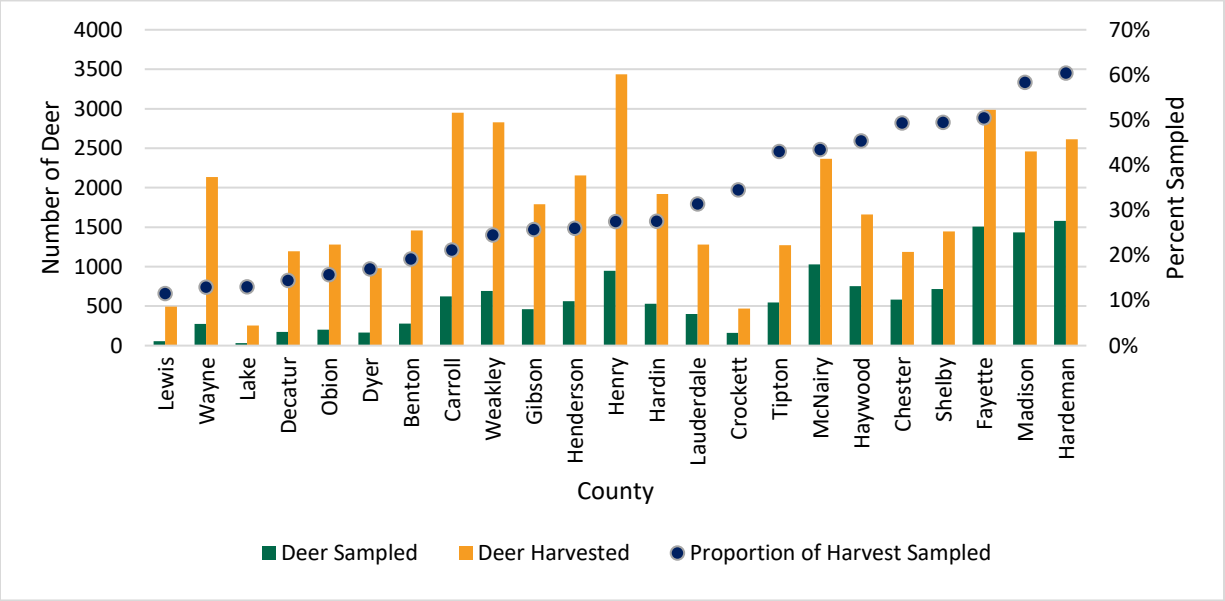

Figure 3. Proportion of hunter harvested deer sampled in each county within the CWD Management Zone for 2023–24 season.

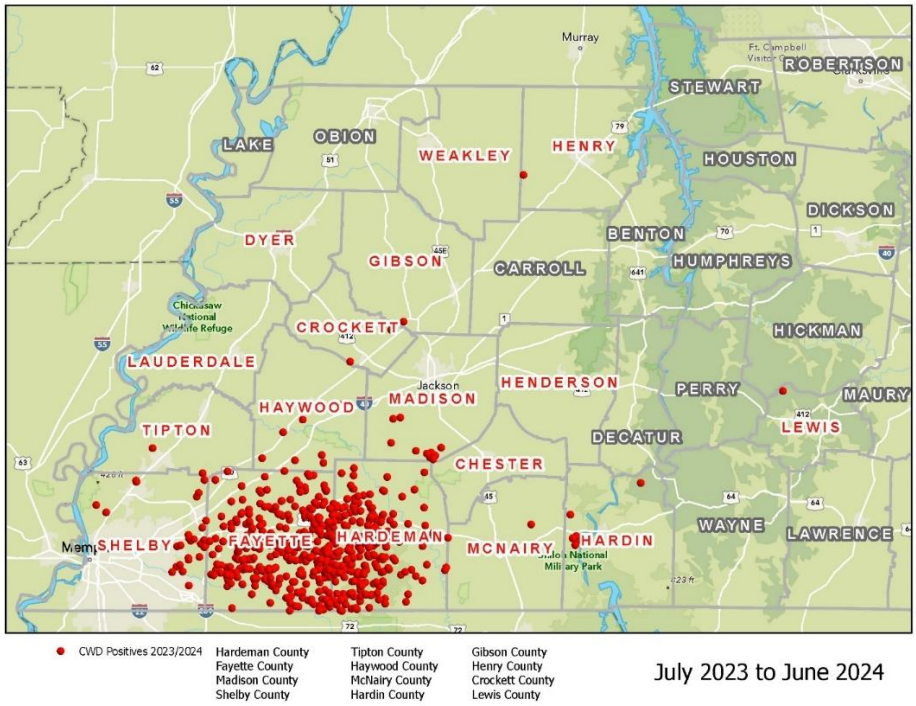

Figure 4. Distribution of CWD positive detections following the 2023–2024 sampling year. Map created by Lynn Barrett, TWRA, July 2024.

Table 1. Cumulative CWD positive detections by county with highlighted cells indicating the year of initial detection in a county. Total animals sampled by year also included.

County	2018–19	2019–20	2020–21	2021–22	2022–23	2023–24
Chester	-	1	-	2	1	3
Crockett	-	-	-	1	1	2
Dyer	-	-	-	1	-	-
Fayette	108	303	376	346	366	370
Gibson	-	-	-	1	-	1
Hardeman	77	167	256	236	380	301
Hardin	-	-	-	2	2	6
Haywood	-	6	2	10	9	10
Henderson	-	-	-	1	-	-
Henry	-	-	-	1	-	1
Lauderdale	-	-	1	-	3	-
Lewis	-	-	-	-	-	1
Madison	1	8	7	10	17	12
McNairy	-	-	-	6	5	2
Shelby	-	6	6	13	18	29
Tipton	-	2	4	5	11	3
Weakley	-	-	-	1	-	-
Total Positive	186	493	652	636	813	741

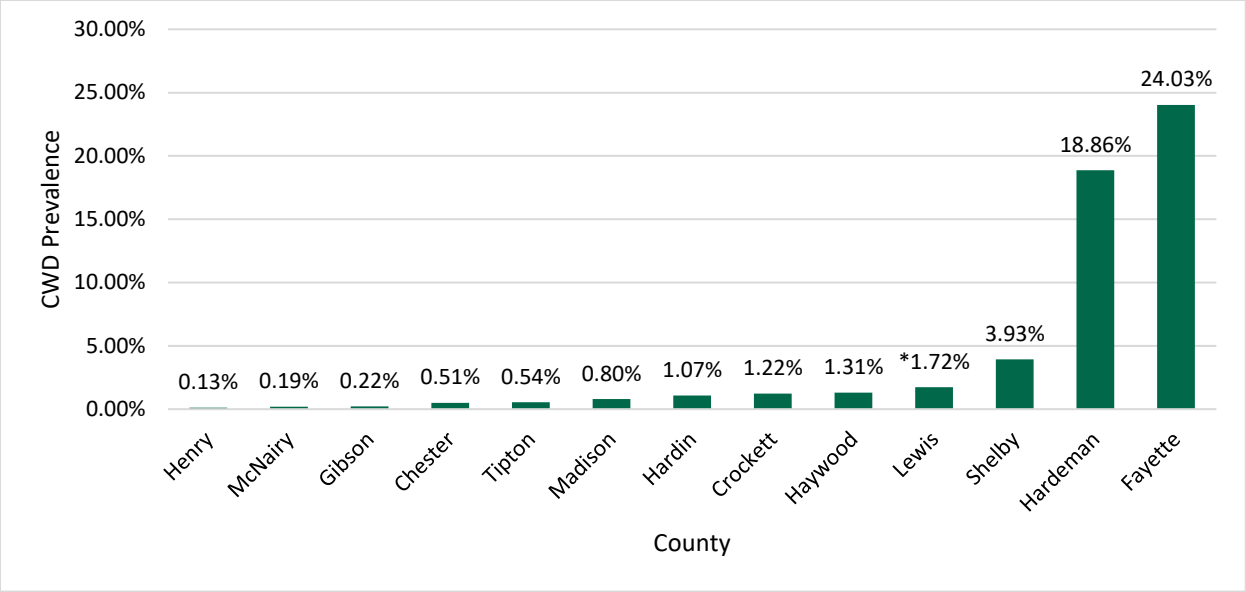

*Figure 5. CWD prevalence for Tennessee counties with positive detections during the 2023–24 sampling year. *All county prevalences are considered accurate representations given the sample size except Lewis County. The prevalence in Lewis County was calculated based on a small total sample size (58). Additional sampling is needed to determine an accurate prevalence in Lewis County.*

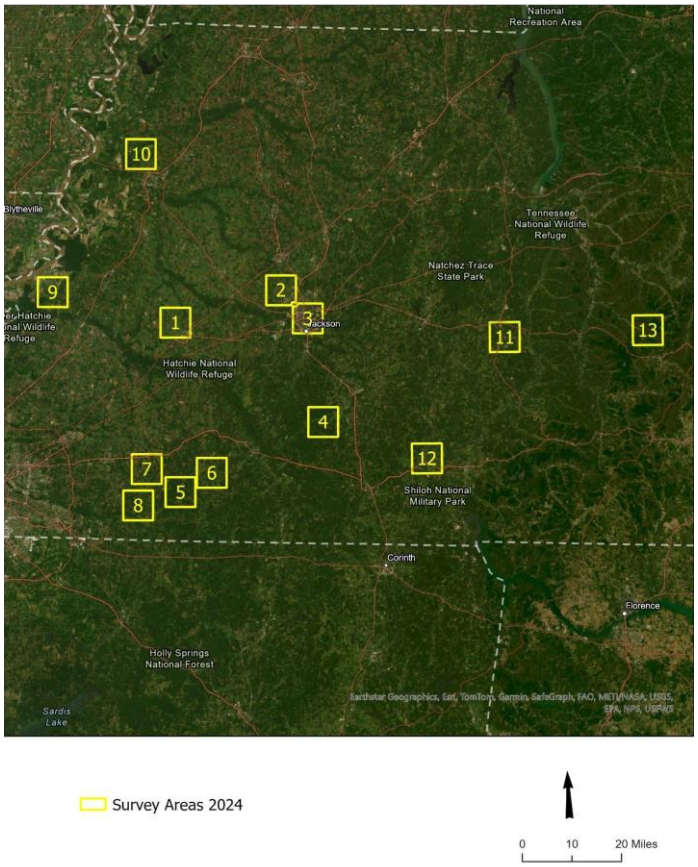

Figure 6. Areas surveyed across western and middle Tennessee in relationship to occurrences of chronic wasting disease. Figure adapted from project report "Monitoring White-tailed Deer Population Density in Unit CWD in 2024," Tennessee EcoSystems Testing Solutions, LLC.

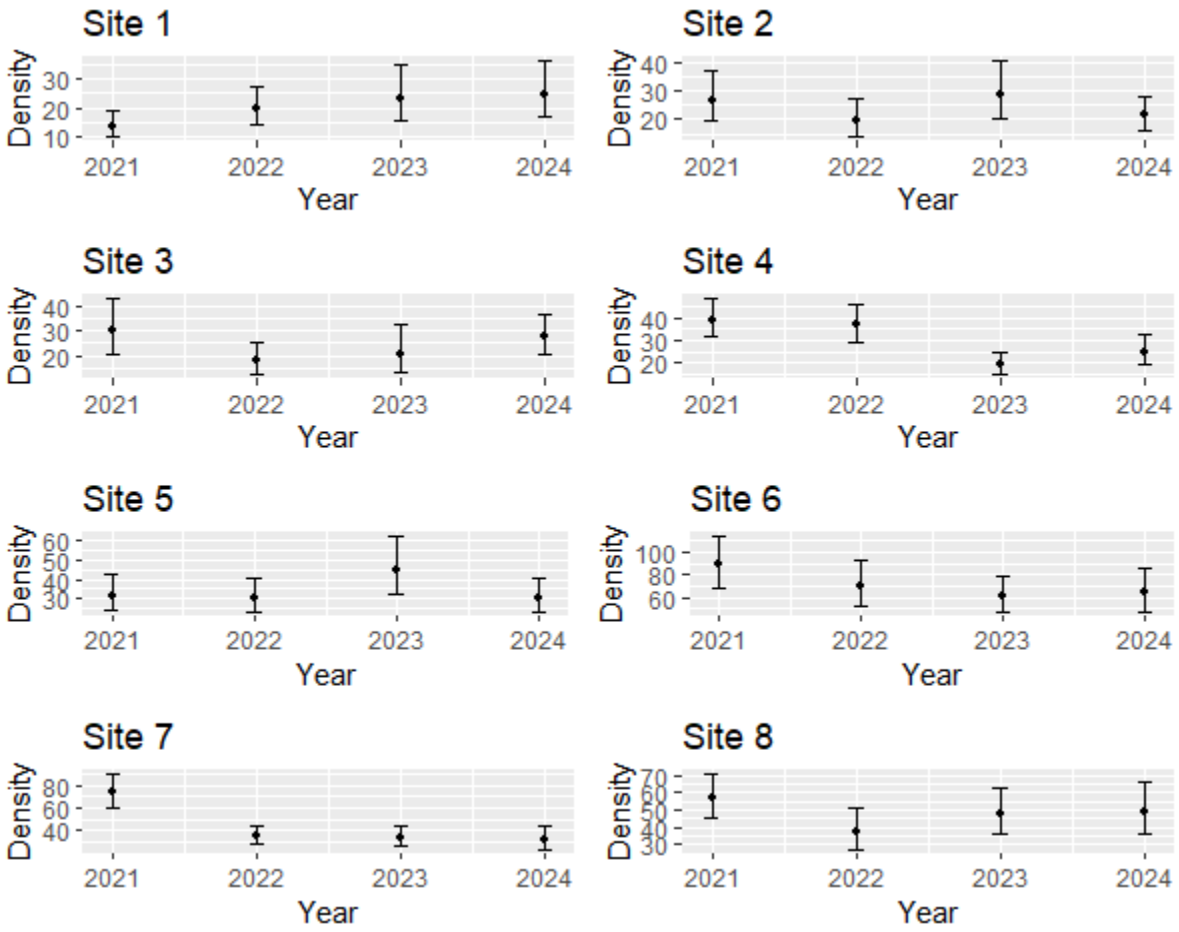

Figure 7. Trends of deer density (number per square mile) with 95% confidence intervals by year and site for sites surveyed across four years (adapted from TWRA Technical Report 24-2).
Site 1: Haywood County
Site 2: Madison County
Site 3: Madison County
Site 4: Chester County
Site 5: Fayette County
Site 6: Hardeman County
Site 7: Fayette County
Site 8: Fayette County

Management

A CWD Management Zone for carcass transportation and wildlife feeding restrictions was implemented prior to the start of the 2023 deer hunting season in efforts to simplify regulations while continuing to reduce the risk of disease spread from human activities (TWRA Rule Chapter 1660-01-34). With the addition of Lewis County following detection of the disease in November of 2023, the CWD Management Zone includes a total of 23 counties (Figure 7). Only approved carcass parts may be moved out of the CWD management zone. Approved parts include deboned meat, antlers, antlers attached to cleaned skull plates, cleaned skulls, cleaned teeth, finished taxidermy and antler products, and hides and tanned products. Deer carcasses (or any approved or unapproved parts) may be moved within and between counties of the CWD management zone. Carcasses from outside the CWD management zone may be moved into the zone, but only approved parts can exit the zone thereafter. Within the CWD management zone the placement of grain, salt products, minerals, and other consumable natural and manufactured products is prohibited (some exceptions apply).

No changes were made to deer hunting units, season dates, or bag limits for the 2023–24 season (Figure 8).

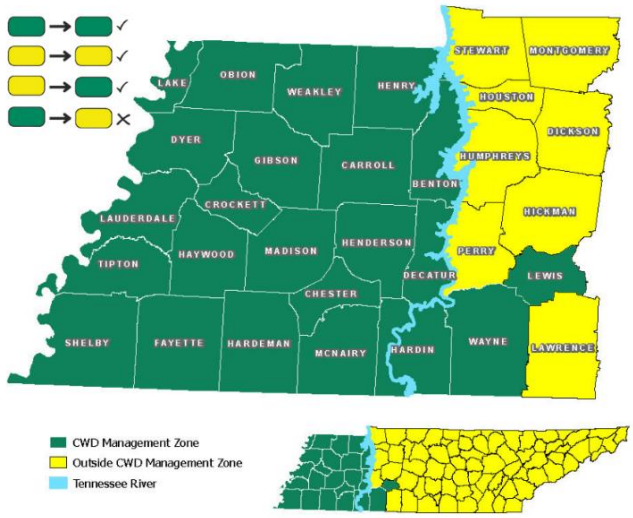

Figure 8. Map of CWD Management Zone for carcass transportation and wildlife feeding restrictions.

Figure 9. Map of deer hunting units effective during the 2023–24 season.

The August hunt occurs at the end of the month (Friday through Sunday) and is valid statewide for private lands and archery only. This hunt is an antlered only hunt with a limit of 1 per day. Within Unit CWD, guns and muzzleloaders are allowed and select public lands are additionally open for hunting. The 2023 August hunt harvest total in Unit CWD (12 counties) was 135, down from the 2022 August hunt harvest total of 160 (Figure 9).

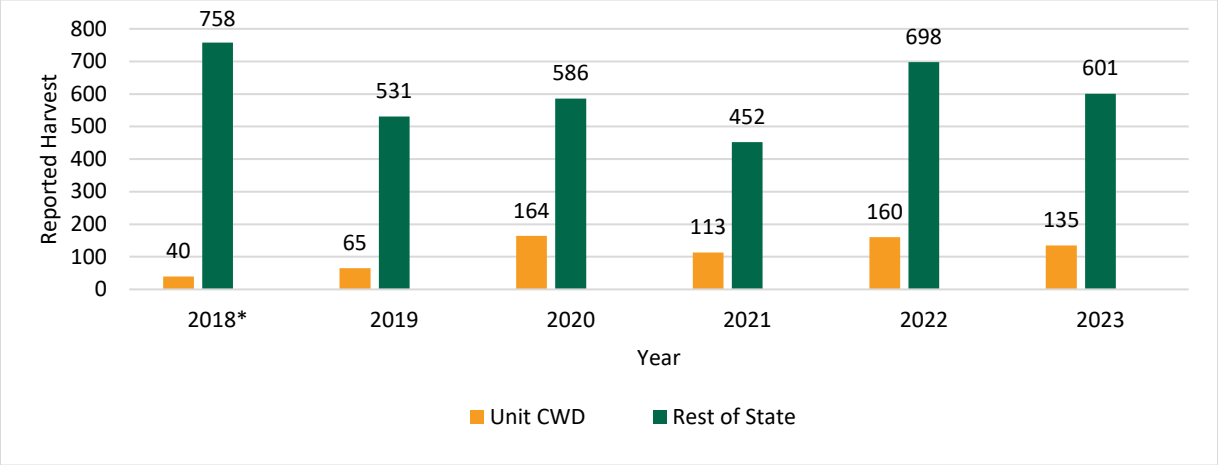

Figure 10. Comparison of reported deer harvests in Unit CWD and all other deer hunting units during the August hunt 2018–2023.
**2018 was the first year of the August hunt. CWD was not identified until December of that year. Unit CWD has changed over time and counties have been added.*
2018–2019 Unit CWD created in December 2018 after discovery of CWD in Fayette, Hardeman, Madison Counties. The 2018 data represents archery only data for Unit CWD (Fayette, Hardeman, Madison, Shelby, Tipton, Haywood, Chester, McNairy).
2019–2020 Unit CWD Fayette, Hardeman, Madison, Shelby, Tipton, Haywood, Chester, McNairy. Muzzleloader was added as a method of take during early archery.
2020–2021 Unit CWD Original eight counties plus Crockett, Gibson, and Lauderdale. Rifle was added as well as all other legal methods of take.
2021–2022 Unit CWD Henderson was added. No regulation changes for early August hunt.
2022–2023 Unit CWD 12 Counties. No regulation changes.
2023–2024 Unit CWD 12 Counties. No regulation changes.

The Unit CWD Earn-A-Buck Program remained in effect during the 2023–24 deer season. This program is aimed at reducing deer densities in the counties most heavily impacted by CWD. A hunter who harvests one antlerless deer within Unit CWD and submits it for CWD testing may harvest a buck in addition to the statewide limit of 2 (Unit CWD limit of 3). The number of bucks that can be earned is unlimited. Bucks earned must be taken during the concurrent legal season and must be harvested within Unit CWD. During the 2023–24 season, a total of 3,963 additional bucks were earned through the Unit CWD Earn-a-Buck program. A total of 1,404 hunters earned one buck, 490 hunters earned 2 bucks, 183 hunters earned 3 bucks, and 186 hunters earned 4 or more bucks.

The Replacement Buck Program allows any hunter who harvests a buck that tests positive for CWD to harvest an additional buck during the legal season in the same county in which they harvested the original animal. This regulation applies statewide regardless of the current CWD status of the county. The positive buck does not count towards the hunter's statewide limit of 2 (Unit CWD limit of 3).

Replacement bucks can carry over to the next legal season. A total of 546 replacement bucks were issued for those who harvested a CWD positive buck in the 2023–24 season.

Hunter utilization of Unit CWD Earn-a-Buck Program and Replacement Buck Program for the 2023–24 season was analyzed within Unit CWD counties. Harvest of each Earned or Replacement Buck is not specifically designated to one of these two programs, therefore the combined use of these programs was inferred by the number of hunters which harvested more than the Unit CWD antlered deer limit of three. A total of 105 hunters harvested four or more antlered deer within Unit CWD.

The Fight CWD Incentive Program was initiated during the 2021–22 season to encourage hunters to continue hunting in CWD affected counties and to offset the costs associated with processing a CWD-positive deer. Hunters who harvested a positive deer or received a result of "untestable" received a $75 voucher for use at a participating processor. A total of 770 vouchers were issued during the 2023–24 season with 248 ($18,600) vouchers redeemed prior to the end of season. These vouchers may carry over to the following season. Therefore, vouchers redeemed this year may have been gifted during either the 2022–23 season or the 2023–24 season, while any unused vouchers issued in the 2023–24 year may be redeemed in the 2024–25 season. Additionally, hunters who harvested 2 or more positive deer received an annual sportsman's license. A total of 100 annual sportsman licenses valued at $165 ($16,500) each were issued after the 2023–24 hunting season. Licenses can be gifted to another individual should the recipient hold a lifetime license. The Fight CWD Incentive Program was jointly funded by the Tennessee Wildlife Resources Foundation.

The Targeted Removal Program continued for its fourth year of implementation. Through a partnership with USDA APHIS Wildlife Services, deer were removed from within 3 miles of several "spark" locations along the periphery of the known disease distribution. The program began after the close of deer hunting season and ended prior to the start of turkey hunting season. Program operations have continued in three counties (Hardin, Henry, Madison) with a new location being added in Lewis County in 2024. In total, 86 deer were removed. CWD has not been detected in any removed deer thus far. However, reducing deer densities through this program can still be an effective management action to decrease the risk of disease transmission along the periphery, while also providing additional samples for CWD monitoring.

The CWD Landowner Disease Management Program continued for its fourth year of implementation. All landowners in Fayette and Hardeman Counties and those landowners within 3 miles of a known positive in all other counties are eligible to obtain a permit to continue to remove deer post-deer season. Landowners in the periphery are required to submit deer for CWD testing. Permits are issued from the close of deer hunting season and are valid until the start of turkey season. In 2024, approximately 134 permits were issued. The total number of deer removed under the permits is pending for 2024 as landowners have until the end of the calendar year to report the number of deer removed.

Unit CWD deer harvest throughout the entire season totaled 21,686 with 11,678 being antlered and 9,997 being antlerless (11 deer no sex reported). Overall, harvest was down from 23,670 deer harvested in Unit CWD during the 2022–23 season (Figure 10). A total of 9,739 hunter harvested deer were sampled from within Unit CWD during the 2023–24 season. A fifteen-year summary of hunter harvest, CWD sampling, and percent positives for Fayette and Hardeman Counties are represented in Figures 11 and 12.

An Adaptive Harvest Management (AHM) framework for deer management in Tennessee was in development during the project period. Input from stakeholders was collected during development and showed liberal regulations aimed towards CWD management were not popular. This sentiment was reflected in the harvest data showing harvest has been slightly declining including in Fayette and Hardeman Counties at the core of the CWD area (Figures 11 and 12), as well as the number of hunters. Furthermore, the average deer per hunter has remained the same since CWD was detected (1.8), indicating that additional opportunities in Unit CWD and Agency marketing efforts were not increasing harvest in CWD affected areas. For those reasons, the recommendation to remove *Unit CWD* as a designation was made by TWRA and voted on by the TFWC. The counties within Unit CWD will be incorporated into a larger unit with bag limits that match statewide limits for the 2024–25 season. Within the new AHM framework, deer hunting regulations are still liberal while harvest incentive programs and landowner permit programs remain available, continuing the opportunity for hunters and landowners to partner with TWRA to help manage CWD.

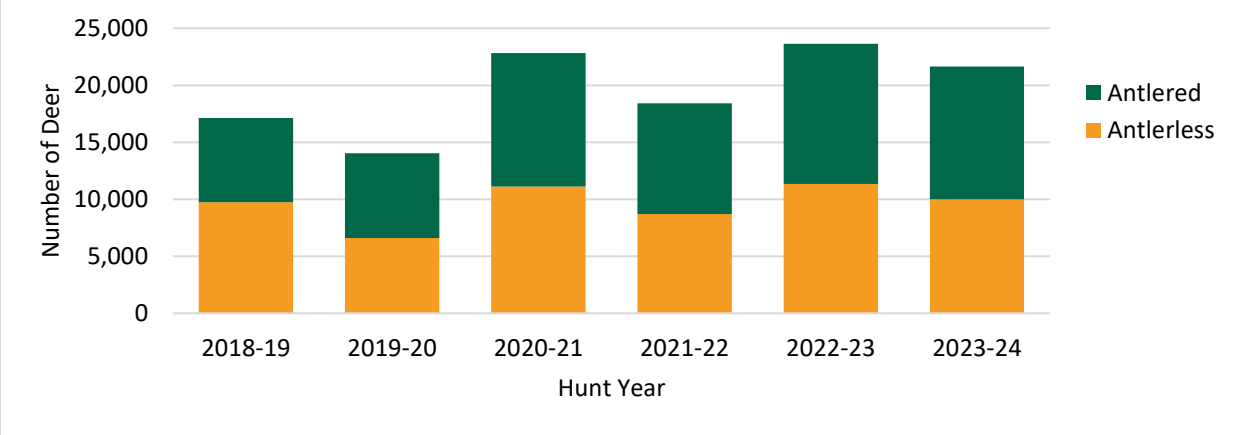

Figure 11. Reported harvest for Unit CWD (3-year average = 21,231). Unit CWD 8 counties (2018–19), 11 counties (2020–21), 12 counties (2021–22 through 2023–24).

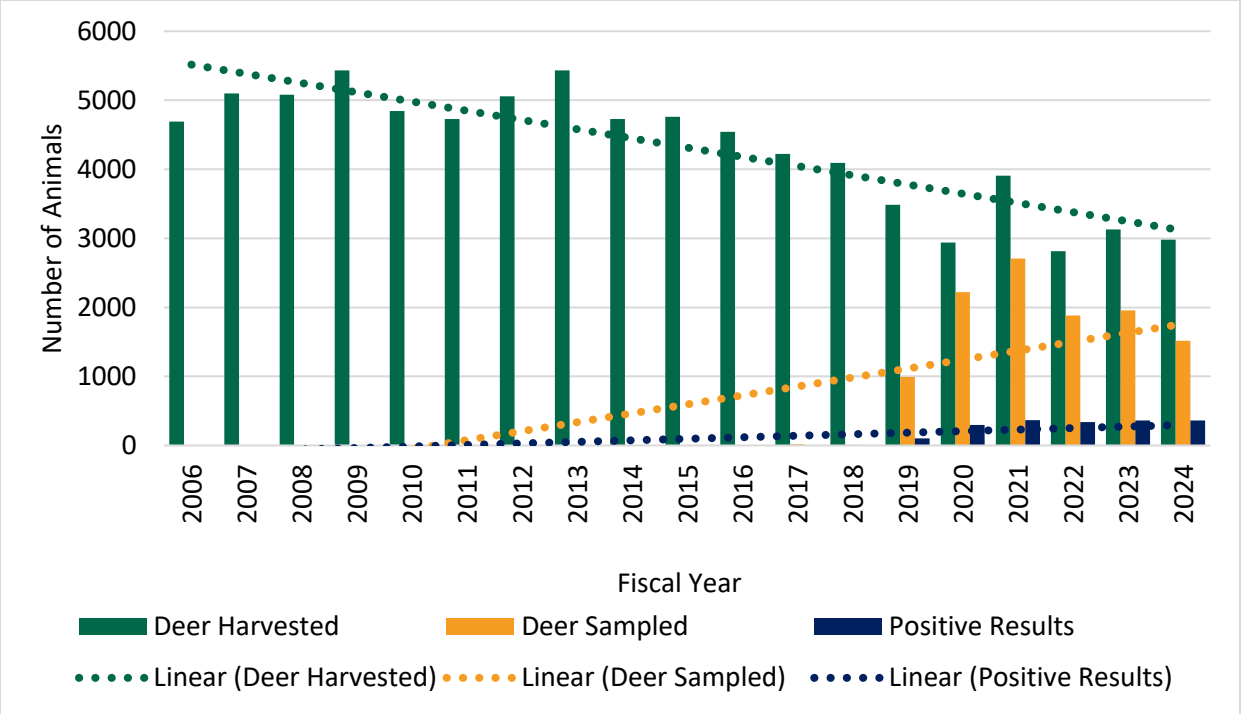

Figure 12. A fifteen-year summary of samples from hunter harvested deer in Fayette County.

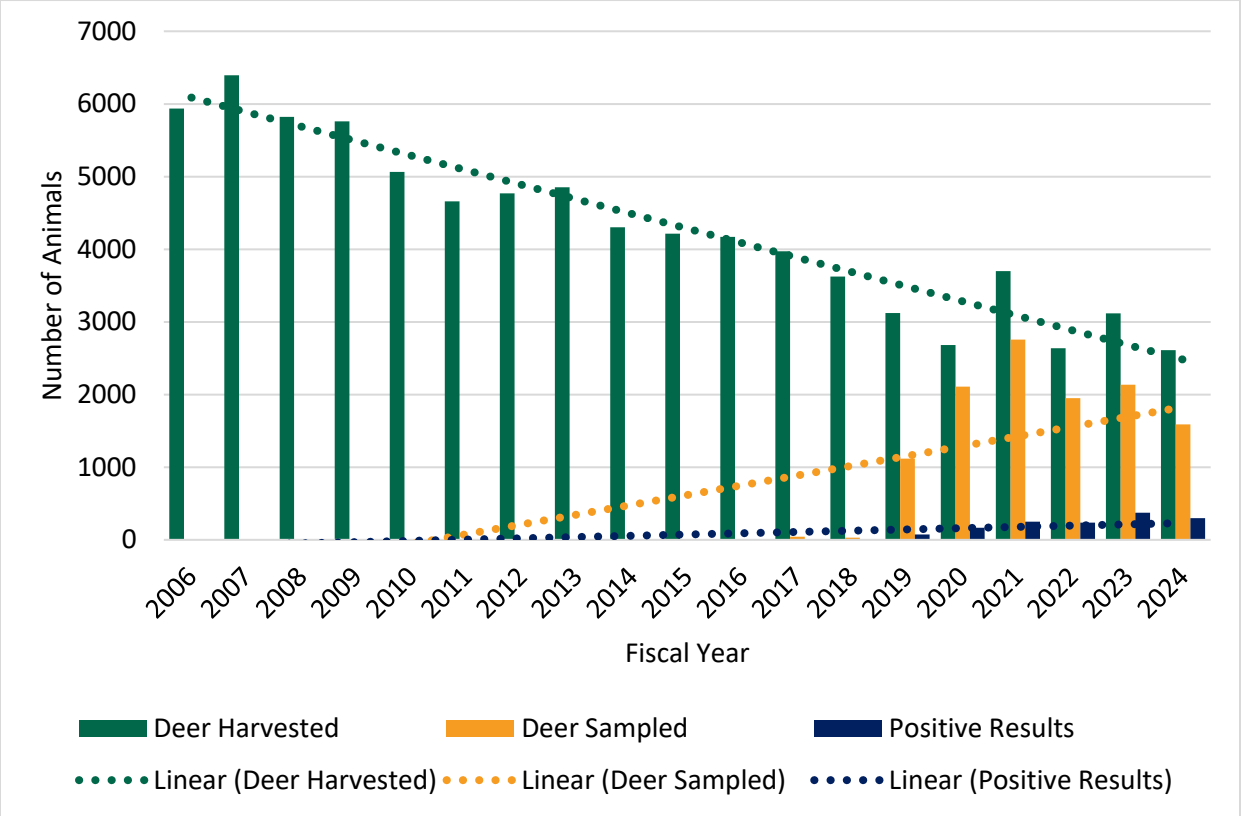

Figure 13. A fifteen-year summary of samples from hunter harvested deer in Hardeman County.

Research

Trained Canine Detection of CWD Infection. TWRA partnered with Colorado State University to analyze the ability of trained dogs to detect the change in chemical signature of CWD-infected white-tailed deer samples. Phase 1 of the project (trained canine detection of CWD infection), which began in 2020, has been completed and researchers have had success in training dogs to successfully identify fecal samples from CWD-infected deer in both laboratory and controlled field settings. Phase 2 of the project (trained canine detection of fecal sample odor and whole-body odor associated with CWD infection in white-tailed deer and other cervid species) began in 2021 and focused on laboratory and field trials of trained dogs to identify CWD infections by transitioning between tissue types. Between the first two phases of the project, dogs were over 80% successful in correctly identifying CWD infection in the various sample types and settings. Phase 3 of the project (field evaluation of trained canine detection of environmental contamination caused by CWD infection) began in 2022 and focuses on laboratory and field trials of trained dogs to identify CWD in soil samples. The dogs were highly successful in correctly identifying CWD infection in soil samples (95% accuracy). A manuscript of the project has been accepted by PLOS ONE (July 2024) the publication is forthcoming. Funding for this research is provided by USDA-APHIS.

CWD Prion Accumulation Dynamics at Bait Sites for Free-ranging Deer. TWRA partnered with the University of Wisconsin, Madison to understand the dynamics of prions located in the soil at historical and newly established bait sites. Soil samples were taken periodically at each of the bait sites and prion activity was measured by RT-QuIC. Modeling analysis will describe the correlation between deer behavior, time at bait sites, soil properties, and prion disposition in the environment. Bait sites that were selectively sealed will be analyzed for prion dissipation as a function of time, precipitation, and soil properties. Findings showed 32 of the 49 (65%) mineral sites in the CWD zone established prior to the regional CWD outbreak, served as foci of environmental PrP^{CWD} contamination and detection of PrP^{CWD} in soils from these artificial mineral sites was dependent on site-specific management efforts. A poster presentation of the work was presented at the 4th International CWD Symposium in May 2023, and the abstract was published in the agenda book (4th International Chronic Wasting Disease Symposium Agenda 2022). The first draft of the manuscript for objective 1 is complete and results from camera trap analysis and modeling are forthcoming. Funding for this research is provided by USDA-APHIS.

Fire as a tool for remediation of prion-contaminated landscapes. TWRA partnered with University of Minnesota to investigate the potential of prescribed burning as a remediation tool for prion-contaminated soils through a highly controlled laboratory study. The study began in 2023 and investigates multiple variables that could affect prion activity in soils including burn temperature, soil depth, time since burning, repeated cycles of burning, and soil textural class. Contaminated soil has been generated from a treated pool of CWD brain homogenate with an extremely high titer and naturally contaminated soil has been obtained from a CWD-positive carcass site. Spiked soils were loaded into steel columns and heated at the surface opening with a 600W branding iron. Temperatures of ~400-600C were achieved at the surface, as measured by an infrared thermometer. Burn duration was held constant at 30 minutes for each cycle. Preliminary findings show that after one cycle, a substantial reduction in extracted seeding activity is seen in the uppermost depth. After two cycles, seeding activity is absent in the uppermost layers. Recovered seeding activity in all lower depths is largely consistent across all burn cycles and is comparable to the original spike, implying little to no prion inactivation. Funding was provided by USDA-APHIS.

Surveillance Optimization Project for Chronic Wasting Disease (SOP4CWD). Led by Cornell Wildlife Health Lab, the SOP4CWD is a collaborative project aimed to improve surveillance of CWD in white-tailed deer across eastern North America. The goal is to provide data driven management recommendations for state agencies via an open science framework developed through regional scale data collection. TWRA began migrating CWD data to the Data Warehouse supported by SOP4CWD in 2023 and is making use of the Data Warehouse tools for executing models for surveillance quota development. Furthermore, TWRA has provided sampling data to support many research questions of the SOP4CWD. Most recently, data provided supported development of a machine learning technique to help predict where CWD may appear on a county scale (Ahmed et al. 2024).

Utilizing a Novel Genetic Resource to Inform Management of CWD. TWRA is participating in a Multistate Conservation Grant Program study by providing 198 lymph node samples from Tennessee CWD positive white-tailed deer to researchers at the University of Wisconsin-Milwaukee. Through the project, three cost-effective panels were created (i.e., a high-density array, a medium-density array, and a GT-seq panel) to understand the genotypes of white-tailed deer and the spatial connectivity and distribution of CWD-associated variants. Preliminary data from the most cost-effective of the three, the Genotyping-in-Thousands by Sequencing (GT-seq) panel, shows that the GT-seq panel works well for genotyping Tennessee white-tailed deer as it can discriminate between sexes and individuals, and loci showed a high level of genetic diversity. The inferred ancestry shows three possible genetic clusters with no apparent geographic clustering. This research is ongoing with future analysis focused on spatial connectivity on a broader scale and investigations into CWD-associated variants. Project updates can be found at https://storymaps.arcgis.com/stories/9794d395588b45d7a055e86bf42d602b.

UT-USDA SARS-CoV2 Study in White-tailed Deer. Report prepared by Justin Kosiewska and Jacob Wyrick UTIA. PI's Mark Wilber, Lisa Muller, Dan Grove. The goal of the study is to identify fine scale disease transmission pathways for SARS-CoV2 amongst deer. The study site at Ames Plantation UT Research and Education Center and Lone Oaks. Given the location is within a high prevalence CWD enzootic area, information about CWD transmission may also be gleaned from the study. Additional funding in year two of the study allowed for vaginal implant transmitters deployment and a fawn collaring and survival study. To date there have been 80 adult deer (25 male/55 female) captured with 74 sampled (24 male/50 female) and 66 collared (18 males/48 females). There have been a total of 24 mortalities since the start of the project related to immediate capture related events and post-release mortality. Ages of deer have been as follows: Females- 2yo= 7, 3yo= 12, 4yo= 13, 5yo=15, unknown=1, Males-2yo= 6, 3yo= 9, 4yo= 1, 5+yo= 2. Pregnancy specific protein B testing was conducted and 43/47 animals were pregnant at the time of capture. To date 4 fawns have been collared. Additional serology and parasitology samples were collected and analyzed from study animals to assess overall herd health. Necropsies have been conducted on all mortalities that have been able to be retrieved. 11/22 of the mortalities were CWD positive via RPLN CWD ELISA. For deaths not related to capture, outside of fall hunter harvest, predation has been the main cause of death. TWRA field personnel provided technical assistance during ground, helicopter, and fawn captures.

Outreach and Communications

A CWD informational public meeting was held in February 2024 in Lewis County in conjunction with UT Extension in response to the detection of CWD there. A presentation outlining CWD information, regulations, and incentive programs was provided followed by a question-answer session. Over 20 TWRA staff were present and over 40 members of the public attended the meeting.

CWD informational publications and CWD-related publications included regularly updated information added to the TWRA CWD webpages (www.CWDinTennessee.com), the TWRA 2022–23 annual report, and the following press releases:

- TWRA Detects CWD in Lewis County (November 2023)
- Lewis County Chronic Wasting Disease Meeting Set for February 27, 2024 (February 2024)
- 2024-25 Hunting and Trapping Proposals Presented to Commission at March Meeting (March 2024)
- 2024-25 Hunting Regulations set at April Commission Meeting (April 2024)

CWD information and event notifications are also shared through social media posts. Headlines from CWD-related social media posts on the TWRA Facebook account are listed below.

- New Area for CWD Carcass Transportation & Feeding Regulations... (August 2023)
- We hope everyone has a safe and successful opening day. In Middle Tennessee, successful Wayne County hunters are encouraged to visit one of the CWD drop-off freezer locations listed in the photos... (September 2023)
- Just a friendly reminder to all hunters headed to the woods this weekend and especially near Unit CWD... (November 2023)
- The Tennessee Wildlife Resources Agency and community volunteers will hold an Old School Deer Check-in at the Waynesboro City Park... (November 2023)
- We enjoyed meeting those who attended the “Wayne County Old School Check-in” (November 2023)
- Wayne County hunters, on opening day of the statewide Gun/Muzzleloader/Archery season, November 18, come by the Waynesboro City Park and visit us... (November 2023)
- Region 4 Deer Checking Stations... (November 2023)
- TWRA Detects CWD in Lewis County... (November 2023)
- Deer Season Wrap-up. As the statewide deer season closed on January 7, TWRA would like to remind hunters there are a few deer units with hunts open this month... (January 2024)
- Lewis County hunters and landowners, please join us in Hohenwald, TN... (February 2024)

A Tennessee WildCast (podcast) episode was recorded and released prior to the start of the 2023–24 hunting season (TN WildCast 359). The episode provided an updated information on deer seasons and CWD management zone carcass transportation and feeding restrictions.

A CWD sample collection refresher training was held for law enforcement staff in region 2. The TWRA CWD Training Manual was updated for staff as reference material.

Interagency CWD communications are ongoing through a CWD briefing call for partner agencies within the state. This briefing call occurs monthly during the hunting season and additional updates are provided by email as needed. The CWD Field Coordinator, Deer Program Coordinator, Wildlife Veterinarian, and Wildlife Health Program Coordinator, participate in CWD meetings that include representatives from state agencies in the southeastern region for the purpose of CWD surveillance updates and discussions on management efforts. The Wildlife Health Program Coordinator and the Wildlife Veterinarian provided CWD updates for the 2024 Interagency Upper Cumberland Kentucky-Tennessee Wildlife Meeting and for the Big South Fork and Obed Wild and Scenic River Science Meeting (Spring 2024). A CWD update was also presented at the Tennessee One Health Committee meeting (Spring 2024).

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