

The Cost of Combatting Chronic Wasting Disease

Putting a dollar amount on annual CWD expenses by state wildlife agencies

By Noelle E. Thompson and J. Russ Mason

Evidence suggests that Chronic Wasting Disease (CWD) may present an existential threat to some cervid populations, particularly in the western United States ([DiVivo et al. 2017](#)). Elsewhere, this disease has the potential to suppress age structure and to affect other demographic factors ([Edmunds et al. 2016](#)). For these reasons, and because of the potential impacts of CWD on hunter recruitment, retention, and reactivation ([Riley et al. 2003](#)), CWD surveillance and management are the top priority of most state fish and wildlife agencies (Mason 2020).

This priority notwithstanding, CWD continues to spread, with little evidence that current management regimes are having positive impacts ([Escobar et al. 2019](#)). Since the first reported case in 1967, CWD now is present in 30 states, four Canadian provinces, three European countries and in South Korea ([USGS 2022](#)). Although there is no direct evidence suggesting that CWD can infect humans, there is accumulating evidence that this may be possible ([Hannaoui et al. 2022](#)), particularly as the number of CWD strains and the number of exposures continue to expand.

Apart from impacts to herd health and hunter participation, CWD also presents an economic challenge to state wildlife agencies. Monitoring for the presence and spread of CWD depends primarily on the collection and testing of hunter-harvested deer samples, all of which comes at a cost. Moreover, many hunters view CWD-testing as a food safety test and the location and quantity of voluntarily submitted samples rarely matches up with an agency's surveillance needs. Nearly all state agencies rely on deer license sales for a majority of their hunting license revenue ([Casellas and Christopher 2022](#)). The Association of Fish and Wildlife Agencies (2017) reported \$5.63 billion as the collective annual budget of state wildlife agencies with over 58% of that budget (\$3.3 billion) generated by hunting and fishing activities. According to Southwick Associates (2021), deer hunting alone generated approximately \$23.4 billion in economic contributions in 2020 and the U.S. Fish and Wildlife Service reports that 79% of all U.S. hunters hunt deer (2016). CWD could represent a 'tipping point' concern, especially when unsubsidized testing costs are passed along to hunters, which is becoming an increasingly popular practice and is being conducted by a handful number of states already.

To date, and for a variety of reasons, most wildlife agencies have not quantified the cost of CWD surveillance and management. A better understanding of these costs is important, if for no other reason than most agencies are diverting limited revenue from other conservation activities to cover disease surveillance and management. Here, we present the results of a national survey that we conducted with help from the Association of Fish and Wildlife Agencies

to quantify the total cost (e.g., sample collection and disposal, testing, salaries, supplies, logistics) associated with this disease.

We began by asking wildlife administrators in all 50 states to summarize costs associated with CWD in 2021. We used a modified template originally developed by the Colorado Department of Parks and Wildlife. If a state had yet to detect CWD, we asked the agency to provide us with all known costs associated with their CWD surveillance efforts. If a state had detected CWD in free-ranging cervids, we also asked them to provide financial data associated with the cost of management. The costs reported were ultimately up to the agencies' discretion but we asked for all costs associated with CWD surveillance, management, and information and education.

Some states had difficulty providing the requested information because CWD related costs were rolled into other accounting categories. Nevertheless, we were able to collect cost information from 32 state wildlife agencies. Sixteen of these had detected CWD in free-ranging cervids. Thirteen of the remaining 16 agencies had not detected CWD in free-ranging cervids. Of the remaining three states, Louisiana and North Carolina were treated as states without CWD in wild cervids although the disease was detected in both states after the 2021-2022 season. We classified New York as a CWD-negative state because, to date, it is the only state that appears to have eradicated CWD from its' free-ranging herd, not having detected a free-ranging case since 2005.

As stated, the level of detail reported to us varied among states. Some were able to provide detailed budgets and expenditures while others were only able to provide overall annual cost estimates. Regardless, we extracted total CWD expenditures and the total number of samples tested for CWD for the 2021 fiscal year from each of these agencies. Using these total expenditure values, we calculated an average overall cost per CWD sample tested (Table 1).

Total CWD expenditure in Fiscal Year 2021 varied dramatically among the 32 agencies, with a low of just under \$8,000 spent by the Oklahoma Department of Wildlife Conservation and a high of \$2.1 million spent by the Texas Department of Parks and Wildlife. Across all 32 agencies, the average annual expenditure for CWD was just under \$503,000 for the most recent fiscal year. However, when agencies with or without CWD were compared, average annual expenditures varied considerably. For those agencies with disease, the average annual cost was \$773,000, whereas for those without disease, the cost was \$220,000.

The average total number of samples tested by the 32 state agencies in 2021 was 4370; however, the averages between agencies with and without CWD varied considerably. Wildlife agencies with CWD tested nearly eight times as many samples as agencies that had not detected CWD (7094 vs. 1645, respectively). For agencies with CWD, the total number of samples tested ranged from 500 to 18,920. For agencies without CWD, the number of samples ranged from 104 to 7548.

The most dramatic variation among agencies was the average cost per sample tested. Average costs varied from \$29 to \$560, with the average for all agencies being \$142. Despite the

average cost per CWD sample tested varying considerably among the individual agencies, the difference in average cost per sample between the two categories of agencies was only \$18. Average cost of each CWD sample tested for agencies with CWD was \$133 versus \$151 for agencies without CWD.

To investigate these costs further, we examined the number of samples tested, total CWD expenditure, and number of years managing CWD for each wildlife agency. Not surprisingly, for agencies with CWD, total expenditures were significantly correlated with the number of samples tested ($t=6.9$, $df=14$, $p=0.0001$, correlation = 0.88). However, there was no significant relationship between expenditures and years since CWD detection ($t=1.2$, $df=14$, $p=0.25$, correlation = 0.31). Similarly, for agencies without CWD, there was a strong and significant relationship between expenditures and number of samples tested ($t=7.2$, $df=14$, $p=0.00001$, correlation = 0.89).

Without question, CWD surveillance and management is expensive and may be unsustainable if for no other reason than that the cost per sample for CWD testing is typically more than twice the revenue generated through the sale of a resident deer hunting license (Table 1). Further, overall costs increased dramatically once the disease was detected. Importantly, we found no indication that ‘practice makes perfect’: CWD-positive states did not improve over time in containing costs. These results unambiguously suggest that ‘prevention is worth a pound of cure’. Strong and pervasive investments in communications, and perhaps also the implementation of enhanced biosecurity (e.g., carcass transport and disposal regulations, limits on baiting and feeding, etc.) are recommended in states that have not detected CWD.

More broadly, CWD is just one among many emerging wildlife diseases with landscape level implications for wildlife population health as well as the ‘user-pay’ model of wildlife conservation. For this reason, state wildlife agencies have identified wildlife disease, and CWD in particular, as the most important existential challenge confronting agencies in the 21st century (Mason 2020). Many agencies remain unequipped or under-equipped to meet this challenge. New funding models that adequately support disease surveillance and management are essential in order to protect the species and habitat restoration achievements of the 20th century.

Table Caption: We list the total expenditures for CWD activities, total number of samples tested for CWD, and the resident hunting license and deer permit cost reported by each state wildlife agency for the 2021-2022 fiscal year. We calculated the average cost per CWD sample by dividing total CWD expenditures by the total number of samples tested that year. We also report the number of years each agency has been dealing with CWD since its initial detection within its state.

State	Total CWD Expenditures	Total CWD samples tested	Average cost per CWD sample	Resident hunting license and deer permit cost	Years with CWD
Arizona	\$138,588	1250	\$110.87	\$127	NA
Colorado*	\$1,108,380	13000	\$85.26	\$52.60	40+
Connecticut	\$33,955	436	\$77.87	\$60	NA
Florida	\$421,955	1650	\$255.73	\$22	NA
Georgia	\$175,000	1500	\$100.00	\$65	NA
Idaho	\$224,638	2680	\$83.82	\$40.50	1
Illinois	\$1,229,889	8618	\$142.71	\$38.50	20
Indiana	\$131,405	641	\$205.00	\$59	NA
Iowa	\$742,800	5277	\$140.76	\$55	9
Kentucky	\$1,149,158	7548	\$152.25	\$62	0
Louisiana	\$168,039	300	\$560.13	\$29	NA
Maine	\$57,500	500	\$115.00	\$26	NA
Maryland	\$64,435	710	\$90.75	\$24.50	12
Michigan	\$1,341,081	8000	\$167.64	\$31	7
Minnesota	\$1,380,000	14786	\$93.33	\$34	11
Mississippi	\$404,539	6037	\$67.01	\$60	4
Nevada	\$34,671	268	\$129.37	\$68	NA
New Hampshire	\$21,237	400	\$53.09	\$66.50	NA
New York	\$228,963	2967	\$77.17	\$32	NA
North Carolina	\$481,606	6885	\$69.95	\$50	NA
North Dakota	\$228,000	3000	\$76.00	\$51	13
Oklahoma	\$8,000	104	\$76.92	\$45	NA
Oregon	\$93,756	1200	\$78.13	\$63	NA
Rhode Island	\$27,543	300	\$91.81	\$34	NA
South Dakota	\$227,213	1225	\$185.48	\$65	21
Tennessee	\$230,013	8000	\$28.75	\$66	4
Texas	\$2,100,000.00	14284	\$147.02	\$25	10
Utah	\$201,174.62	1566	\$128.46	\$64	20
Washington	\$98,737	373	\$265.00	\$44.90	NA
West Virginia	\$232,096	500	\$464.19	\$55	17
Wisconsin	\$1,728,153	18920	\$91.34	\$84	20
Wyoming	\$929,691	6900	\$134.74	\$42	40+
Average	\$502,733	4494	\$142.92		

*Highlighted agencies had CWD in free-ranging cervids prior to the 2021-2022 hunting season

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Image Captions

Image 1: Hunter-harvested white-tailed deer heads lined up on the Michigan Department of Natural Resources' laboratory floor as staff prepare to extract the retropharyngeal lymph nodes from each head to test for chronic wasting disease.

Image 2: Michigan Department of Natural Resources staff extracting the retropharyngeal lymph nodes from hunter-harvested deer heads to test for chronic wasting disease.

Brief Bios

Noelle E. Thompson is a Ph.D. candidate in the Fisheries and Wildlife Department at Michigan State University and the Deer and Chronic Wasting Disease Program Coordinator for the Kentucky Department of Fish and Wildlife Resources.

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