

Results of Chronic Wasting Disease Survey for  
Hunters in Virginia



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## Executive Summary

This project represents the first comprehensive CWD human dimensions study of hunters in Virginia. The Virginia Department of Wildlife Resources (DWR) relies on hunters to achieve deer-population goals. This includes harvest and surveillance goals in CWD disease management areas (DMAs). Support for DWR efforts and decisions to change or adapt hunting behaviors depends on hunters' risk perceptions of CWD and their perceptions of DWR's ability to effectively management wildlife. To assess hunters' risk perceptions of CWD, and their perceptions of DWR management, support for management strategies, and preferred levels of action to manage DWR, we surveyed hunters across Virginia. We focused the survey's distribution in and near DMAs, where CWD is known to occur. To attain accurate and representative results for hunters in each DMA, we set out to attain 2,000 survey responses with a majority of responses coming from hunters in DMAs. We received a total of 2,722 responses, 55.2% were from hunters residing in a DMA, 20.9% were hunters residing in counties adjacent to DMAs, and 23.9% were from hunters residing elsewhere in Virginia. Results of this study indicate that:

- A majority of hunters agree that DWR provides important, timely, and truthful information about CWD in Virginia.
- A majority of hunters perceive DWR's efforts to manage CWD as appropriate, which included DWR's efforts to restrict carcass transportation and increasing testing of harvested deer.
- Hunters were generally supportive of management strategies that introduce more opportunities to harvest deer, new seasons, longer seasons, and increased bag limits in affected areas.
- Hunters perceived CWD as a higher risk to deer than people, but hunters reported that where they hunt and how much deer meat they consume has not changed because of CWD.
- Hunters reported that the DWR Hunting Digest and the DWR website are the two most common sources of information about CWD.

The results of this study can be used by DWR to improve communication with hunters. Hunters in Virginia are most often receiving CWD information directly from DWR. DWR can focus on highlighting recent and ongoing CWD management actions and efforts. Given the challenging nature of CWD management, DWR can retain and improve high trust with hunters by consistently demonstrating that the agency is making strong efforts to protect deer and support deer hunting opportunities. In response to open-ended questions, several hunters mentioned the lengthy time it takes to receive test results. DWR has limited control over testing conducted at external labs. However, if delays are expected, DWR can acknowledge and explain the testing process to minimize confusion and frustration among hunters. There are also broader impacts to this study as DWR staff plan to share results of this study with other wildlife agencies and researchers in the southeast to promote regional collaborations and efforts to strengthen relationships between hunters and managers.



## INTRODUCTION

Chronic wasting disease (CWD) is a neurodegenerative fatal disease that affects members of the Cervidae family (cervids), including white-tailed deer (*Odocoileus virginianus*). CWD is extremely difficult to manage in free-ranging populations due to its protracted incubation period, prolonged period when infected individuals shed prions, and the extended persistence of prions on the landscape (Williams et al., 2002). There is no cure or treatment for CWD. There is no evidence that the prions that cause CWD can infect humans (MaWhinney et al., 2006), however the Center for Disease Control (CDC) recommends avoiding the consumption of venison from deer with CWD.

Without a cure or treatment for the disease, wildlife managers have sought to limit and slow the spread of CWD. CWD is a serious threat which can reduce population levels of wild cervids (DeVivo et al., 2017). To protect the deer herd in Virginia and continue to provide hunting opportunities, the Virginia Department of Wildlife Resources (DWR) has prioritized reducing the spread of CWD, maximizing sampling efficiency, detecting CWD in new areas, and reducing transmissions of CWD in areas where it occurs (VDWR, 2021). Ideally, the eradication of CWD would be the preferred objective but given the persistence of prions within infected deer and the environment, eradication does not appear to be feasible.

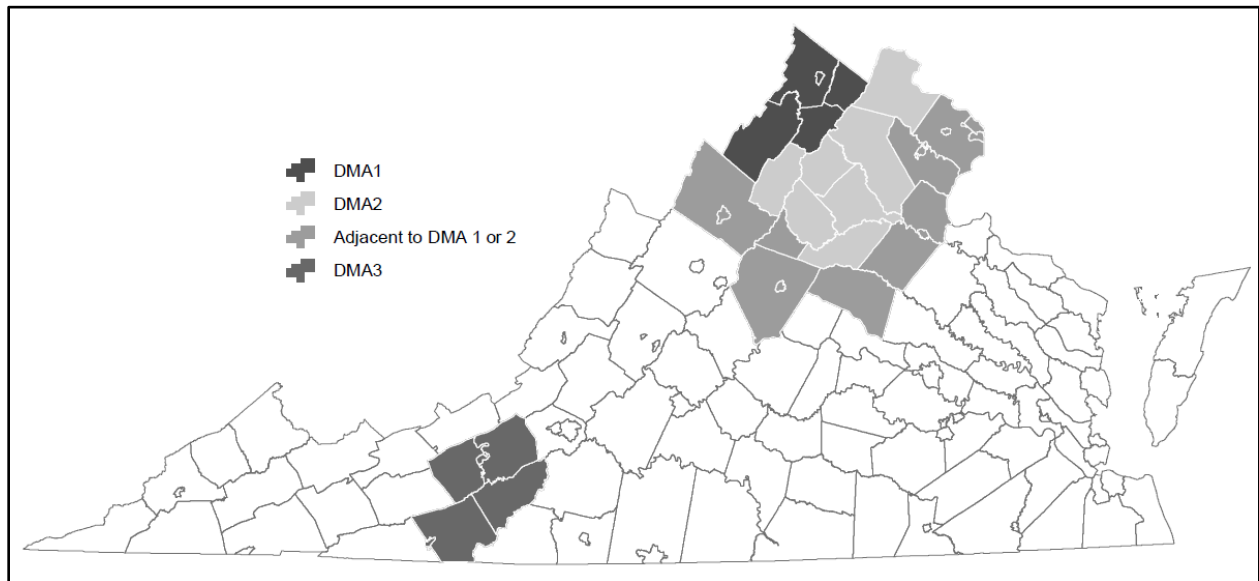
To prioritize management efforts in areas known to have CWD, DWR designates multi-county regions as disease management areas (DMAs). CWD was first detected in white-tailed deer in Virginia in 2009. In the following years, CWD was detected in several surrounding counties in northern Virginia. More recently, CWD was detected in southwest Virginia. Based on the number of detections, DWR has designated three areas as DMAs (Figure 1). Based on disease prevalence, DMAs have prescribed levels of surveillance, potential strategies for increasing or changing harvest rates, and increasing communication with constituents, especially hunters (VDWR, 2021). As with statewide deer-population objectives (VDGIF, 2015), CWD objectives in Virginia heavily rely on cooperation from hunters.

Given the importance of hunters to achieve management objectives, it is critical to understand how CWD affects hunting behaviors. These behaviors are influenced by risk perceptions of CWD and trust between management agencies and hunters. Previous research has suggested that hunters may decrease or stop hunting if CWD becomes highly prevalent (Needham et al., 2004). Hunters in Maryland indicated that they would hunt less if CWD were to become prevalent but in follow-up surveys there did not appear to be changes in hunting behavior over time (Haus et al., 2017). In a similar disease management context, research from Michigan indicated that hunters did not increase deer harvest in bovine tuberculosis (BTb) areas following requests from a state wildlife agency (Triezenberg et al., 2016). In addition to deer population objectives, DWR relies on hunters to voluntarily submit deer harvest to monitor for CWD across much of the state (VDWR, 2021). The decision to continue hunting, or add behaviors to hunting efforts, such as submitting samples for volunteer testing, depends on risk perceptions of CWD and trust in wildlife agencies (Harper et al., 2015; Needham & Vaske, 2008). In addition to disease prevalence (Needham et al., 2004) risk perception can change based on a hunters' proximity to CWD (Haus et al., 2017; Vaske et al., 2018), although this relationship may be influenced by other factors (Smith et al., 2020). Both risk perceptions and acceptance of management decisions are influenced by trust with management agencies (Harper

et al., 2015). There are multiple aspects that define trust and similar to previous CWD human dimensions studies (Needham & Vaske, 2008), we focused on measuring social trust. Social trust can be defined as a willingness to rely on experts for decision-making related to public health, safety, and the environment (Siegrist & Cvetkovich, 2000).

DWR conducted a statewide survey to assess hunters' perceptions of CWD and their perceptions and attitudes towards DWR and CWD management efforts. Specifically, the objectives of this project were to assess: (1) knowledge, awareness, and perceived effectiveness of DWR management actions in reducing CWD transmission and spread, (2) preferred levels of action for DWR to pursue to control CWD, (3) support or opposition for novel management strategies, and (4) perception of risk that CWD poses to humans and the wild deer population of Virginia. This project represents the first comprehensive CWD human dimensions study of hunters in Virginia. Hunters were identified via residency- within, adjacent to, and outside DMAs. Survey sampling was adapted to yield enough responses to be representative of hunters that reside in each DMA. The results of this project provide a high level of information about hunters which can be used to adapt and re-focus communication efforts with Virginia hunters. In addition to the primary objectives, the results were compared by DMA residency, to add to the growing literature on the effect of proximity to CWD risk perceptions (Smith et al., 2020; Vaske et al., 2018).

Figure 1 Disease Management Areas (DMA) for CWD Management in Virginia.



## METHODS

### *Sampling*

To meet the objectives of this project, we used stratified random sampling and oversampled areas of Virginia where CWD is known to occur. Virginia hunters were divided into five strata based on their residency in DMA1, DMA2, counties adjacent to DMA1 or DMA2 (hereafter referred to as 'Adjacent' counties), DMA3, and other places in Virginia (hereafter referred to as 'Other' counties). The counties adjacent to DMA3 were not included in the strata with counties adjacent to DMA1 and DMA2 because CWD was only recently, in 2020, confirmed in that area of the state. In turn, DWR has only recently focused on increasing

messaging about CWD in and around DMA3. Prior to the distribution of this survey, DWR added Carroll County to DMA3. This change occurred after the 2021-2022 deer hunting season, so Carroll county hunters were not added to the DMA3 sample as we would not expect them to change hunting practices or seek CWD information differently as we might expect of hunters residing in DMA3. The number of survey invitations for each strata was based on the expected number of responses that was needed to minimize the sampling error for each sub-population (Table 2, 3).

Table 1 Number of hunters by DMA strata and county.

<b>County or Area</b>	<b>DMA Status</b>	<b>Number of Hunters 2019-2022</b>
<b>DMA1</b>		<b>9971</b>
Clarke	DMA 1	924
Frederick	DMA 1	3797
Shenandoah	DMA 1	3303
Warren	DMA 1	1947
<b>DMA2</b>		<b>17571</b>
Culpeper	DMA 2	2881
Madison	DMA 2	1281
Orange	DMA 2	2801
Fauquier	DMA 2	3779
Page	DMA 2	1812
Loudoun	DMA 2	4587
Rappahannock	DMA 2	430
<b>DMA3</b>		<b>6262</b>
Floyd	DMA 3	837
Montgomery	DMA 3	3539
Pulaski	DMA 3	1886
<b>DMA1/2 Adjacent counties</b>		<b>34317</b>
Albemarle	Non-DMA	2969
Fairfax	Non-DMA	7472
Greene	Non-DMA	1102
Louisa	Non-DMA	2670
Prince William	Non-DMA	5861
Rockingham	Non-DMA	5804
Spotsylvania	Non-DMA	4382
Stafford	Non-DMA	4057
<b>Other counties</b>	Non-DMA	<b>186954</b>

Table 2 Number of individual hunters, and unique email addresses by DMA.

Area	Number of Hunters - 2019-2022	Number of Email Addresses	Percent of Hunters with Unique Email Address
DMA1	9971	7539	75.6
DMA2	17571	14194	80.8
DMA3	6262	4503	71.9
Adjacent counties	34317	28885	84.2
Other counties	186954	141319	75.6

Table 3 Sampling effort and target number of responses by DMA.

Area	Desired Number of Responses	% Email	Number of Invitations	Paper Invitations	Email Invitations
DMA1	400	75.6	4500	900	3600
DMA2	400	80.8	5000	1000	4000
DMA3	400	71.9	4000	800	3200
Adjacent counties	400	84.2	5500	1100	4400
Other counties	400	75.6	6000	1200	4800
<b>Total</b>	2000		25000	5000	20000

Number of invitations was calculated by balancing minimum number of invitations per strata, with relative difference in population of each strata (relative difference instead of proportional difference because sample size in each strata is more important).

DMA1 Paper Invitations = DMA1 Invitations / Total Invitations \* Total Paper Invitations

Surveys were distributed by email and by mail, the first invitations were distributed on April 15, 2022. We distributed surveys by mail because we did not have valid email addresses for all hunters. Two follow-up postcard reminders were distributed to mail non-respondents two and three weeks after the initial invitation. Three follow-up emails were distributed to email non-respondents each subsequent week following the initial invitation. Data collection for the initial sampling period was closed at the end of May. Following the initial sampling period, 2,000 non-respondents were selected to receive a brief non-response survey. Non-response surveys were distributed in June 2022 and data collection for non-respondents was closed at the end of July 2022. Excluding undeliverable invitations, the effective sample size was 24,904. There was a total of 2,722 responses, for a response rate of 10.9%.

#### *Survey Development*

The survey instrument was developed in collaboration with DWR staff that are responsible for deer and CWD management. Staff initially met to discuss the goals and objectives of the survey. The survey instrument was iteratively revised by staff to improve the accuracy of the information conveyed by survey items and to enhance readability. Approaches to CWD management in the US vary by state but the need for wildlife agencies to work and

communicate with hunters is similar throughout. Therefore, many of the survey items were adopted from previous surveys to hunters in other states (Quartuch, 2020; Rubino et al., 2022). Questions to measure social trust in DWR were adopted from a previous CWD study (Needham & Vaske, 2008). Risk perception questions were developed with researchers at North Carolina State University, who were similarly drafting and preparing to distribute a CWD survey to hunters in North Carolina.

### *Statistical Analysis*

Survey responses were weighted to account for sampling methodology. Results were reported following two different weighting procedures, one to report statewide results and one to report strata-level results. Hunters residing in strata with or near CWD-positive deer (i.e. DMAs) were oversampled to return precise measures of hunters' perceptions and behaviors in each area. This means that hunters in DMAs are over-represented when all survey responses are summarized. Among respondents, 23.9% reside in Other counties but they represent 71.3% of Virginia hunters (*Supplemental Table 1*). For all other strata, respondents are overrepresented compared to the percent of the population they represent (*Supplemental Table 1*). The weighting procedure for statewide results corrects for these differences.

For both statewide and strata-level results, non-respondent differences were accounted for with survey weights. Comparing survey and non-response survey results, survey respondents with a Bachelor's degree or higher were more likely to respond to the survey compared to respondents with less formal education (*Supplemental Table 1*). Comparing license database metadata to survey results, survey respondents were older and were less avid hunters compared to the population (*Supplemental Table 1*). An avid hunter was defined as someone who had purchased a hunting license in each of the previous three years. The weighting procedure for these variables was applied to return results closer to the demographics of the hunter population.

All statistical analyses were conducted in program R (v4.1.3; R Core Team, 2022). Weights were calculated and applied to responses with the 'survey' package (v4.1.1; Lumley, 2021). To calculate survey weights, data cannot be missing from any variable that is part of the weighting procedure. A small percent of missing responses for respondents' education were imputed with random forest models using the 'missForest' package (v1.5; Stekhoven, 2022).

## **RESULTS**

Descriptive statistics are reported in tabular form for all survey items. Statewide results are reported in Tables 4-23 and Tables 54-55. Results for survey responses are presented in the order they appeared on the survey. DMA-level results are presented in Tables 24-53. Survey results that directly address the four major objectives of this project are further described below.

### **(1) Assess knowledge, awareness, and perceived effectiveness of DWR management actions in reducing CWD transmission and spread**

A majority of hunters agreed that DWR provides important, timely, and truthful information about CWD in Virginia (Table 21). Hunters were asked to respond to six statements regarding DWR's communication and responses were consistently positive. This trend was consistent among hunters across DMAs (Table 47). Hunters were asked if DWR makes good deer management and CWD management decisions and hunters responded positively to these questions (Tables 22, 48). A sizeable percent of hunters reported "Neither Agree or Disagree" for

these questions, indicating a need to continue providing information and justification to hunters regarding DWR policies and decisions.

When asked about the sources of information where hunters have learned about CWD, they most often reported the DWR website, and the DWR Hunting regulations booklet (Table 23). This was consistent across DMAs (Table 49). Among non-DWR sources, TV outdoor programs was the most commonly reported source of CWD information (Table 23). More than 50% of respondents reported learning about CWD from outdoor blogs and websites, outdoor magazines, and family and friends. Respondents were asked to report other sources of information about CWD not listed on the survey. The highest number of other responses was for podcasts (Table 54).

## **(2) Assess preferred levels of action for DWR to pursue to control CWD**

Many hunters tended to perceive DWR's efforts to manage CWD as appropriate, which included DWR's efforts to restrict carcass transportation and increasing testing of harvested deer (Table 20). However, across all measures, a high percent of hunters responded that they didn't know or weren't sure about DWR's efforts (Table 20). When comparing hunter responses by DMA, hunters in Other counties more frequently reported that they didn't know or weren't sure about DWR efforts (Table 46). Results of a chi-square test indicate significant differences in responses by DMA for whether "DWR's efforts to increase hunting seasons and bag limits in DMA counties are: too limited, appropriate, or too extensive"; although the overall effect size was relatively weak ( $\chi^2 = 117.64$ ,  $p < .001$ , Cramer's  $V = 0.19$ ; Table 46). When comparing the percent of responses by DMA, 20.8% of hunters in DMA 1 reported "Too extensive", the next highest was DMA2 with 11.0%, and the third highest were hunters in Adjacent counties at 6.6%.

Communication preferences are indirectly related to management efforts but are critical for informing hunters of new developments and securing trust and cooperation with hunters. Hunters most often indicated that their preferred channel of communication for CWD information are the DWR website, and the DWR Hunting Regulation booklet. These were also the sources from which they have most often received CWD information in the past (Table 23). This trend did not change across DMAs (Table 50).

## **(3) Assess support or opposition for novel management strategies**

Hunters were asked to indicate the acceptability of several potential management options that could limit CWD (Table 12, Table 13). Several management options to increase season lengths, add additional seasons, and increase bag limits, were on average rated moderately acceptable by hunters (Table 12). Similar types of management options, focused specifically on increasing buck harvest, were also rated moderately acceptable (Table 13). The only exception was the option, "Reduction of localized deer populations using sharpshooters in affected areas", which was the only option with a mean unacceptable rating (mean response less than 4; Table 12).

## **(4) Assess perception of risk that CWD poses to humans and the wild cervid population of Virginia**

Respondents were asked a series of risk questions, which included CWD risk questions, followed by a series of strictly CWD risk questions (Table 9, Table 10). Respondents rated the risk of "Inadvertently eating meat from an animal infected with CWD" ( $\bar{x} = 3.5$ ,  $SE = 0.07$ )

higher than the risk of “Becoming ill as a result of exposure to CWD” ( $\bar{x} = 3.0$ ,  $SE = 0.07$ ; Wilcoxon sign test,  $W = 9.34$ ,  $p < .001$ ; Table 9). When asked about CWD risks, respondents rated risks to deer populations higher than risks to people, themselves and others (Table 10). These trends did not change much across DMAs (Table 33).

Following these risk questions, hunters were asked about their potential level of concern if they consumed meat from a deer that was not tested for CWD and their concern if they consumed meat from a deer that tested positive for CWD (Table 11). Generally, hunters reported more concern if the deer tested positive for CWD. This was consistent across DMAs (Table 34).

Related to risk perceptions, hunters that reported submitting a sample for CWD testing were asked about three potential motivations for testing- concern about consumption, to help track CWD in VA, and whether friends and family members believe it is important to conduct testing (Table 16, Table 41). Among all hunters, only 7.8% reported having a deer tested for CWD (Table 15), although this percent greatly increased among hunters in DMA1, DMA2, and DMA 3 (Table 40). Among hunters that have tested, helping to monitor CWD in VA was rated as a significantly higher motivation than consumption concern and perceptions from friends and family members (Table 16). To detect for differences in the motivation to help track CWD in VA between hunters in different DMAs a One-Way ANOVA and TukeyHSD post hoc test were performed. Results indicated that hunters in DMA1 rated this motivation lower than hunters in Other counties and hunters in DMA3 ( $F(4,439) = 10.5$ ,  $p < .001$ ; Table 41).

Perceptions of risk are also important for understanding changes in hunting behavior. However, a strong majority of hunters reported no change in where they hunt or consuming deer meat due to CWD (Table 18). This did not change between DMAs (Table 43). Similarly, there were very few reported changes in deer consumption.

*Results - Tables*

Table 4 Responses to hunting participation questions – most recent deer hunting experience in Virginia, who they recently hunted with, and hunting experience level.

	%	n
<b>Last hunted deer in Virginia</b>		
The most recent season, 2021- 2022	80.2	2,081
The 2020-2021 season (over a year ago)	8.1	210
The 2019-2020 season (over two years ago)	2.9	75
A season before 2019-2020 (three or more years ago)	4.0	105
I have never hunted deer in Virginia	4.8	124
<b>Hunt deer in the past year with:</b>		
Friends	66.9	1,600
Immediate family	60.2	1,441
Extended family	23.5	563
Members of a hunt club	29.3	702
Other	3.0	72
Did not hunt in the past year	11.2	267
<b>Self-rated hunting experience level</b>		
Beginner	6.7	164
Intermediate	33.8	833
Advanced	59.6	1468

Table 5 Reported areas where hunters most often hunt. Hunters were asked to report county and responses were categorized into DMAs.

	%	n
DMA1	17.7	418
DMA2	22.1	521
Adjacent to DMA1 or 2	13.6	321
DMA3	13.5	319
Other	33.0	778



Table 6 Responses to statements for the question, “How important to you is each of the following reasons to hunt deer in Virginia?”

Hunting motivations	Mean (SE)	Not at all important % (n)	Slightly important % (n)	Moderately important % (n)	Very important % (n)
To spend time in nature	3.8 (0.01)	0.3 (8)	1.7 (41)	17.1 (419)	80.9 (1985)
To harvest a trophy	2.3 (0.04)	23.3 (566)	36.2 (882)	25.0 (609)	15.5 (377)
To spend time with family/friends	3.5 (0.03)	3.8 (93)	8.5 (207)	21.9 (536)	65.8 (1608)
To obtain wild game meat	3.3 (0.03)	3.9 (95)	14.4 (352)	31.8 (779)	50.0 (1225)
To contribute to wildlife management	3.3 (0.03)	2.3 (55)	10.2 (248)	38.3 (931)	49.2 (1197)
To contribute to the local community (e.g. financial benefits from hunters)	2.7 (0.04)	15.3 (371)	28.8 (701)	31.0 (754)	24.9 (605)
To test/improve my skills	3.1 (0.04)	8.8 (212)	17.4 (421)	30.5 (738)	43.4 (1052)
For physical exercise	2.9 (0.04)	9.2 (226)	21.3 (522)	37.4 (915)	32.1 (787)

Table 7 Hunters' responses to whether they had heard of CWD before receiving a survey invitation. For hunters that answered 'Yes', they were asked to rate their knowledge about CWD.

CWD Background Information	%	n
<b>Heard about CWD (Yes)</b>	93.6	2306
<b>Knowledge about CWD</b>		
Hardly anything	7.8	180
A little bit	55.9	1282
A fair amount	32.4	744
A lot	3.8	87

Table 8 Results for five True-False questions about CWD. For reference, correct responses are bolded.

CWD Knowledge	Correct % (n)	Incorrect % (n)	Unsure % (n)
CWD outbreaks typically occur in late summer to early fall. <b>(F)</b>	12.0 (276)	31.3 (718)	56.7 (1303)
A deer that has CWD can still look healthy. <b>(T)</b>	67.8 (1545)	17.1 (389)	15.1 (344)
Deer infected with CWD will die only if they experience a severe case. <b>(F)</b>	52.6 (1203)	12.7 (290)	34.7 (795)
Research suggests CWD has created some human health problems. <b>(F)</b>	32.3 (741)	24.9 (571)	42.8 (980)
The importation of whole deer carcasses into VA is prohibited to prevent the spread of CWD. <b>(T)</b>	77.9 (1789)	3.1 (71)	19.0 (436)
Mean Score (0-5)	2.4		
Percent that answered all five questions correctly	4.9% (111)		

Table 9 Responses to seven statements for the question, “How much risk do you think is associated with each of the following happening to you?” Responses ranged from No Risk = 1 to Extreme Risk = 9.

	$\bar{x}$	SE	Median
Contracting Rabies	2.9	0.07	3
Contracting COVID-19	4.0	0.08	5
Getting shot by another hunter	3.7	0.07	4
Accidentally shooting yourself	1.9	0.06	2
Harvesting a deer infected with COVID-19	2.6	0.07	2
Inadvertently eating meat from an animal infected with CWD	3.5	0.07	4
Becoming ill as a result of exposure to CWD	3.0	0.07	3

Table 10 Responses to four statements for the question, “How concerned are you about each of the following issues now that chronic wasting disease has been detected in 11 Virginia counties?” Responses ranged from Not Concerned = 1 to Extremely Concerned = 9. Results of a One-Way ANOVA and Tukey’s HSD post-hoc test indicated significant differences between human health risk perceptions (<sup>a</sup>) and deer risk perceptions (<sup>b</sup>;  $F(3, 9589) = 1136, p < .001$ ).

CWD Risk (1-9)	$\bar{x}$	SE	Median
Your own personal health?	3.8 <sup>a</sup>	0.08	4
The health of other people you know?	4.0 <sup>a</sup>	0.09	5
...The potential for CWD to dramatically reduce the deer population in Virginia?	6.4 <sup>b</sup>	0.08	7
The threat CWD poses to the future of deer hunting in Virginia?	6.8 <sup>b</sup>	0.09	8

Table 11 Responses to two statements for the question, “We would like to know how concerned you would be about eating meat from a wild deer harvested by you or another hunter in a county where chronic wasting disease has been detected.

Consumption Risk	$\bar{x}$ (SE)	Not at all Concerned % (n)	Slightly Concerned % (n)	Extremely Concerned % (n)
...was not tested for CWD	1.9 (0.03)	27.8 (632)	53.5 (1218)	18.7 (426)
...tested positive for CWD	2.6 (0.02)	7.9 (179)	28.4 (647)	63.8 (1455)

Table 12 Responses to statements for the question, “DWR is evaluating management options to slow the spread of this disease. If it is necessary to reduce deer populations in areas affected by CWD, please indicate how acceptable or unacceptable the following options are.”

	Mean (SE)	Response % (Count)						
		Unaccepta ble (1)	2	3	Neutral (4)	5	6	Acceptable (7)
Unlimited doe bag limits in affected areas	4.8 0.08	9.2 212	6.2 143	6.9 158	24.8 569	10.2 233	9.8 225	32.9 754
Increase the length of the general firearms season in affected areas	5.4 0.07	5.7 132	3.5 80	3.4 79	17.5 402	12.4 284	15.7 360	41.6 954
An early antlerless-only firearms season during September in affected areas	5.2 0.07	7.2 165	3.9 89	3.8 86	21.5 490	13.7 314	12.4 284	37.4 853
A late antlerless- only firearms season during January-March in affected areas	5.1 0.08	9.0 207	5.7 131	5.0 115	16.3 372	11.6 266	14.3 328	38.0 870
A regulation that requires deer hunters to kill one or more antlerless deer before they could kill a 2 <sup>nd</sup> antlered deer in affected areas	4.7 0.08	11.5 264	7.5 172	5.6 128	25.6 587	8.7 200	11.0 252	29.9 685
Reduction of localized deer populations using sharpshooters in affected areas	3.0 0.09	38.7 882	11.5 263	8.5 194	19.5 445	5.3 121	3.7 84	12.7 289

Table 13 Responses to statements for the question, “Research has shown that adult male deer (bucks) are infected with CWD at higher rates than other age and sex classes of deer. If it is necessary to reduce the number of mature bucks on the landscape in areas affected by CWD, please indicate how acceptable or unacceptable the following options are.”

	Mean (SE)	Response % (Count)						
		Unaccepta ble	-	-	Neutral	-	-	Acceptable
Initiate a velvet (early) season in affected areas	4.8 0.07	10.4 238	4.4 100	4.7 107	26.0 594	15.5 355	10.9 249	28.1 643
Extra buck tags that are only valid in affected areas	5.4 0.07	5.8 133	3.2 73	3.5 80	17.7 404	14.4 330	16.4 375	39.0 892
Expand buck firearms season before the rut in affected areas	5.1 0.07	7.7 176	4.5 104	4.9 112	20.3 463	12.4 283	14.4 329	35.8 820
Expand buck firearm season after the rut in affected areas	5.3 0.07	6.2 141	2.8 64	3.9 88	21.1 481	14.4 330	16.2 370	35.4 810

Table 14 Responses to questions about methods for handling deer carcass in the field, how deer harvest was processed, and carcass disposal. For each question, respondents could select more than one option, percent response may exceed 100%.

	% Response	n
<b>Methods for handling deer carcass</b>		
De-bone the deer in the field	4.1	93
Quarter the deer in the field	5.8	133
Bring the whole carcass out of the field (except organs removed during field-dressing)	52.2	1197
Bring the whole carcass out of the field (including organs)	22.9	525
I did not harvest a deer in the 2021-2022 DEER seasons	32.4	743
<b>How deer harvest was processed</b>		
Deer processor for my own use	34.4	528
Deer processor for donation to Hunters for the Hungry, or a similar organization	6.7	103
Processed by friends or family members	19.7	302
Processed my own deer	74.2	1140
<b>Disposal options used</b>		
Left carcass parts at the location of the harvest	26.0	368
Left carcass parts on the landscape, away from location of the harvest but within 20 miles of where the deer was harvested	27.5	390
Left carcass parts of the landscape, farther than 20 miles away from where the deer was harvested	3.9	56
Buried leftover carcass parts	23.4	332
Disposed of leftover carcass parts in an open-air pit	14.6	207
Disposed of leftover carcass parts directly in a landfill or transfer station	28.1	399
Disposed of leftover carcass parts in a household trash container	14.0	199

Table 15 Percent of respondents that had a deer tested in the past five years and the type of testing process used. Percent response exceeded 100 % because more than one type of testing process could be selected.

Deer testing	%	n
Harvest tested in past 5 years (Yes)	7.8	176
<b>Testing process</b>		
Mandatory CWD sample station	41.6	74
Taxidermist	24.2	43
Voluntary CWD deer head drop site	25.8	46
Deer processor	39.3	70

Table 16 Responses to the question, “Below are potential reasons for testing harvested deer for CWD. How important are each of the following to you?” Responses ranged from Not at all Important (1) to Very Important (4). Results of a One-Way ANOVA and Tukey’s HSD post-hoc test indicated significant differences between motivations related to concern eating meat and family and friends perceptions (<sup>a</sup>), and monitoring CWD status in VA (<sup>b</sup>;  $F(2,1324) = 109.4, p < .001$ ).

Testing motivation	Mean (SE)	Not at all important	Somewhat Important	Moderately Important	Very Important
Concern about eating meat from a deer infected with CWD	2.8 <sup>a</sup> (0.14)	14.5 (29)	29.2 (59)	20.4 (41)	35.9 (72)
Help DWR monitor the status of CWD in VA	3.6 <sup>b</sup> (0.06)	0.8 (2)	8.4 (17)	22.4 (45)	68.4 (138)
The people closest to me (e.g., significant other, friend, family member) think it is important	2.7 <sup>a</sup> (0.13)	14.7 (29)	27.7 (55)	26.2 (52)	31.4 (63)

Table 17 Number and percent of respondents that hunted cervid outside Virginia in the past 5 years and, if yes, did they hunt in a state or country with known positive cases of CWD.

Outside Virginia	%	n
Hunt cervid (Yes)	20.0	457
Hunt cervid in CWD state or country		
Yes	45.1	208
No	28.3	130
Unsure	26.5	122

Table 18 Reported changes to deer hunting and deer meat consumption due to the spread of CWD in Virginia.

	Response % ( <i>Count</i> )					
	Mean ( <i>SE</i> )	Hunt much more in CWD areas	Hunt a bit more in CWD areas	No change in where I hunt	Hunt a bit less in CWD areas	Hunt much less in CWD areas
Change in deer hunting	3.0 (0.01)	0.1 (1) Major increase	0.8 (19) Slight increase	96.6 (2207) No change	0.9 (20) Slight decrease	1.6 (37) Major decrease
Change in deer consumption	3.0 (0.01)	0.2 (4)	1.3 (30)	93.5 (2146)	3.2 (74)	18 (41)

Table 19 Reported deer hunting in DMAs in recent seasons. The number of seasons changes per DMA to reflect spread of CWD. Hunters were subsequently asked what area of Virginia they most often hunted in the past 5 seasons.

Hunt in Virginia	Total (%)	Total (n)	Most often (%)	Most often (n)
DMA1 in past 5 seasons	6.7	165	5.4	132
DMA2 in past 2 seasons	13.1	321	8.9	217
Adjacent to DMA1 or 2 in past 2 seasons	15.8	389	10.6	259
DMA3 in past season	6.2	152	5.1	125
Other places in VA			70.0	1711



Table 20 Responses to questions about DWR efforts to manage CWD in Virginia.

Perceptions of management	Not Restrictive Enough	Appropriate	Too restrictive	Don't know/ Not sure
DWR's efforts to restrict carcass transportation are:*	3.6 (79)	50.2 (1120)	4.9 (109)	41.4 (924)
	Too limited	Appropriate	Too restrictive	Don't know/ Not sure
DWR's efforts to increase hunting seasons and bag limits in DMA counties are:	7.6 (171)	44.6 (999)	5.3 (119)	42.5 (951)
DWR's efforts to collect samples from deer in <b>DMA counties</b> to test for CWD are:	10.0 (224)	46.6 (1043)	1.3 (29)	42.1 (942)
DWR's efforts to collect samples from deer in <b>non-DMA counties</b> to test for CWD are:	12.8 (286)	37.7 (845)	2.0 (44)	47.5 (1065)

Table 21 Responses to questions that measure social trust. The survey questions ask hunters to rate DWR communication efforts related to CWD. Responses ranged from Strongly Disagree (1) to Strongly Agree (5).

	Mean (SE)	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
Provides me with enough information to decide what actions I should take regarding CWD.	3.5 0.03	2.7 (61)	8.3 (187)	33.6 (756)	47.9 (1075)	7.5 (168)
Provides the best available information on CWD in Virginia	3.6 0.03	2.3 (52)	6.1 (136)	35.3 (792)	46.9 (1051)	9.5 (213)
Provides timely information regarding CWD issues	3.5 0.03	2.7 (61)	6.5 (144)	36.4 (811)	45.6 (1016)	8.7 (194)
Provides truthful information about human safety issues related to CWD	3.6 0.03	2.0 (45)	3.6 (80)	34.7 (779)	47.8 (1072)	11.9 (268)
Provides truthful information about the spread of CWD in Virginia	3.7 0.03	1.8 (41)	3.3 (74)	31.2 (696)	51.0 (1139)	12.7 (284)
Provides adequate opportunities for hunters to express their concerns about CWD.	3.5 0.04	2.2 (49)	7.1 (159)	35.7 (798)	45.3 (1011)	9.7 (216)

Table 22 Responses to questions asking respondents to rate DWR management efforts related to deer and CWD. Responses ranged from Strongly Disagree (1) to Strongly Agree (5).

	Mean (SE)	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
Makes good management decisions for deer in Virginia	3.5 0.04	4.1 (92)	12.3 (277)	25.9 (582)	48.6 (1090)	9.1 (204)
Makes good management decisions regarding CWD	3.6 0.03	1.2 (26)	3.5 (79)	41.7 (933)	44.8 (1002)	8.8 (198)
Implements appropriate regulations to minimize the spread and prevalence of CWD	3.6 0.03	1.4 (30)	4.4 (99)	39.0 (874)	46.4 (1038)	8.8 (196)
Follows the best available science in managing CWD	3.6 0.03	1.1 (25)	1.9 (43)	41.5 (926)	46.3 (1033)	9.2 (205)

Table 23 Responses to where hunters have gained information about CWD and where they would prefer to hear more information about CWD.

	None % (n)	A little % (n)	A lot % (n)	Preferred % (n)
Family and friends	43.8 (972)	48.1 (1067)	8.2 (181)	19.7 (483)
Local newspaper	76.9 (1693)	21.8 (479)	1.3 (28)	20.1 (494)
Statewide or National newspapers	74.7 (1641)	23.5 (517)	1.8 (40)	12.2 (300)
Radio	87.5 (1928)	10.9 (240)	1.6 (35)	12.8 (313)
TV – News	73.3 (1601)	23.6 (515)	3.0 (66)	20.2 (496)
TV – Outdoor program	35.8 (788)	51.5 (1135)	12.7 (279)	22.1 (543)
DWR Website	22.9 (507)	44.9 (994)	32.2 (712)	63.0 (1546)
Outdoor blogs and websites (non-DWR)	45.2 (993)	40.6 (890)	14.2 (312)	17.0 (418)
Outdoor magazines (non-DWR)	41.1 (906)	44.9 (989)	14.0 (309)	23.8 (583)
Virginia Department of Health (VDH)	77.5 (1700)	19.6 (429)	2.9 (65)	17.8 (437)
Center for Disease Control (CDC)	83.2 (1811)	14.1 (306)	2.7 (59)	12.6 (308)
DWR Staff	64.9 (1424)	27.5 (604)	7.5 (94)	20.3 (499)
DWR Public meeting	84.0 (1836)	11.6 (254)	4.3 (94)	15.6 (382)
DWR online social media (i.e., Facebook)	63.9 (1396)	27.2 (594)	9.0 (196)	29.5 (724)
DWR Hunting Regulations booklet	19.6 (430)	54.4 (1194)	25.9 (569)	65.7 (1613)
Online social media account (non-DWR)	68.3 (1487)	26.4 (576)	5.3 (116)	14.1 (347)
Information via the mail				39.3 (964)

Table 24 Demographics of survey respondents.

	% or Mean	n
<b>Age</b>	$\bar{x} = 57.7$	
<b>Gender</b> (Men)	90.0	1822
<b>Ethnicity</b> (Non-Hispanic)	98.6	1912
<b>Race</b>		
White	91.0	1827
Black or African American	3.3	67
American Indian or Alaska Native	0.7	14
Asian	0.2	5
Native Hawaiian or Pacific Islander	0.0	0
Other	1.1	23
Multiracial	3.7	74
<b>Education</b> (Bachelor's degree or higher)	19.3	502
<b>Income level</b>		
Less than \$24,999	14.8	283
\$25,000 - \$49,999	25.3	485
\$50,000 - \$74,999	21.8	418
\$75,000 - \$99,999	16.1	309
\$100,000 - \$124,999	9.4	180
\$125,000 or more	12.6	242
<b>Current Residency</b>		
Urban	9.9	201
Suburban	30.3	616
Rural	59.7	1212
<b>Childhood Residency</b>		
Urban	9.9	198
Suburban	29.2	580
Rural	60.9	1211
<b>DMA Residency*</b>		
DMA1	18.5	482
DMA2	20.0	520
Adjacent to DMA1 or 2	20.9	544
DMA3	16.7	435
All other	23.8	619

Strata-level (DMA) results based on hunter address. For most questions only the percent by strata (column) and means per strata are reported. Adjacent refers to counties listed as Adjacent to DMA1/2. Other refers to all other areas not part of a DMA or Adjacent.

Table 25 Responses by DMA, to the question, “When was the last time you hunted deer in Virginia?”

	DMA1	DMA2	DMA3	Adjacent	Other
The most recent season, 2021-2022	79.3	78.6	83.7	78.0	80.8
The 2020-2021 season (over a year ago)	11.1	6.9	7.6	7.5	8.1
The 2019-2020 season (over two years ago)	4.5	3.8	5.4	2.4	2.8
A season before 2019-2020 (three or more years ago)	4.5	4.8	2.2	4.7	3.8
I have never hunted deer in Virginia	0.6	5.9	1.1	7.3	4.5

Table 26 Responses by DMA to the question, “What county or city in Virginia do you most often hunt deer?”

	DMA1	DMA2	DMA3	Adjacent	Other
DMA1	84.0	5.1	0.0	3.8	0.3
DMA2	8.3	78.9	0.2	16.2	0.7
DMA3	0.0	0.2	77.4	0.0	1.9
Adjacent	4.7	8.8	0.2	59.1	2.4
Other	3.0	7.0	22.2	20.9	94.8

Table 27 Responses by DMA, to the question, “In the past year, have you hunted deer with any of the following?” Column percent exceed 100% because respondents could select multiple responses.

	DMA1	DMA2	DMA3	Adjacent	Other
Friends	54.6	66.4	58.6	64.8	67.9
Immediate Family	63.5	59.8	58.6	55.6	61.2
Extended Family	22.8	20.4	23.5	18.6	24.8
Members of a Hunt Club	9.6	21.5	7.0	22.5	33.1
Other	5.3	4.6	6.0	5.1	2.1
Did not hunt in the past year	11.9	11.0	10.9	9.7	11.6

Table 28 Responses by DMA to the question, “How would you describe your experience as a deer hunter?”

	DMA1	DMA2	DMA3	Adjacent	Other
Beginner	3.5	5.5	6.4	8.4	6.6
Intermediate	32	31.7	33.3	40	33.3
Advanced	64.5	62.8	60.4	51.7	60.1

Table 29 Responses by DMA to statements for the question, “How important to you is each of the following reasons to hunt deer in Virginia?”

	DMA1	DMA2	DMA3	Adjacent	Other
<b>To spend time in nature</b>					
Not at all important	0.8	1.3	0.7	0.2	0.3
Slightly important	2.3	3.2	4.0	2.9	1.1
Moderately important	21.6	13.9	19.4	16.5	17.2
Very important	75.3	81.6	76.0	80.4	81.4
<b>To harvest a trophy</b>					
Not at all important	25.2	25.9	22.7	23.2	22.9
Slightly important	33.8	36.7	33.6	36.5	36.5
Moderately important	27.9	21.9	31.2	26.9	24.4
Very important	13.2	15.5	12.5	13.4	16.2
<b>To spend time with family/friends</b>					
Not at all important	4.6	5.3	6.0	4.4	3.4
Slightly important	9.9	9.4	8.7	11.8	7.8
Moderately important	26.9	22.1	24.8	20.4	21.8
Very important	58.6	63.2	60.5	63.3	67.0
<b>To obtain wild game meat</b>					
Not at all important	2.7	5.3	2.6	2.9	3.9
Slightly important	14.3	13.7	10.2	14.6	14.4
Moderately important	27.4	25.9	32.2	33.3	32.5
Very important	55.6	55.1	55.0	49.2	49.2
<b>To contribute to wildlife management</b>					
Not at all important	3.1	3.8	2.9	3.6	1.8
Slightly important	11.5	11.2	9.4	14.3	9.3
Moderately important	37.5	32.0	39.0	33.9	39.9
Very important	47.9	53.0	48.8	48.3	49.0

**To contribute to the community  
(e.g. financial benefit from hunter)**

Not at all important	14.0	16.6	17.1	15.2	15.2
Slightly important	31.9	24.4	28.5	30.6	28.8
Moderately important	30.5	36.7	31.2	30.1	30.8
Very important	23.6	22.3	23.2	24.1	25.2

Table 30 Percent of hunters by DMA that had previously heard of CWD.

	DMA1	DMA2	DMA3	Adjacent	Other
% Yes	96.9	98.1	98.0	93.2	92.9

Table 31 Mean and percent responses by DMA for self-rated CWD knowledge.

	DMA1	DMA2	DMA3	Adjacent	Other
Mean ( $\bar{x}$ )	2.6	2.5	2.5	2.4	2.3
<b>Percent by DMA</b>					
Hardly anything	5.1	6.2	4.9	7.5	8.6
A little bit	40.2	46.9	46.6	50.5	59.3
A fair amount	48.5	40.0	43.7	36.8	29.2
A lot	6.2	6.9	4.7	5.2	3.0



Table 32 Mean and percent responses by DMA for five true-false questions about CWD. For reference, correct responses are bolded.

	DMA1	DMA2	DMA3	Adjacent	Other
<hr/>					
CWD outbreaks typically occur in late summer to early fall.					
True	30.5	24.2	31.2	28.1	32.6
<b>False</b>	22.5	19.9	17.2	15.1	9.8
Unsure	47.0	55.9	51.7	56.8	57.7
<hr/>					
A deer that has CWD can still look healthy.					
<b>True</b>	76.4	73.3	78.4	70.3	65.5
False	11.3	13.1	12.0	13.3	18.8
Unsure	12.2	13.6	9.5	16.4	15.7
<hr/>					
Deer infected with CWD will die only if they experience a severe case.					
True	15.9	11.0	14.7	14.0	12.4
<b>False</b>	54.5	58.0	53.8	52.4	51.6
Unsure	29.5	31.0	31.4	33.6	36.0
<hr/>					
Research suggests CWD has created some human health problems.					
True	21.0	19.8	23.5	28.9	24.9
<b>False</b>	44.3	38.7	41.0	35.1	29.9
Unsure	34.7	41.5	35.5	36.0	45.2
<hr/>					
The importation of whole deer carcasses into VA is prohibited to prevent the spread of CWD.					
<b>True</b>	84.5	77.6	77.5	82.0	76.8
False	3.2	3.9	4.3	3.1	2.8
Unsure	12.2	18.5	18.2	14.9	20.4
<hr/>					
Summary					
Percent All Correct	7.0	9.4	4.3	5.6	4.3
Mean ( $\bar{x}$ )	2.8	2.7	2.7	2.6	2.3

Table 33 Mean responses by DMA to seven statements for the question, “How much risk do you think is associated with each of the following happening to you?” Responses ranged from No Risk = 1 to Extreme Risk = 9. Followed by mean responses to four statements for the question, “How concerned are you about each of the following issues now that chronic wasting disease has been detected in 11 Virginia counties?” Responses ranged from Not Concerned = 1 to Extremely Concerned = 9.

	DMA1	DMA2	DMA3	Adjacent	Other
<b>Risk Questions (<math>\bar{x}</math>)</b>					
Contracting Rabies	2.9	2.8	2.7	2.8	2.9
Contracting COVID-19	3.7	3.9	4.1	4.0	3.9
Getting shot by another hunter	3.6	3.4	3.6	3.6	3.7
Accidentally shooting myself	1.8	1.7	2.1	2.0	1.9
Harvesting a deer infected with COVID-19	2.7	2.7	2.7	2.8	2.5
Inadvertently eating meat from an animal infected with CWD	3.8	3.5	3.6	3.7	3.4
Becoming ill as a result of exposure to CWD	2.9	2.9	3.1	3.0	3.0
<b>Virginia CWD Risk Questions (<math>\bar{x}</math>)</b>					
Your own personal health?	3.6	3.6	3.9	3.7	3.8
The health of other people you know?	3.8	3.8	4.2	3.8	4.1
The potential for CWD to dramatically reduce the deer population in Virginia?	6.1	6.2	6.4	6.2	6.5
The threat CWD poses to the future of deer hunting in Virginia?	6.6	6.5	6.7	6.6	6.8

Table 34 Means and percent responses by DMA to two statements for the question, “We would like to know how concerned you would be about eating meat from a wild deer harvested by you or another hunter in a county where chronic wasting disease has been detected.

	DMA1	DMA2	DMA3	Adjacent	Other
<b>...was not tested for CWD (<math>\bar{x}</math>)</b>					
Not at all concerned	36.5	33.8	22.7	32.9	26.1
Slightly Concerned	50.9	45.2	59.0	49.2	54.9
Extremely Concerned	12.7	21.0	18.4	17.9	19.0
<b>...tested positive for CWD (<math>\bar{x}</math>)</b>					
Not at all concerned	12.1	12.6	7.5	9.0	6.9
Slightly Concerned	40.3	30.9	33.6	32.3	26.4
Extremely Concerned	47.6	56.5	58.9	58.7	66.7

Table 35 Mean and percent responses by DMA for statements to the question, “DWR is evaluating management options to slow the spread of this disease. If it is necessary to reduce deer populations in areas affected by CWD, please indicate how acceptable or unacceptable the following options are.”

	DMA1	DMA2	DMA3	Adjacent	Other
<b>Unlimited doe bag limits in affected areas (<math>\bar{x}</math>)</b>	4.3	4.6	5.1	4.9	4.8
Unacceptable (1)	16.3	13.6	8.4	6.4	9.1
2	8.2	4.1	4.7	5.9	6.5
3	7.5	7.5	6.1	7.8	6.8
Neutral (4)	25.2	24.8	17.4	24.4	25.3
5	9.9	9.5	13.8	13.5	9.4
6	7.3	10.1	9.5	11.1	9.6
Acceptable (7)	25.6	30.4	40.2	30.8	33.3
<b>Increase the length of the general firearms season in affected areas (<math>\bar{x}</math>)</b>	4.5	5.1	5.8	5.3	5.5
Unacceptable (1)	15.7	10.4	2.3	5.7	4.7
2	6.9	5.4	3.4	3.5	3.2
3	7.5	2.8	4.1	7.1	2.6
Neutral (4)	18.9	21.0	12.1	17.0	17.5
5	14.0	8.0	10.7	13.4	12.8
6	10.8	14.3	14.2	16.3	15.9
Acceptable (7)	26.2	38.1	53.2	37.0	43.3
<b>An early antlerless-only firearms season during September in affected areas (<math>\bar{x}</math>)</b>	4.4	4.7	5.2	5.2	5.3
Unacceptable (1)	17.3	15.1	12.0	5.2	6.0
2	6.9	5.6	2.9	5.0	3.3
3	7.5	5.0	4.3	6.6	2.8
Neutral (4)	22.9	19.2	17.2	18.4	22.5
5	9.0	9.3	8.6	15.8	14.4
6	10.1	12.7	12.2	13.9	12.3
Acceptable (7)	26.3	33.2	42.8	35.0	38.7
<b>A late antlerless-only firearms season during January-March in affected areas (<math>\bar{x}</math>)</b>	4.2	4.9	5.3	5.1	5.2
Unacceptable (1)	22.2	13.3	9.7	6.4	8.4
2	6.9	6.3	4.3	5.9	5.6
3	7.7	4.6	4.7	5.9	4.9
Neutral (4)	18.9	18.0	11.3	18.0	15.8
5	7.7	8.9	10.6	13.5	11.8
6	9.0	12.4	15.6	15.9	14.4
Acceptable (7)	27.5	36.5	43.8	34.4	39.1

<b>A regulation that requires deer hunters to kill one or more antlerless deer before they could kill a 2nd antlered deer in affected areas (<math>\bar{x}</math>)</b>	4.6	4.5	5.0	4.7	4.6
Unacceptable (1)	14.2	17.8	9.5	10.7	11.1
2	5.4	4.7	4.5	8.1	8.1
3	4.3	4.3	5.5	5.5	6.0
Neutral (4)	25.6	24.5	19.3	24.6	26.1
5	10.8	8.4	12.3	10.7	8.1
6	8.2	11.8	13.0	9.7	11.2
Acceptable (7)	31.6	28.4	35.9	30.8	29.5
<b>Reduction of localized deer populations using sharpshooters in affected areas (<math>\bar{x}</math>)</b>	2.6	3.0	3.2	3.1	3.0
Unacceptable (1)	47.2	42.9	36.4	40.0	37.6
2	11.6	9.7	9.5	11.0	12.0
3	6.2	6.5	10.5	6.2	9.3
Neutral (4)	21.2	17.5	16.4	19.5	19.7
5	2.6	5.8	8.0	5.2	5.3
6	3.6	4.5	4.1	3.3	3.7
Acceptable (7)	7.5	13.0	15.2	14.8	12.5

Table 36 Mean and percent responses by DMA for statements to the prompt, “Research has shown that adult male deer (bucks) are infected with CWD at higher rates than other age and sex classes of deer. If it is necessary to reduce the number of mature bucks on the landscape in areas affected by CWD, please indicate how acceptable or unacceptable the following options are.”

	DMA1	DMA2	DMA3	Adjacent	Other
<b>Initiate a velvet (early) season in affected areas (<math>\bar{x}</math>)</b>	3.9	4.4	4.7	4.8	4.9
Unacceptable (1)	22.6	17.9	11.7	10.2	8.9
2	5.6	4.3	5.9	4.3	4.2
3	7.3	7.8	5.4	6.4	3.9
Neutral (4)	29.7	24.6	23.4	27.6	25.7
5	11.4	9.3	12.4	9.3	17.9
6	4.9	9.5	9.7	12.9	11.0
Acceptable (7)	18.5	26.7	31.5	29.3	28.4
<b>Extra buck tags that are only valid in affected areas (<math>\bar{x}</math>)</b>	4.8	5.1	5.4	5.3	5.4
Unacceptable (1)	13.1	10.2	8.9	7.3	4.6
2	3.9	3.5	2.2	2.4	3.3
3	4.1	4.8	2.5	3.1	3.5
Neutral (4)	21.1	16.9	16.1	20.4	17.2
5	15.1	14.3	9.8	11.6	15.1
6	11.0	13.4	18.3	14.9	17.2
Acceptable (7)	31.7	37.0	42.1	40.3	39.2
<b>Expand buck firearm season before the rut in affected areas (<math>\bar{x}</math>)</b>	4.2	4.6	5.2	4.9	5.2
Unacceptable (1)	20.5	18.9	8.6	9.0	5.6
2	7.1	3.5	5.0	4.5	4.5
3	3.2	7.4	3.2	5.5	4.7
Neutral (4)	22.2	15.2	19.0	24.0	20.1
5	15.1	11.3	11.5	11.6	12.4
6	8.4	11.9	13.1	14.0	15.0
Acceptable (7)	23.3	31.9	39.7	31.4	37.6
<b>Expand buck firearm season after the rut in affected areas (<math>\bar{x}</math>)</b>	4.7	5.1	5.5	5.2	5.3
Unacceptable (1)	13.4	10.7	6.8	7.1	5.1
2	5.2	1.7	2.3	3.1	2.8
3	3.5	5.4	1.4	3.1	4.0
Neutral (4)	21.4	17.2	16.0	19.9	22.1
5	15.6	13.7	13.8	16.5	14.2
6	12.3	15.0	16.5	16.8	16.3
Acceptable (7)	28.7	36.3	43.3	33.6	35.6

Table 37 Percent responses by DMA to methods used for handling deer carcass in the most recent deer season. Percent response per DMA can exceed 100% because multiple responses could be selected.

	DMA1	DMA2	DMA3	Adjacent	Other
De-bone the deer in the field	3.6	3.4	8.8	4.7	6.0
Quarter the deer in the field	11.2	8.4	11.8	9.9	7.7
Bring the whole carcass out of the field (except organs removed during field-dressing)	92.1	87.6	84.8	83.9	69.0
Bring the whole carcass out of the field (including organs)	11.5	18.6	14.8	22.6	36.8

Table 38 Percent responses by DMA for deer harvest processed used in hunters' most recent deer season. Percent response per DMA can exceed 100% because multiple responses could be selected.

	DMA1	DMA2	DMA3	Adjacent	Other
Deer processor for my own use	48.6	48.1	31.5	48.8	29.7
Deer processor for donation to Hunters for the Hungry, or a similar organization	8.0	12.0	11.5	7.8	5.6
Processed by friends or family members	17.8	16.5	12.9	19.9	20.2
Processed my own deer	62.9	68.0	74.8	68.0	76.7

Table 39 Percent response by DMA for hunters' disposal methods used in the most recent deer season. Percent response per DMA can exceed 100% because multiple responses could be selected.

	DMA1	DMA2	DMA3	Adjacent	Other
Left carcass parts at the location of the harvest	25.3	25.4	26.3	26.1	25.9
Left carcass parts on the landscape, away from location of the harvest but within 20 miles of where the deer was harvested	13.0	22.4	24.1	25.2	28.9
Left carcass parts of the landscape, farther than 20 miles away from where the deer was harvested	3.2	1.5	1.9	3.1	4.6
Buried leftover carcass parts	13.4	19.5	18.9	13.7	25.9
Disposed of leftover carcass parts in an open-air pit	5.5	13.2	8.5	8.4	16.3
Disposed of leftover carcass parts directly in a landfill or transfer station	51.0	30.5	30.7	35.4	25.6
Disposed of leftover carcass parts in a household trash container	8.3	17.3	21.9	19.9	13.1

Table 40 Percent response by DMA for hunters that had a deer tested in the past five years and the type of testing process used. Percent response per DMA can exceed 100% because multiple responses could be selected.

	DMA1	DMA2	DMA3	Adjacent	Other
<b>Harvest tested in past 5 years</b>					
Yes (%)	33.1	19.1	17.6	9.0	4.6
<b>Testing Process</b>					
Mandatory CWD sample station	69.1	30.2	45.5	62.2	25.9
Taxidermist	24.3	24.4	39.0	27.0	22.2
Voluntary CWD deer head drop site	5.3	19.8	18.2	8.1	44.4
Deer processor	24.3	54.7	16.9	37.8	44.4

Table 41 Mean and percent response by DMA to the question, “Below are potential reasons for testing harvested deer for CWD. How important are each of the following to you?” Responses ranged from Not at all Important (1) to Very Important (4).

	DMA1	DMA2	DMA3	Adjacent	Other
<b>Concern about eating meat from a deer infected with CWD (<math>\bar{x}</math>)</b>					
Not at all important	17.8	13.2	6.2	7.9	15.2
Somewhat important	36.2	31.9	26.2	21.1	30.3
Moderately important	21.7	24.2	25.0	28.9	15.2
Very important	24.3	30.8	42.5	42.1	39.4
<b>Help DWR monitor the status of CWD in VA (<math>\bar{x}</math>)</b>					
Not at all important	3.9	1.1	0.0	0.0	0.0
Somewhat important	20.3	15.4	6.3	12.8	0.0
Moderately important	35.3	27.5	24.1	25.6	15.2
Very important	40.5	56.0	69.6	61.5	84.8
<b>The people closest to me (e.g., significant other, friend, family member) think it is important (<math>\bar{x}</math>)</b>					
Not at all important	20.4	24.4	6.4	18.4	9.1
Somewhat important	27.0	26.7	17.9	15.8	33.3
Moderately important	32.2	22.2	33.3	26.3	24.2
Very important	20.4	26.7	42.3	39.5	33.3

Table 42 Percent responses by DMA for hunters that hunted cervid outside Virginia in the past 5 years and, if yes, did they hunt in a state or country with known positive cases of CWD.

	DMA1	DMA2	DMA3	Adjacent	Other
Hunted Cervid Outside VA (% Yes)	21.4	23.2	13.3	23.9	18.9
Hunted Cervid Outside VA in CWD area					
Yes (%)	73.0	56.9	55.0	57.4	38.0
No (%)	17.0	22.0	30.0	20.8	31.5
Unsure (%)	10.0	21.1	15.0	21.8	30.6

Table 43 Percent responses by DMA for reported changes to deer hunting and deer meat consumption due to the spread of CWD in Virginia.

	DMA1	DMA2	DMA3	Adjacent	Other
<b>Change in deer hunting (<math>\bar{x}</math>)</b>	3.1	3	3.1	3	3
Hunt much more in CWD areas	0.4	0.0	1.6	0.0	0.0
Hunt a bit more in CWD areas	0.0	0.0	0.7	0.7	1.1
No change in where I hunt	96.6	95.5	95.3	94.7	97.0
Hunt a bit less in CWD areas	1.3	2.2	0.7	1.0	0.7
Hunt much less in CWD areas	1.7	2.4	1.8	3.6	1.2
<b>Change in deer consumption (<math>\bar{x}</math>)</b>	3.1	3.1	3.1	3.2	3
Major increase	0.4	1.1	0.4	0.2	0.0
Slight increase	1.1	0.2	2.7	0.7	1.6
No change	92.3	91.4	82.5	93.8	94.1
Slight decrease	2.8	4.9	8.3	3.8	2.8
Major decrease	3.4	2.4	6.1	1.4	1.6

Table 44 Percent responses by DMA for reported deer hunting in DMAs in past seasons.

	DMA1	DMA2	DMA3	Adjacent	Other
DMA1 in past 5 seasons	90.2	16.5	0.7	9.6	1.0
DMA2 in past 2 seasons	29.1	85.4	0.4	31.9	2.6
Adjacent to DMA1 or 2 in past 2 seasons	9.2	23.0	3.1	69.2	6.5
DMA3 in past season	1.3	1.1	80.7	1.3	5.2



Table 45 Percent responses by DMA for the area in Virginia most hunted in the past 5 years.

	DMA1	DMA2	DMA3	Adjacent	Other
DMA1	82.8	6.0	0.2	8.1	0.8
DMA2	9.3	76.7	0.4	19.4	1.1
DMA3	1.1	0.4	82.6	0.9	3.7
Counties Adjacent to DMA1 or 2	3.8	9.5	1.8	50.2	4.4
Other places in Virginia	3.0	7.3	15.0	21.4	90.0

Table 46 Percent responses by DMA to questions about DWR efforts to manage CWD in Virginia.

	DMA1	DMA2	DMA3	Adjacent	Other
<b>DWR's efforts to restrict carcass transportation are:</b>					
Not restrictive enough	4.2	4.0	5.5	3.4	3.4
Appropriate	69.7	58.2	66.1	50.7	47.2
Too restrictive	4.8	10.3	5.5	8.5	3.8
Don't know/Not sure	21.3	27.5	23.0	37.4	45.6
<b>DWR's efforts to increase hunting seasons and bag limits in DMA counties are:</b>					
Too limited	9.0	16.9	18.0	9.0	6.1
Appropriate	51.3	48.7	52.5	44.9	43.4
Too extensive	20.8	11.0	2.7	6.6	3.8
Don't know/Not sure	18.9	23.5	26.8	39.6	46.8
<b>DWR's efforts to collect samples from deer in DMA counties to test for CWD are:</b>					
Too limited	19.7	20.6	20.4	11.9	7.5
Appropriate	62.8	54.2	55.6	45.1	44.9
Too extensive	2.4	2.4	3.2	2.9	0.7
Don't know/Not sure	15.1	22.8	20.9	40.0	46.9
<b>DWR's efforts to collect samples from deer in non-DMA counties to test for CWD are:</b>					
Too limited	11.6	15.1	16.4	11.9	12.5
Appropriate	49.0	46.1	45.5	36.9	36.1
Too extensive	2.0	2.4	2.5	4.6	1.4
Don't know/Not sure	37.4	36.4	35.7	46.6	49.9

Table 47 Mean and percent responses by DMA for hunters' ratings of DWR communication efforts related to CWD. Responses ranged from Strongly Disagree (1) to Strongly Agree (5).

	DMA1	DMA2	DMA3	Adjacent	Other
<b>Provides me with enough information to decide what actions I should take regarding CWD (<math>\bar{x}</math>)</b>	3.6	3.5	3.5	3.5	3.5
Strongly Disagree	3.1	2.4	4.1	1.5	2.9
Disagree	7.5	9.5	8.4	9.8	8.0
Neither Agree or Disagree	24.3	27.0	24.8	32.2	35.5
Agree	56.6	54.7	54.1	48.4	46.3
Strongly Agree	8.6	6.4	8.6	8.1	7.3
<b>Provides the best available information on CWD in Virginia (<math>\bar{x}</math>)</b>	3.6	3.6	3.6	3.6	3.5
Strongly Disagree	2.2	2.4	2.7	1.7	2.5
Disagree	6.6	7.5	6.1	5.9	5.9
Neither Agree or Disagree	26.9	31.6	28.4	30.4	37.4
Agree	53.1	48.5	54.1	52.7	44.8
Strongly Agree	11.2	10.1	8.6	9.3	9.4
<b>Provides timely information regarding CWD issues (<math>\bar{x}</math>)</b>	3.6	3.6	3.6	3.6	3.5
Strongly Disagree	2.9	1.1	2.7	1.2	3.2
Disagree	8.4	8.4	7.7	6.0	6.1
Neither Agree or Disagree	26.0	32.3	27.1	32.6	38.7
Agree	52.9	50.4	54.4	52.2	43.2
Strongly Agree	9.9	7.7	8.0	8.0	8.8
<b>Provides truthful information about human safety issues related to CWD (<math>\bar{x}</math>)</b>	3.7	3.6	3.7	3.7	3.6
Strongly Disagree	1.6	2.9	2.5	1.7	2.0
Disagree	5.1	3.9	4.1	4.2	3.4
Neither Agree or Disagree	31.0	32.2	27.0	33.5	35.8
Agree	49.3	49.8	55.9	48.3	46.9
Strongly Agree	12.9	11.2	10.5	12.3	11.9
<b>Provides truthful information about the spread of CWD in Virginia (<math>\bar{x}</math>)</b>	3.7	3.7	3.7	3.7	3.7
Strongly Disagree	1.5	2.9	2.1	1.5	1.8
Disagree	6.0	3.3	6.2	4.9	2.9
Neither Agree or Disagree	26.5	29.2	21.2	30.0	32.2
Agree	53.9	53.8	59.1	50.2	50.3
Strongly Agree	12.1	10.8	11.4	13.3	12.9

<b>Provides adequate opportunities for hunters to express their concerns about CWD (<math>\bar{x}</math>)</b>	3.5	3.5	3.5	3.5	3.5
Strongly Disagree	2.6	2.6	2.3	2.7	2.2
Disagree	7.0	7.9	7.8	6.9	7.2
Neither Agree or Disagree	35.3	36.6	32.3	37.0	35.5
Agree	46.3	43.4	49.1	43.1	45.5
Strongly Agree	8.8	9.4	8.5	10.3	9.7

Table 48 Mean and percent responses by DMA for hunters' ratings of DWR management efforts related to deer and CWD. Responses ranged from Strongly Disagree (1) to Strongly Agree (5).

	DMA1	DMA2	DMA3	Adjacent	Other
<b>Makes good management decisions for deer in Virginia (<math>\bar{x}</math>)</b>	3.3	3.4	3.5	3.6	3.4
Strongly Disagree	6.7	6.4	2.7	4.2	3.7
Disagree	13.6	11.4	11.6	5.7	13.5
Neither Agree or Disagree	27.1	25.0	28.9	21.7	26.7
Agree	45.1	48.2	48.6	59.0	47.1
Strongly Agree	7.6	9.0	8.2	9.4	8.9
<b>Makes good management decisions regarding CWD (<math>\bar{x}</math>)</b>	3.5	3.5	3.5	3.6	3.6
Strongly Disagree	4.2	3.7	1.8	1.5	0.7
Disagree	5.8	3.7	6.4	3.9	3.2
Neither Agree or Disagree	36.8	39.0	33.2	35.6	44.1
Agree	45.5	46.3	52.3	49.1	43.2
Strongly Agree	7.8	7.2	6.4	9.8	8.8
<b>Implements appropriate regulations to minimize the spread and prevalence of CWD (<math>\bar{x}</math>)</b>	3.5	3.5	3.5	3.6	3.6
Strongly Disagree	3.6	3.9	1.8	1.7	0.9
Disagree	8.9	6.6	6.3	3.5	4.1
Neither Agree or Disagree	32.1	37.3	37.2	37.5	40.2
Agree	48.0	45.0	49.2	50.1	45.5
Strongly Agree	7.4	7.2	5.4	7.2	9.3
<b>Follows the best available science in managing CWD (<math>\bar{x}</math>)</b>	3.5	3.5	3.7	3.6	3.6
Strongly Disagree	3.8	4.4	1.4	1.2	0.5
Disagree	3.6	3.5	2.5	3.9	1.3
Neither Agree or Disagree	38.5	39.0	32.7	38.2	43.1
Agree	46.5	44.7	55.9	45.6	46.1
Strongly Agree	7.6	8.3	7.5	11.1	9.0

Table 49 Percent responses by DMA for where hunters have gained information about CWD.

	DMA1	DMA2	DMA3	Adjacent	Other
Family and friends	57.2	63.7	70.0	55.9	55.0
Local newspaper	33.9	27.9	36.0	20.3	21.9
Statewide or National newspapers	37.2	32.0	29.3	24.2	24.0
Radio	19.4	13.7	19.1	12.1	11.8
TV – News	24.8	21.8	40.3	21.4	27.8
TV – Outdoor program	59.6	62.7	56.6	60.4	65.7
DWR Website	81.0	81.2	84.4	78.4	75.7
Outdoor blogs and websites (non-DWR)	52.9	56.0	55.3	51.3	55.2
Outdoor magazines (non-DWR)	60.3	64.3	48.5	62.5	57.6
Virginia Department of Health (VDH)	24.5	19.8	24.5	18.8	23.2
Center for Disease Control (CDC)	17.7	15.9	21.2	15.8	17.0
DWR Staff	44.0	36.7	38.2	33.9	34.4
DWR Public meeting	21.5	22.2	21.3	17.2	14.6
DWR online social media (i.e., Facebook)	33.9	37.9	39.6	35.2	36.0
DWR Hunting Regulations booklet	87.8	81.5	72.5	80.4	79.9
Online social media account (non-DWR)	26.8	31.6	32.5	29.7	32.4

Table 50 Percent responses by DMA for hunters' preferences for receiving information about CWD in the future.

	DMA1	DMA2	DMA3	Adjacent	Other
Family and friends	16.2	25.2	22.2	18.3	19.8
Local newspaper	26.9	22.7	17.9	22.3	19.3
Statewide or National newspapers	14.3	14.8	11.5	14.9	11.4
Radio	17.3	15.6	10.4	14.2	12.3
TV – News	17.3	22.3	31.9	21.9	19.6
TV – Outdoor program	21.3	24.6	21.3	20.8	22.4
DWR Website	67.8	66.8	66.3	67.1	61.4
Outdoor blogs and websites (non-DWR)	17.3	18.6	12.2	16.6	17.2
Outdoor magazines (non-DWR)	24.5	26.4	15.8	25.5	23.5
Virginia Department of Health (VDH)	18.8	22.3	22.6	20.2	16.7
Center for Disease Control (CDC)	13.6	17.2	14.5	16.3	11.3
DWR Staff	18.6	24.0	21.5	20.8	19.9
DWR Public meeting	17.5	18.6	21.0	15.9	15.0
DWR online social media (i.e., Facebook)	27.5	27.3	33.5	35.0	28.6
DWR Hunting Regulations booklet	67.2	62.7	59.3	69.0	65.5
Online social media account (non-DWR)	9.6	12.1	12.0	11.0	15.5
Information via the mail	32.6	37.5	43.2	38.2	39.9

Table 51 Average hunter age by DMA.

	DMA1	DMA2	DMA3	Adjacent	Other
Mean (Years)	49.6	48.5	43.7	48.9	47.6

Table 52 Hunter demographics by DMA.

	DMA1	DMA2	DMA3	Adjacent	Other
<b>Gender</b>					
Woman	9	5.2	6.3	7.3	9.3
Man	89.4	92.5	92.9	90.1	89.7
Transgender	0	0	0	0	0
A gender not listed here	1.1	1.7	0.3	0.3	0.2
Prefer not to say	0.5	0.5	0.5	2.3	0.8
<b>Ethnicity</b>					
Hispanic	1.4	1.5	1.7	3.6	0.8
Non-Hispanic	98.6	98.5	98.3	96.4	99.2
<b>Race</b>					
White	97	92.9	96.7	86.9	91.1
Black or African American	0.8	2.3	0.8	4.6	3.4
American Indian or Alaska Native	0.5	0.3	0	0	1
Asian	0	1	0.6	1.1	0
Native Hawaiian or Pacific Islander	0.3	0	0	0	0
Other	0.5	1.3	1.4	1.3	1
Multiracial	0.8	2.3	0.6	6.2	3.6

Table 53 Continued hunter demographics by DMA.

	DMA1	DMA2	DMA3	Adjacent	Other
<b>Education</b>					
Less than high school	3.8	2.5	3	5.3	4.6
High school diploma or equivalent	44.8	33.4	31.6	23.9	30.5
Some college, no degree	25.4	27.1	26.4	27.6	31.3
Associate's degree	12.6	10.6	12.8	10.9	13.7
Bachelor's degree	6.3	15.3	16.1	17.5	14.1
Master's degree	4.6	7.8	6.3	10.9	3.8
Professional degree	0.5	1	1.1	1.6	1.2
Doctorate degree	1.6	2.3	2.7	2.4	1
<b>Income Level</b>					
Less than \$24,999	17.7	9.7	17.1	10.9	16.1
\$25,000 - \$49,999	24.5	21.3	29	17	28
\$50,000 - \$74,999	23	18.3	27.2	19.3	22.4
\$75,000 - \$99,999	13	17.8	11.3	13.5	16.4
\$100,000 - \$124,999	9.1	11.6	9	14.1	8.1
\$125,000 or more	12.7	21.3	6.4	25.3	9.1
<b>Current Residency</b>					
Urban	6.6	4.4	6.5	11.4	10.5
Suburban	16.5	25.9	28.6	40.3	29.3
Rural	76.6	69.6	64.9	48.3	60.2
<b>Childhood Residency</b>					
Urban	5.1	6.7	5.9	11.8	10.3
Suburban	19.3	31.2	22.6	34.9	28.3
Rural	75.4	62.1	71.4	53.2	61.4



Table 54 Summary of responses where hunters had learned about CWD from other sources not specifically listed in the survey.

Response	Examples	Count
Podcast	"Podcasts", "Meateater podcast"	37
Other Government Agency	"Colorado Parks and Wildlife", "Other State Research and Reports"	31
Non-Governmental Agency	"NRA", "QDMA Program"	26
Scientist, university, or scientific research	"Online searches of scientific literature", "Microbiology dept, College of Charleston"	22
Internet search (non-specific)	"General internet searches", "Youtube"	18
Wildlife or hunting resource	"A Game Book", "hunting websites"	12
Virginia Wildlife magazine	"VA Wildlife", "Virginia Wildlife Magazine Article"	6

Table 55 Summary of comments for the open-ended question at the end of the survey for further comments about CWD in Virginia.

Response	Examples	Count
Suggestion to change or add new hunting regulation	"Outlaw all deer feeding, salt blocks, etc. at all times. " "I fully support creating more opportunities for hunters to control the deer populations in DMAs including longer seasons and increased bag limits."	90
Request information or lacks information	"I answered the best I could to the questions but have not had very much information on CWD. I am going to educate myself how now through the information sites you have given."	57
Approval of DWR	"I attended a public meeting and found it informative .... I benefitted from it and appreciated the opportunity to interface with DWR staff."	57
Disapproval of current management or regulations	"Cut down the # of gun hunting seasons in VA!!! Season is way too long and too many deer get killed!!!"	47
Suggestion to change or add testing options	"We need to implement a better way to test for CWD. I personally would be willing to pay for a field test kit."	39
Question	"Are there any cases documenting where CWD has jumped from deer (in particular) to humans through the consumption of venison?"	36
Disapproval of communication	"DWR has not been timely on updated regulations."	19
CWD concern	"I am concerned about the future of deer hunting in Virginia because of CWD."	12
Change in hunting or consumption behaviors	"Only reason my family did not harvest deer this year is we are waiting on [previous year] CWD test results"	8
CWD is natural	"Cwd is concerning but over harvest and crazy regulations is not going to do but so much for the spread we need to let nature take it's course"	7
Refute the severity or impact of CWD or known information about CWD	"Chronic waste is more about the pollution, pesticides and fertilizers harming animals. Look into that, then you might have a chance at removing this infection ."	7

## DISCUSSION

### **(1) Assess knowledge, awareness, and perceived effectiveness of DWR management actions in reducing CWD transmission and spread**

Overall, hunters had high social trust with DWR. DWR has made numerous efforts to communicate updates and management efforts to hunters. DWR regularly receives public input during the regulatory process and receives input from hunters on hunter surveys. Anecdotally, there has not been strong disagreement from Virginia hunters about DWR's efforts to manage CWD. The results of this study provide empirical evidence that hunters in Virginia trust DWR's decision to manage wildlife. There was a high percent of hunters that were neutral about DWR's decisions. This indicates a potential need to increase or change the way DWR communicates its management efforts.

There were no strong or consistent differences in perceptions of DWR management between hunters in different DMAs, potentially due to the communication efforts that DWR uses to provide information to hunters. DWR has made strong efforts to provide information to hunters in Virginia, especially to hunters in areas where CWD has been detected. For example, DWR has hosted town hall events in areas with CWD. These town hall events were also broadcast and recorded via Facebook for public access. The Virginia Hunting Digest is printed and distributed across the state and a digital copy is available on the DWR website ([dwr.virginia.gov/hunting/regulations/](http://dwr.virginia.gov/hunting/regulations/)). The digest provides comprehensive information about CWD to all hunters in the state.

### **(2) Assess preferred levels of action for DWR to pursue to control CWD**

A high percent of hunters approved of current management efforts and a high percent were uncertain about appropriate levels of action. Ideally, an organization would want to definitively demonstrate both their actions and the outcomes that result from those actions. The uncertainty related to CWD – prevalence rate, transmission rate, and efforts required to stop the spread of the disease, are all high. With so much uncertainty it is difficult to demonstrate positive results. Even without the possibility of a cure, previous human dimensions research on management preferences for CWD indicate that hunters are strongly opposed to 'do nothing' approaches (Needham et al., 2004). In that light, DWR may consider further highlighting the efforts and actions they are undertaking even if the outcomes are uncertain. More details on actions and efforts being conducted annually would help demonstrate that DWR is taking an active role in CWD management.

### **(3) Assess support or opposition for novel management strategies**

Hunters were generally supportive of new management strategies with the exception of a potential option to introduce sharpshooters to harvest deer. This aligns with previous research indicating that using agency staff to reduce cervid populations was less supported than increasing hunting opportunities for non-commercial hunters (Needham & Vaske, 2008). Theories related to self-interest may explain the preference for management options that create additional hunting options for hunters (i.e., extended season or additional season) and the rejection of an option that reduces hunting opportunities – introducing sharpshooters. DWR does not have plans to introduce sharpshooters to reduce local deer populations. And to garner support for a

management option that may be perceived as against the self-interest of hunters, there would need to be an extensive effort to prove that the “cost” of a given policy would be worthwhile to hunters (Rho & Tomz, 2017). In the case of CWD, there would need to be evidence that a short-term reduction in deer hunting opportunities would lead to more hunting opportunities and a healthy deer herd in the future. This would hold true for more popular management strategies as well since a high percent of hunters responded “Neutral” to all management options and would potentially need convincing that a change would have a real impact on CWD. Given the high uncertainties surrounding CWD management, this would likely be a challenging undertaking.

#### **(4) Assess perception of risk that CWD poses to humans and the wild cervid population of Virginia**

Results from this study align with previous studies indicating that hunters perceive CWD risks higher for deer compared to humans (Smith et al., 2020; Vaske et al., 2018). These risk perceptions also align with scientific research on CWD risks, which has not produced evidence of impacts to humans (MaWhinney et al., 2006) but has produced evidence that population-level declines are possible (DeVivo et al., 2017). Further, there is likely enough evidence from organizations outside Virginia and images of deer with CWD to convince people with limited knowledge of CWD that the disease is harmful to deer.

The introduction and spread of CWD in Virginia, and across the United States and elsewhere, have likely impacted the knowledge and risk perceptions of hunters across Virginia, not just those hunting in areas with CWD-positive deer. As CWD has spread, various organizations have spread information about it, allowing hunters in non-CWD areas to learn about the disease. Smith et al. (2020) suggest a similar explanation for the lack of risk perception differences between hunters hunting in CWD management and adjacent areas in Minnesota. As previously mentioned, the most common sources of CWD information for Virginia hunters were produced by DWR and are available to all hunters. Further, results from the open-ended question about other sources of CWD information revealed a wide variety of information sources including federal agencies, other state wildlife agencies, universities outside Virginia, hunting NGOs, and podcasts. This is a broad trend that continues with the proliferation of internet access and technologies. This process has been described as the *pluralization of public communication* and means that more media platforms and more individuals and organizations can produce and transfer information to broad audiences (Weitkamp et al., 2021). DWR will need to continue to provide as much relevant information as it can to hunters in the state. DWR may also explore how it can best curate external sources of information about CWD in order to leverage the trust that constituents have in other organizations and media channels.

#### *Future Research*

Further analysis on hunters that were unsure about DWR management decisions or about preferred levels of action may be beneficial. A segmentation analysis may yield a sub-population of hunters that are less engaged in CWD management. Following a segmentation analysis, we would be able to analyze for differences between sub-populations and determine whether there are differences in hunting motivations or communication preferences that could be used to inform future DWR efforts to engage with hunters that are less certain or knowledgeable about current DWR efforts.

Virginia DWR collaborated with researchers at North Carolina State University and staff at the North Carolina Wildlife Resources Commission to develop several survey items. The surveys in each state were distributed within a few weeks of each other. Future comparisons of survey responses between states may provide additional context for how hunters in Virginia perceive CWD.

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## Supplemental Materials

To correct for differences between the population and the respondents was compared to available metadata for the population. Typically, metadata for the population of interest is not available. The Go Outdoors Virginia license database has some data that can be used to compare the population to the respondents- age, gender, license purchase avidity, and geographic residency. The sampling methodology included a stratified random sample according to residency within or near a CWD DMA. The DMA and Adjacent strata were oversampled given their importance for CWD management. The largest strata, which included hunters that lived outside the DMAs, was undersampled. As a result, population-level estimates (i.e., overall survey results) were weighted. Following population-respondent comparison, and non-respondent comparisons, strata-level results were also weighted.

Supplemental Table 1 Comparisons between respondents and the population and respondents and non-respondents. For non-response comparisons, only results significant at the  $\alpha = .05$  level are reported.

	Respondents (%)	Population (%)	Statistical test	Statistical difference	Effect Size
Age (Years)	53.1	44.4	$t = 30.1$	$p < .001$	Cohen's d = .53
Gender (% Women)	4.5	8.5	$\chi^2 = 51.0$	$p < .001$	Cramer's V = .01
License Avidity (% Avid)	46.0	64.2	$\chi^2 = 352.0$	$p < .001$	Cramer's V = .04
Residency:			$\chi^2 = 3641.0$	$p < .001$	Cramer's V = .12
DMA1 (%)	18.5	5.8			
DMA2 (%)	20.0	5.2			
DMA3 (%)	16.7	4.1			
Adjacent to DMA1/2 (%)	20.9	13.7			
Other (%)	23.9	71.3			
	Respondents (%)	Non-respondents (%)			
Education:			$\chi^2 = 14.7$	$p < .001$	Cramer's V = .08
Less than bachelor's degree	62.9	80.7			
Bachelor's degree or higher	37.1	19.3			

*Survey Copy*

Dear Virginia Hunter,

The Virginia Department of Wildlife Resources (DWR) invites you participate in a survey about chronic wasting disease (CWD) management. CWD was first detected in deer in Virginia in 2009. Over the last several decades, the disease has been confirmed in 29 states, including West Virginia, Maryland, Pennsylvania, and Tennessee. In recent years, CWD has been detected in multiple new counties in Virginia. As part of CWD management in Virginia, DWR is committed to sustaining deer populations, addressing disease concerns, and preserving Virginia's deer hunting heritage. In support of these goals, DWR is inviting hunters to participate in a survey so that the agency can learn how hunters are managing with CWD and what the agency can do to continue sustaining healthy deer herds and supporting deer hunting in Virginia.

You are among a small percent of hunters that has been selected for this survey. You were eligible for selection because you purchased a hunting license within the past few years. Hunters living in CWD Disease Management Areas (DMAs), or counties adjacent to DMAs, are more likely to receive a survey invitation. Please respond to this survey, even if you did not hunt deer this past year or have not regularly hunted deer in recent years. DWR is interested in the perspective of hunters who hunt every season as well as hunters who do not have the opportunity to hunt as often. This survey should take 15-20 minutes to complete. The results of this study will be reported in aggregate and shared with DWR staff and other wildlife professionals to better understand and support CWD management. The results will also be used to help direct the development of novel CWD management strategies.

We will do everything we can to protect your privacy and confidentiality. Your name will never be associated with your responses and survey responses will not be used to pursue hunting violations that are revealed in this survey. Participation in this study is not mandatory. If you have any questions or concerns about this study, please contact [UVA Contact Information]. Instructions for completing this survey are below. Thank you for your help on this important topic!



CONSERVE. CONNECT. PROTECT.

[Insert UVA Logo]

The survey begins on the back of this page. Please take your time and respond to the questions as best you can. When you have answered all of the questions, place all of the survey pages, including this one, into the pre-paid envelope and mail the envelope at your earliest convenience.



**Section 1. Hunting Participation**

1. When was the last time you hunted deer in Virginia?

- The most recent season, 2021- 2022
- The 2020-2021 season (over a year ago)
- The 2019-2020 season (over two years ago)
- A season before 2019-2020 (three or more years ago)
- I have never hunted deer in Virginia (If selected, skip to Question 36, Page 11)

2. What county or city in Virginia do you most often hunt deer? \_\_\_\_\_ **County/City**

3. In the past year, have you hunted deer with any of the following? (*Check all that apply*)

- Friends
- Immediate family
- Members of a hunt club
- Extended family
- Other (Please describe): \_\_\_\_\_
- Did not hunt in the past year

4. How would you describe your experience as a deer hunter?

- Beginner
- Intermediate
- Advanced

5. How important to you is each of the following reasons to hunt deer in Virginia?

	<b>Not at all important</b>	<b>Slightly important</b>	<b>Moderately important</b>	<b>Very important</b>
<b>To spend time in nature</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>To harvest a trophy</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>To spend time with family/friends</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>To obtain wild game meat</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>To contribute to wildlife management</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>To contribute to the local community (e.g. financial benefits from hunters)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>To test/improve my skills</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>For physical exercise</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Section 2 CWD Management**

6. Before receiving this survey, had you heard about chronic wasting disease (CWD)?

- Yes                       No (If No, skip to the map on page 8)

7. How much would you say that you know about CWD?

- Hardly anything       A little bit               A fair amount               A lot

8. Please indicate if you believe that each of the following statements related to chronic wasting disease (CWD) are True or False. (Check “Unsure” if you are not sure if the statement is true or false.)

	True	False	Unsure
<b>CWD outbreaks typically occur in late summer to early fall.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>A deer that has CWD can still look healthy.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Deer infected with CWD will die only if they experience a severe case.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Research suggests CWD has created some human health problems.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>The importation of whole deer carcasses into VA is prohibited to prevent the spread of CWD.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you would like to receive a one-time mailing from DWR that explains the known risks of CWD, select the box below.

- Yes, I would like to receive additional information about CWD.**

9. How much risk do you think is associated with each of the following happening to you?

(Check one answer for each statement)

	No Risk =1			Some Risk =5			Extreme Risk =9		
	1	2	3	4	5	6	7	8	9
<b>Contracting Rabies</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Contracting COVID-19</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Getting shot by another hunter</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Accidentally shooting yourself</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Harvesting a deer infected with COVID-19</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Inadvertently eating meat from an animal infected with CWD</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Becoming ill as a result of exposure to CWD</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. How concerned are you about each of the following issues now that chronic wasting disease has been detected in 11 Virginia counties? (Check one answer for each statement)

	Not Concerned = 1			Somewhat Concerned = 5			Extremely Concerned = 9		
	1	2	3	4	5	6	7	8	9
<b>Your own personal health?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>The health of other people you know?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>The potential for CWD to dramatically reduce the deer population in Virginia?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>The threat CWD poses to the future of deer hunting in Virginia?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. We would like to know how concerned you would be about eating meat from a wild deer harvested by you or another hunter in a county where **chronic wasting disease has been detected**. (Check one answer for each statement)

**How concerned would you be about eating meat from this deer if it...**

	Not at all Concerned	Slightly Concerned	Extremely concerned
<b>...was not tested for CWD?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>...tested positive for CWD?</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



12. DWR is evaluating management options to slow the spread of this disease. If it is necessary to reduce deer populations in areas affected by CWD, please indicate how acceptable or unacceptable the following options are. (Check one answer for each statement)

	Unacceptable			Neutral		Acceptable	
	1	2	3	4	5	6	7
<b>Unlimited doe bag limits in affected areas</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Increase the length of the general firearms season in affected areas</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>An early antlerless-only firearms season during September in affected areas</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>A late antlerless-only firearms season during January-March in affected areas</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>A regulation that requires deer hunters to kill one or more antlerless deer before they could kill a 2<sup>nd</sup> antlered deer in affected areas</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Reduction of localized deer populations using sharpshooters in affected areas</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. Research has shown that adult male deer (bucks) are infected with CWD at higher rates than other age and sex classes of deer. If it is necessary to reduce the number of mature bucks on the landscape in areas affected by CWD, please indicate how acceptable or unacceptable the following options are. (Check one answer for each statement)

	Unacceptable			Neutral		Acceptable	
	1	2	3	4	5	6	7
<b>Initiate a velvet (early) season in affected areas</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Extra buck tags that are only valid in affected areas</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Expand buck firearms season before the rut in affected areas</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Expand buck firearm season after the rut in affected areas</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**14.** DWR is interested in how hunters handle, process, and dispose of deer carcasses. In the 2021-2022 DEER seasons, did you engage in any of the following when handling a deer that you harvested? (*Check all that apply*)

- De-bone the deer in the field
- Quarter the deer in the field
- Bring the whole carcass out of the field (except organs removed during field-dressing)
- Bring the whole carcass out of the field (including organs)
- I did not harvest a deer in the 2021-2022 DEER seasons (If selected, skip to Question 17)

**15.** In the 2021-2022 DEER seasons, were any of the deer you harvested processed in any of the following ways? (*Check all that apply*)

- Deer processor for my own use
- Deer processor for donation to Hunters for the Hungry, or a similar organization
- Processed by friends or family members
- Processed my own deer

**16.** In the 2021-2022 DEER seasons, did you use any of the following disposal options for deer you harvested? (*Check all that apply*)

- Left carcass parts at the location of the harvest
- Left carcass parts on the landscape, away from location of the harvest but within 20 miles of where the deer was harvested
- Left carcass parts on the landscape, farther than 20 miles away from where the deer was harvested
- Buried leftover carcass parts
- Disposed of leftover carcass parts in an open-air pit
- Disposed of leftover carcass parts directly in a landfill or transfer station
- Disposed of leftover carcass parts in a household trash container

**17.** Did you get any of your deer, harvested in Virginia, tested for CWD in the last 5 years?

- Yes  No (If No, skip to Question 20, Page 7)

18. How did you get your deer tested for CWD? (Check all that apply)

- Mandatory CWD sample station                       Voluntary CWD deer head drop site  
 Taxidermist     Deer processor

19. Below are potential reasons for testing harvested deer for CWD. How important are each of the following to you?

	Not at all important	Somewhat Important	Moderately Important	Very Important
<b>Concern about eating meat from a deer infected with CWD</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Help DWR monitor the status of CWD in VA</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>The people closest to me (e.g., significant other, friend, family member) think it is important</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. In the past 5 years, have you hunted deer or other cervids outside Virginia? (*Cervids include white-tailed deer, black-tailed deer, mule deer, elk, moose, or reindeer*)

- Yes     No (If No, skip to Question 22 )

21. Did you hunt deer or other cervids in another country or in a state other than Virginia where CWD was known to occur?

- Yes                                       No                                       Unsure

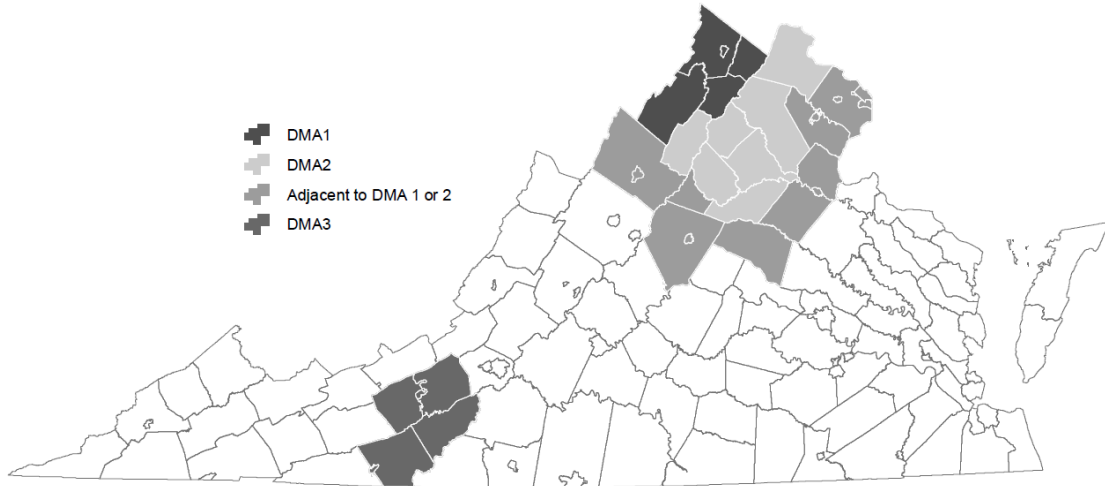
22. Have you changed where you hunt deer in Virginia because of the spread of CWD?

- |                             |                              |                           |                              |                             |
|-----------------------------|------------------------------|---------------------------|------------------------------|-----------------------------|
| Hunt much more in CWD areas | Hunt a bit more in CWD areas | No change in where I hunt | Hunt a bit less in CWD areas | Hunt much less in CWD areas |
| <input type="checkbox"/>    | <input type="checkbox"/>     | <input type="checkbox"/>  | <input type="checkbox"/>     | <input type="checkbox"/>    |

23. Have you changed your consumption of deer meat harvested in Virginia because of the spread of CWD?

- |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Major increase           | Slight increase          | No change                | Slight decrease          | Major decrease           |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Below is a map of Virginia highlighting CWD Disease Management Areas (DMAs). Counties, and the cities and towns within, are assigned to DMAs based on the distance to confirmed CWD-detections and depending on the number of deer in the area that have tested positive for CWD. Counties adjacent to DMAs 1 and 2 are also highlighted for reference.



**Counties in DMA1**- Clarke, Frederick, Shenandoah, Warren

**Counties in DMA2** – Culpeper, Fauquier, Loudon, Madison, Orange, Page, Rappahannock

**Counties Adjacent to DMA1 or 2** – Albemarle, Fairfax, Greene, Louisa, Prince William, Rockingham, Spotsylvania, Stafford

**Counties in DMA3**- Carroll, Floyd, Montgomery, Pulaski

**24.** Anytime during the past 5 seasons, have you hunted deer in **DMA1**?

- Yes  No

**25.** Anytime during the past 2 seasons, have you hunted deer in **DMA2**?

- Yes  No

**26.** Anytime during the past 2 seasons, have you hunted deer in any counties **Adjacent to DMA1 or 2**?

- Yes  No

**27.** Anytime during the 2021-2022 season, did you hunt deer in **DMA3**?

- Yes  No

**28.** Where have you most often hunted in the past 5 seasons?

- DMA1**  **DMA2**  **Counties Adjacent to DMA1 or 2**  **DMA3**  **Other places in Virginia**

**\* If you had not heard about CWD before receiving this survey, SKIP to Question 36 on Page 11 \***

DWR has taken efforts to manage the spread of CWD in Virginia. For the following three statements select the response that best matches what you know about these efforts.

**29. DWR's efforts to restrict carcass transportation are:**

Not restrictive enough      Appropriate      Too restrictive      Don't know/ Not sure  
                                                                                                                 

**30. DWR's efforts to increase hunting seasons and bag limits in DMA counties are:**

Too limited                      Appropriate                      Too extensive                      Don't know/ Not Sure  
                                                                                                                 

**31. DWR's efforts to collect samples from deer in DMA counties to test for CWD are:**

Too limited                      Appropriate                      Too extensive                      Don't know/ Not Sure  
                                                                                                                 

**32. DWR's efforts to collect samples from deer in non-DMA counties to test for CWD are:**

Too limited                      Appropriate                      Too extensive                      Don't know/ Not Sure  
                                                                                                                 

**Section 3 DWR Management and Communication**

**33. How much do you agree or disagree with the following statements about the Virginia Department of Wildlife Resources (DWR)? (Check one answer for each statement)**

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
<b>Provides me with enough information to decide what actions I should take regarding CWD.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Provides the best available information on CWD in Virginia</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Provides timely information regarding CWD issues</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Provides truthful information about human safety issues related to CWD</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Provides truthful information about the spread of CWD in Virginia</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Provides adequate opportunities for hunters to express their concerns about CWD.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



34. How much do you agree or disagree with the following statements about the Virginia Department of Wildlife Resources (DWR)? (Check one answer for each statement)

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither Agree or Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>Makes good management decisions for deer in Virginia</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Makes good management decisions regarding CWD</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Implements appropriate regulations to minimize the spread and prevalence of CWD</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Follows the best available science in managing CWD</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

35. How much information do you get about CWD from the sources listed below:

	<b>None</b>	<b>A little</b>	<b>A lot</b>
<b>Family and friends</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Local newspaper</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Statewide or National newspapers</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Radio</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>TV – News</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>TV – Outdoor program</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DWR Website</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Outdoor blogs and websites (non-DWR)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Outdoor magazines (non-DWR)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Virginia Department of Health (VDH)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Center for Disease Control (CDC)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DWR Staff</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DWR Public meeting</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DWR online social media (i.e., Facebook)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>DWR Hunting Regulations booklet</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Online social media account (non-DWR)</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you have received information about CWD from another source, not listed on the previous page, please list it below:

**36.** In the future, how would you prefer to receive information about chronic wasting disease (CWD) in deer in Virginia? *(Check all that apply)*

- |   |   |
|---|---|
| <input type="checkbox"/> Family and friends                   | <input type="checkbox"/> DWR Website                              |
| <input type="checkbox"/> Local newspaper                      | <input type="checkbox"/> Virginia Department of Health (VDH)      |
| <input type="checkbox"/> Statewide or National newspapers     | <input type="checkbox"/> Center for Disease Control (CDC)         |
| <input type="checkbox"/> Radio                                | <input type="checkbox"/> DWR Staff                                |
| <input type="checkbox"/> TV – News                            | <input type="checkbox"/> DWR Public meeting                       |
| <input type="checkbox"/> TV – Outdoor program                 | <input type="checkbox"/> DWR online social media (i.e., Facebook) |
| <input type="checkbox"/> Outdoor blogs and websites (non-DWR) | <input type="checkbox"/> DWR Hunting Regulations booklet          |
| <input type="checkbox"/> Outdoor magazines (non-DWR)          | <input type="checkbox"/> Online social media account (non-DWR)    |
| <input type="checkbox"/> Information via the mail             |   |

**Section 4 Hunter Information**

**37.** In what year were you born? \_\_\_\_\_

**38.** What is your gender?

- |                                      |   |
|--------------------------------------|---|
| <input type="checkbox"/> Woman       | <input type="checkbox"/> A gender not listed here (Please specify:) |
| <input type="checkbox"/> Man         | <input type="checkbox"/> Prefer not to answer                       |
| <input type="checkbox"/> Transgender |   |

**39.** What is your ethnicity?

- |                                   |                                       |
|-----------------------------------|---------------------------------------|
| <input type="checkbox"/> Hispanic | <input type="checkbox"/> Non-Hispanic |
|-----------------------------------|---------------------------------------|

**40.** What is your race?

- |   |  |
|---|--|
| <input type="checkbox"/> White                            | <input type="checkbox"/> Asian                               |
| <input type="checkbox"/> Black or African American        | <input type="checkbox"/> Native Hawaiian or Pacific Islander |
| <input type="checkbox"/> American Indian or Alaska Native | <input type="checkbox"/> Other (Please specify): _____       |

41. What is your highest degree or level of school? (*Select one*)

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Less than high school             | <input type="checkbox"/> Associate's degree | <input type="checkbox"/> Professional degree |
| <input type="checkbox"/> High school diploma or equivalent | <input type="checkbox"/> Bachelor's degree  | <input type="checkbox"/> Doctorate degree    |
| <input type="checkbox"/> Some college, no degree           | <input type="checkbox"/> Master's degree    |  |

42. What was your total individual income during the past 12 months? (*Select one*)

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Less than \$24,999  | <input type="checkbox"/> \$50,000 - \$74,999 | <input type="checkbox"/> \$100,000 - \$124,999 |
| <input type="checkbox"/> \$25,000 - \$49,999 | <input type="checkbox"/> \$75,000 - \$99,999 | <input type="checkbox"/> \$125,000 or more     |

43. Which of the following best describes where you live now compared to where you lived most of your time growing up? (*Please select one per statement*)

	<b>Urban</b>	<b>Suburban</b>	<b>Rural</b>
<b>Where I live now</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Where I lived growing up</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you have any further comments about chronic wasting disease in Virginia, please share them in the space below.

Thank you for taking the time to complete this survey. Please place the completed survey in the pre-paid envelope that arrived with this survey. If you have any questions regarding this study, please contact \_\_\_\_\_ [UVA Contact Info].