
Study of Southeast Minnesota Landowners' Attitudes toward Chronic Wasting Disease and its Management

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Introduction

Chronic wasting disease (CWD) is a neurological disorder that affects species of the family cervidae, including deer, elk, moose, and caribou. The disease is always fatal and as such represents a significant threat to the health of wild cervid populations, and the sustainability of the flow of benefits Minnesotans obtain from them. Managing CWD requires the cooperation of multiple stakeholders beyond the Department of Natural Resources and partner agencies. This is especially true in the context of southeast Minnesota where the disease is primarily found in deer that live on privately owned land. Facilitating access for hunters, and maintaining participation in deer hunting is critical for meeting disease management goals, including lower deer density. With this in mind this study was conducted to better understand southeast Minnesota landowners' attitudes toward CWD and preferences for CWD management, especially the use of financial incentives to facilitate access for hunters, and to maintain hunter participation.

Methods

Sample Frame and Sampling Procedure

Freely available land parcel data was obtained from Dakota, Fillmore, Goodhue, Houston, Olmsted, Wabasha, and Winona counties in southeast Minnesota. The administrative boundaries of these counties was the geographic extent of the study. Parcels less than 20 acres in size, and those classified as industrial or commercial were removed from the study sample frame. Individual parcels were then dissolved based on common owner names (e.g., landowners that own more than one parcel) and parcel size recalculated for multipart features in ArcGIS 10.2. The parcels were then filtered to remove corporate landholdings using keywords (e.g., LLC, INC, Corp, etc.). Public lands, including those held by the state of Minnesota, counties, towns, cities, schools and churches were removed. Landowners with incomplete mailing addresses were removed. Finally, a check was conducted to ensure that individuals that were sampled in a partner study of southeast Minnesota deer hunters were not included in the sample. Address lists were compared from that study, and 357 landowners were removed. A final sample frame of 12,555 landowners was created. 5,000 landowners were randomly selected for participation from 4 quantiles of property size (20-42 acres, 43-100 acres, 101-202 acres, and >202 acres) in even amounts. Participants in this final list ($n=5,000$) were then randomly assigned to one of 4 survey versions for a stated choice experiment ($n=1,250$ per version).

Following the first round mailing it was apparent that an error occurred in the processing of names and addresses for Goodhue and Olmsted counties (the vast majority of solicitations returned undeliverable). These two counties were resampled following the same procedures outlined above, and the originally sampled parcels/owners excluded. There were fewer remaining parcels available to resample the largest land parcel strata (>202) proportional to the initial random selection. Therefore, all remaining parcels in this strata were selected for participation.

Data Collection

Data were collected through postal mail following the recommendations of Dillman et al. (2014). Three attempts were made to solicit participation. Participants were sent a survey packet containing a cover letter describing the nature of the study, a copy of the survey questionnaire and a business reply envelope to return the completed questionnaire at no cost to them. Solicitations were sent at roughly 4-week intervals beginning on February 16, 2019. Data collection was ceased July 31, 2019. Address lists were adjusted between mailings, and responding parties removed.

Choice Experiment Design

A discrete choice experiment was embedded in the survey questionnaire to explore landowners' preferences for incentives and regulations to facilitate hunter access, deer-hunting participation, and management of CWD in southeast Minnesota. The experiment asked landowners to choose between two competing sets of regulatory options for CWD management, or a status quo option for neither. In the experiment, pairs of attributes were systematically manipulated to determine that attributes part-worth utility in landowners' choice of program structure.

Program attributes were derived from focus groups conducted in 2018 with landowners and hunters in the study focus area. Attribute levels were determined in consultation with wildlife section leadership to represent feasible management alternatives. A total of 7 CWD management program attributes were evaluated including: deer density reduction, financial payments to landowners for CWD positive deer shot on their property, financial payment to hunters for shooting CWD positive deer, the form of an incentive given to a landowner for offering public hunting access, use of deer culling, and imposition of a deer feeding ban. Attributes and levels are presented in Table I1.

The experimental design was generated in the Sawtooth statistical software (Chrzan and Orme, 2000). The d-efficiency metric was used to compare study designs considering the number of choice tasks, attributes and levels, data needs and length. The d-efficiency of several designs were compared and a design with 4 survey versions with 7 tasks was ultimately selected. Each version does not contain all possible choice sets. Rather, they are distributed across the four versions, and an assumption that participants are rational actors with homogenous preferences is made.

Data Analysis

Descriptive statistics including means, frequencies, and proportions were calculated for all survey items as appropriate using the Stata statistical software version 15 (StataCorp, 2017).

The choice experiment was analyzed using an alternative specific conditional logit model. Extensions of this model, including latent class analyses, and/or hierarchical Bayesian estimation, which more explicitly account for preference heterogeneity, will be explored in a more comprehensive format including peer reviewed scientific

literature. The results here simply reflect the average part-worth utility of that attribute in landowners' choice of regulatory options.

Table 11. Stated choice experiment attributes and levels

Attributes	Levels
Reduce deer herd in CWD management zone	No change, 25% reduction, 50% reduction
Pay hunter for killing a CWD positive deer	\$0, \$1,000, \$2,000
Pay landowner if CWD positive deer killed on their property	\$0, \$1,000, \$2,000
Incentivize landowners to allow public hunting access	No incentive, Tax break per acre, Monetary payment per acre
Use professionals to cull deer in CWD management zone	Yes, No
Continue deer feeding ban outside of CWD management zone	Yes, No

Results

Response Rate

A total of 4,992 questionnaires were mailed to landowners in southeast Minnesota (adjusted from 5,000 following the first mailing). Of these, 134 questionnaires were returned undeliverable. A further 27 responses were either invalid or unusable. Another 22 indicated that their land area was less than 20 acres and were excluded from the analysis, and 22 duplicate response identification numbers were identified and removed. The adjusted sample frame was 4,807. A total of 1,605 questionnaires were returned valid and useable. This yields an adjusted response rate of 33%.

Post-hoc Weighting

Responses were more or less equally distributed across the sample strata following the study design. The three smallest land parcel strata were slightly over sampled (~27% of responses each), and the largest strata by parcel size was under sampled (~17% of responses). Weights were calculated by dividing the sample proportion by the expected value (population proportion). Weights used for analysis are presented in Table I2.

Table 12. Summary of sample proportion by strata and post-hoc weights

Strata	Sample proportion	Population proportion	Weight
Strata 1 (20-42 acres)	.2793	.25	.895095
Strata 2 (43-100 acres)	.2750	.25	.909091
Strata 3 (101-202 acres)	.2732	.25	.915081
Strata 4 (>202 acres)	.1724	.25	1.450116

Part A. About Your Property

Land parcel size

Study participants owned on average 215 acres of land in southeast Minnesota. Landowners that leased property leased an average of 188 acres (Table A1.)

Identity as a landowner

Landowners were asked to indicate the one label that best identified them as a landowner (Table A2). Among respondents, 36% reported that “corn/soybean grower” best identified them as a landowner. This was followed by 19% that felt that “homeowner” best described them. 17% self-identified with the label “recreationist” and 15% felt that some other label was best reflective of them. Roughly 12% identified with “cattle producer” and “hobby farmer” respectively. A small minority of participants identified with the labels “vegetable grower”, “poultry producer”, or “dairy producer.”

Property posting

Around 42% of landowners in southeast MN reported that they post their property (Table A3). Landowners were asked their agreement with a variety of reasons why they post their property (Table A4) on a scale where 1=strongly disagree, 2=disagree, 3=neither, 4=agree, and 5=strongly agree. Among those that post their property, more than 95% agreed with the statement “control who uses my property” as a reason for posting their property. Similarly high levels of agreement were found for items: “human safety”, “liability concerns”, and “eliminate trespass.” On average, southeast MN landowners were in less agreement with motives associated with controlling deer populations, protecting livestock, or keeping wildlife for themselves or friends and family as reasons for posting their property.

Table A1. Average acres owned and leased by southeast MN landowners

Question	M (SD)
Acres owned	214.94 (299.17)
Acres leased	187.63 (413.06)

Table A2. Primary identity as a landowner among respondents

Question	Percent
Corn/soybean grower	36.2
Hobby farmer	11.7
Homeowner	19.3
Cattle producer	12.3
Vegetable grower	2.0
Poultry producer	<1.0
Recreationist	16.9
Dairy producer	4.5
Other	15.5

Table A3. Percent of southeast MN landowners with posted property

Question	Percent
Percent of landowners with posted property	42.2

Table A4. Southeast MN landowners' reasons for posting their property

Question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	M (SD)
Control who uses my land	1.9	0.5	1.9	18.6	77.1	4.68 (0.72)
Human safety	2.4	2.5	15.8	28.2	51.0	4.23 (0.97)
Liability concerns	1.9	2.2	11.7	27.7	56.5	4.35 (0.91)
Eliminate trespass	2.5	1.6	4.5	25.6	65.7	4.51 (0.86)
Keep wildlife for myself/family/friends	10.3	12.1	30.6	20.3	26.7	3.41 (1.28)
Reduce property damage	2.4	5.4	21.9	32.4	37.8	3.98 (1.02)
Livestock safety	12.5	6.6	41.7	14.8	24.4	3.32 (1.26)
Relationship with neighbor	8.9	7.8	40.8	21.5	21.0	3.38 (1.16)
Better control of deer population	10.3	9.1	43.7	16.2	20.8	3.28 (1.19)
Family tradition	8.3	7.8	40.1	20.8	23.0	3.42 (1.17)
Conflict with other recreational users	7.0	8.0	36.6	21.0	27.5	3.54 (1.17)
Other	7.1	2.1	65.7	6.3	18.8	3.28 (1.02)

Part B. Deer Hunting and Your Property

Deer hunting participation by landowners

A majority of landowners indicated that they have hunted deer in the last 3 years. Only ~46% indicated that they have not (Table B1). Around 40% of landowners participated in firearm deer hunting in 2016, 2017, and 2018. This value was lower for archery (~20%) and muzzleloader (~12%) respectively (Table B2).

Hunting landowners' effort was spread relatively evenly across several deer permit areas, with the exception of deer permit area (DPA) 338 which less than 1% indicated was their primary deer hunting area.

As might be expected, the majority of hunting effort (62%) was concentrated on the lands that landowners own themselves. Similarly, greater than 80% of southeast MN landowners indicated that they did not public land at all for deer (Table B4).

Deer hunting access and restrictions

Greater than 80% of southeast MN landowners allow deer hunting on their property (Table B5). Roughly 54% allow family members to hunt on their property or hunt their property themselves. Around 59% reported that they allowed hunting access to friends or neighbors. Roughly 11% allowed access to strangers that ask permission. A small minority provided hunting access to hunt groups or individuals that lease their property (Table B6).

Among landowners that allow deer hunting on their property, the vast majority (~73%) did not impose any restrictions on what type of deer (age and sex) can be harvested. Around 16% of landowners restrict hunters to take only mature bucks, but allow hunters to take any antlerless deer. A small percent (~2%) restrict antlerless harvest, but allow the take of any legal buck or restrict both antlered and antlerless harvest (Table B7).

Deer hunting property leasing

Less than 3% of landowners reported that they lease their property for deer hunting (Table B8). Landowners reported their agreement with several statements about why they might lease their property on a scale where 1=strongly disagree, 2=disagree, 3=neither, 4=agree, and 5=strongly agree. Among individuals that lease their property, a majority agreed that exerting control over who accesses their property was a reason for leasing. Landowners, on average, disagreed that social pressure from neighbors was a reason for leasing. (Table B9).

Beliefs about deer hunting and hunters

Landowners were asked their agreement with a variety of statements about deer hunting and their property in general (Table B10) on a scale where 1=strongly disagree, 2=disagree, 3=neither, 4=agree, and 5=strongly agree. On average, landowners agreed with statements "hunting will reduce the number of deer on my property," "hunting is a tradition of my family," "I am concerned about the liability of other hunters on my property," and

“hunting on my property will help keep deer from being over abundant.” Landowners expressed particularly strong disagreement with the statement “I am opposed to hunting in general.”

Landowners also reported their agreement with statements regarding the extent to which they perceive hunters to share similar values as them and whether or not they can be trusted to make appropriate decisions. Responses were recorded on a scale where 1=strongly disagree, 2=disagree, 3=neither, 4=agree, and 5=strongly agree. On average, felt that deer hunters shared similar values as them (Table B11), and that deer hunters can be trusted to make appropriate decisions.

Table B1. Percent of southeast MN landowners that did not hunt deer in 2016, 2017, or 2018

Question	Percent
Percent of landowners that did not hunt deer	45.7

Table B2. Percent of southeast MN landowners that hunted deer in 2016, 2017 and 2018 by season

Year	Archery	Firearm	Muzzleloader
2016	20.3	43.4	12.4
2017	20.9	42.8	11.6
2018	21.5	42.7	11.4

Table B3. Percent of southeast MN landowners by primary deer permit area hunted in 2018

Deer Permit Area	Percent
338	<1%
339	3.7
341	11.9
342	10.8
343	10.5
344	3.6
345	8.4
346	14.1
347	7.8
348	4.6
349	17.7
603	6.5
Other	33 DPAs listed (most commonly 293)

Table B4. Primary location southeast MN landowners hunted

Question	None	Some	Most	All	M (SD)
Private land that I own	9.0	9.3	19.6	62.1	3.49 (0.98)
Private land that I lease for hunting	92.1	2.7	3.5	1.7	1.15 (0.55)
Private land that I do not own or lease	60.9	23.7	10.2	5.2	1.60 (0.87)
Public land	81.8	14.2	2.4	1.6	1.24 (0.57)

Table B5. Percent of southeast MN landowners that allow deer hunting on their property

Question	Percent
Percent of landowners that allow deer hunt on their property	80.8

Table B6. Percent of southeast MN landowners that allow deer hunting on their property by type of people and the average number of type of people

Question	Percent	M (SD)
Myself or family members	53.6	4.04 (2.99)
Friends or neighbors	58.7	4.73 (4.25)
Strangers who ask permission	11.0	2.63 (2.52)
Specific groups of people who are affiliated with an organized hunting group	1.3	2.88 (4.38)
People who lease my property	4.0	2.57 (2.96)
Other	1.7	2.32 (3.48)

Table B7. Percent of southeast MN landowners that impose different deer hunting restrictions on their property

Question	Percent
Antlerless harvest is restricted, but hunters can take any legal buck	2.3
Buck harvest is restricted to only large antlered bucks, but hunters can take any antlerless deer	15.8
Buck harvest restricted to only large antlered bucks, and antlerless harvest is also restricted	2.5
No restrictions on the type of deer that can be harvested	72.7
Don't know	2.6
Other	4.1

Table B8. Percent of southeast MN landowners that lease their property for deer hunting

Question	Percent
Percent of landowners that lease their property for deer hunting	2.5

Table B9. Reasons why southeast MN landowners lease their property for deer hunting

Question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	M (SD)
I have better control over who is using my land	13.8	5.0	16.6	20.0	44.6	3.77 (1.42)
I have better control of the type of deer that are harvested	17.6	5.9	43.8	13.3	19.4	3.11 (1.29)
I am managing my property for mature bucks	26.7	8.7	43.4	9.7	11.5	2.70 (1.28)
Leasing allows me to earn extra money from my property	31.6	10.7	33.2	6.6	17.8	2.68 (1.44)
I feel pressure from my neighbors who also lease their property	42.1	10.3	12.1	2.3	3.1	2.14 (1.10)
I see leasing as the future way landowners can manage their property	33.0	6.9	40.9	10.5	8.8	2.55 (1.23)
Other	26.0	3.2	58.0	6.4	6.4	2.64 (1.15)

Table B10. Southeast MN landowners' beliefs about deer hunting and hunters in general

Question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	M (SD)
Hunting will reduce the number of deer on my property	5.5	11.3	29.1	36.2	18.0	3.50 (1.08)
Hunting is a tradition in my family	10.0	8.1	20.1	28.7	33.2	3.67 (1.28)
I feel pressure from my neighbors to allow hunting	32.9	28.2	30.0	6.3	2.7	2.18 (1.04)
Hunting will reduce the number of mature bucks on my property	9.4	16.7	35.2	27.4	11.3	3.14 (1.12)
Allowing other hunters on my property will reduce my family's opportunity to hunt deer	13.4	46.6	30.6	23.1	16.3	3.12 (1.25)
Hunters cause too many problems	14.2	24.5	32.3	17.4	9.6	2.84 (1.16)
I am concerned about the liability of other hunters on my property	6.5	14.2	24.9	33.5	21.0	3.48 (1.16)
I am opposed to deer hunting in general	62.3	20.0	14.8	1.7	1.3	1.60 (0.89)
I am not opposed to hunting, but I want to provide a refuge for deer	26.1	21.4	33.9	13.6	5.0	2.50 (1.16)
Hunting reduces my privacy	15.6	23.1	30.8	21.3	9.3	2.86 (1.19)
Hunting reduces damage caused by deer on property	7.2	11.7	31.4	33.7	16.1	3.40 (1.11)
Hunting improves the quality of habitat on my property	6.9	12.6	49.6	23.2	7.8	3.12 (0.97)
Hunting on my property will help keep deer from being over-abundant in the area	4.2	8.0	23.0	45.7	19.2	3.68 (1.01)
Letting others hunt on my property encourages a hunting tradition	6.4	8.1	37.8	36.5	11.3	3.38 (1.00)
Hunting puts my livestock at risk	19.7	22.1	40.1	11.9	6.2	2.63 (1.11)

Table B11. Southeast MN landowners' perception of value similarity with deer hunters

Question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	M (SD)
...share similar values as me	3.4	9.9	30.6	47.7	8.4	3.48 (0.91)
...share similar opinions as me	2.9	10.2	40.4	40.4	6.1	3.37 (0.86)
...think in a similar way as me	3.3	11.2	42.4	37.7	5.4	3.31 (0.86)
...take similar actions as I would	3.6	11.8	40.7	38.6	5.3	3.30 (0.88)
...share similar goals as me	3.8	13.0	40.2	37.4	5.7	3.28 (0.90)
...are open and honest about things they do and say related to deer hunting	5.9	11.8	32.4	44.0	5.9	3.32 (0.96)
...can be trusted to make decisions about deer hunting that are good for the resource	5.5	12.9	32.5	42.5	6.7	3.32 (0.97)
...listen to landowners' concerns	5.9	11.6	25.4	48.4	8.7	3.42 (1.00)

Part C. Opinions about Deer Management and Chronic Wasting Disease

Attitudes toward reducing deer density

Landowners were asked to choose between three sets of options on bipolar scales indicating their attitude toward reducing deer density as a CWD management strategy. These sets included foolish versus wise, worthless versus valuable, and bad versus good. Bipolar statements were recorded on a scale where -3 and +3 = extremely, -2 and +2 = moderately, -1 and +1 = slightly and 0 = neither. Greater than 70% of landowners either expressed a neutral or positive attitude toward density reduction. However, 22.8%, 23.7% and 21.6% of landowners indicated that reducing deer density was either extremely, moderately or slightly foolish, worthless, or bad respectively (Table C1).

Perception of and preference for deer populations

On average, landowners perceived (Table C2) a slight increase in the deer population around their property over the last 5 years. Response were recorded on a scale where 1=a lot fewer deer, 2=moderately fewer deer, 3=slightly fewer deer, 4=about the same number of deer, 5=slightly more deer, 6=moderately more deer, and 7=many more deer).

Nearly 48% of landowners felt that the deer population around their property is “about right” while roughly 39% indicated that it was either, slightly, moderately, or much too high. Fewer landowners (~14%) felt that the deer population was too low (Table C3). Responses were recorded on a scale where 1=much too low, 2=moderately too low, 3=slightly too low, 4=about right, 5=slightly too high, 6=moderately too high, and 7=much too high.

Emotions and CWD

Landowners were asked the extent to which CWD causes them worry, uncertainty, and anger (Table C4). On a unipolar scale ranging from 1=none to 7=a lot, landowner reported experiencing a moderate amount of worry and uncertainty, but experienced anger to a lesser degree (Table C4).

Beliefs about CWD regulations

Landowners indicated their agreement with a variety of statements about CWD regulations on a scale where 1=strongly disagree, 2=disagree, 3=neither, 4=agree, and 5=strongly agree. There was strong agreement with the statements “CWD regulations should be designed to limit disease spread” and “CWD regulations should consider long-term impacts on deer populations.” Respondents expressed disagreement with the notion of letting nature take its course with respect to CWD, or providing a financial incentive for harvest (Table C5).

Perceived risks from CWD

Several potential risks associated with CWD were presented to southeast MN landowners for assessment. Landowners expressed concern over the potential for CWD to spread because of deer and elk farms, spread through the deer population on their property, and affect the health of deer around their property, among

others (Table C6). Interestingly, landowners expressed the least concern with the statement “CWD will lead to declining land values.” Responses were recorded on a unipolar scale where 1=not at all concerned and 7=extremely concerned.

Table C1. Southeast MN landowners' attitudes toward reducing deer density to manage CWD

Question (-)	Extremely	Moderately	Slightly	Neither	Slightly	Moderately	Extremely	Question (+)	M (SD)
Foolish	9.2	6.4	7.2	19.0	12.0	21.6	24.6	Wise	3.81 (1.95)
Worthless	10.2	7.3	6.2	21.9	13.0	19.6	21.8	Valuable	3.88 (1.89)
Bad	9.7	5.8	6.1	26.0	11.4	18.1	23.0	Good	2.95 (1.97)

Table C2. Southeast MN landowners' perception of the 5-year trend in deer population

Question	A lot fewer deer	Moderately fewer deer	Slightly fewer deer	About the same number of deer	Slightly more deer	Moderately more deer	Many more deer	M (SD)
5-Year Trend	4.2	7.0	9.5	40.7	15.8	11.8	11.1	4.36 (1.50)

Table C3. Southeast MN landowners' belief about the deer population around their property

Question	Much too low	Moderately too low	Slightly too low	About right	Slightly too high	Moderately too high	Much too high	M (SD)
Perception of deer population	2.1	4.2	7.4	47.5	17.3	11.3	10.3	4.49 (1.32)

Table C4. Southeast MN landowners' feelings about CWD

Question	None 1	2	3	4	5	6	A lot 7	M (SD)
Worry	18.3	11.3	13.2	16.8	16.8	13.0	10.0	3.81 (1.95)
Uncertainty	16.1	11.2	12.9	21.0	16.4	12.4	10.1	3.88 (1.89)
Anger	35.1	15.9	12.0	14.7	8.0	6.0	8.3	2.95 (1.97)

Table C5. Southeast MN landowners' beliefs about CWD regulations

Question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	M (SD)
...be designed to reduce deer densities	7.5	12.6	24.9	39.0	16.0	3.43 (1.12)
...take precedent over all other deer hunting regulations	12.6	18.7	28.5	28.4	11.8	3.08 (1.20)
...be no different than deer hunting regulations in surrounding areas	8.3	28.0	32.1	25.3	6.2	2.93 (1.05)
...be designed to limit disease spread	3.9	4.9	15.2	47.0	29.1	3.92 (0.99)
...be passive and let nature take its course	18.8	35.4	23.0	14.3	8.5	2.58 (1.19)
...be as aggressive as possible in the short term (3-5 years)	9.9	13.2	27.1	33.8	16.0	3.33 (1.18)
...consider the long-term impacts on deer populations	2.9	4.2	23.9	50.0	19.1	3.78 (0.90)
...not impact local economies	5.7	14.2	49.3	25.0	5.8	3.11 (0.92)
...not impact hunter participation	5.2	14.0	41.5	31.1	8.2	3.23 (0.97)
...provide a financial incentive for harvest	15.9	22.8	40.6	16.2	4.6	2.71 (1.06)
...provide a non-financial incentive for harvest	8.8	10.5	47.4	25.8	7.4	3.13 (1.00)

Table C6. Southeast MN landowners' concerns about CWD

Question	Not at all concerned						Extremely concerned	M (SD)
	1	2	3	4	5	6	7	
...spread throughout the deer population on or around your property	11.3	9.4	9.3	16.9	20.1	15.7	17.4	4.42 (1.92)
...dramatically reduce the deer population on or around your property	15.2	14.8	13.7	21.1	15.3	11.3	8.6	3.75 (1.85)
...affect the health of the deer population on or around your property	12.3	10.1	9.0	18.6	19.2	16.9	13.9	4.28 (1.91)
...have the potential to kill the entire deer population on or around your property	19.6	14.4	12.8	20.4	12.7	10.3	9.9	3.62 (1.94)
...threaten deer hunting opportunity	17.0	12.9	10.6	19.9	15.9	12.7	11.1	3.87 (1.95)
...threaten the future of deer hunting for your children or grandchildren	18.8	11.9	10.2	16.8	15.6	13.6	13.1	3.91 (2.03)
...affect the future existence of deer on the Minnesota landscape	14.7	11.1	11.9	20.5	17.3	13.4	11.2	3.99 (1.90)
...spread to livestock	19.4	12.0	8.7	16.3	12.8	14.8	16.1	4.00 (2.12)
...have economic impacts on businesses that depend on deer hunting	18.7	14.0	12.6	24.3	15.6	9.2	5.6	3.54 (1.79)
...lead to declining land values	32.4	16.9	11.8	17.0	8.8	6.7	6.5	2.99 (1.90)
...spread because of deer and elk farms	14.7	8.6	7.7	15.9	13.0	14.9	25.2	4.49 (2.12)

Question	Not at all concerned						Extremely concerned	M (SD)
	1	2	3	4	5	6	7	
...cause your family to stop eating deer meat	27.6	12.8	8.8	17.1	12.3	10.6	10.9	3.49 (2.09)
...cause you to have concerns about eating deer meat	23.6	13.0	9.2	13.5	12.7	13.5	14.5	3.77 (2.16)
...threaten your personal health or the health of your family	24.0	14.4	9.0	16.9	12.8	10.4	12.7	3.62 (2.09)
...cause disease in humans	22.9	14.4	9.2	14.4	13.4	11.9	13.9	3.72 (2.12)
...cause disease in you personally	30.3	15.3	8.8	14.6	10.8	8.9	11.3	3.32 (2.11)

Part D. Management and Regulations to Address Chronic Wasting Disease

Perceptions of current CWD management and regulations

The MNDNR is currently engaged in a variety of activities to address the threat of CWD. Landowners were asked their general perception of these activities. Around half of landowners thought that the approach taken by the MNDNR with respect to CWD was “about right” while a quarter of landowners perceived this approach to be either “too aggressive” or “not aggressive enough” (Table D1).

Landowners were asked to indicate whether they support or oppose several management strategies currently used by the MDNR to address CWD in southeast MN on a scale where 1=strongly oppose, 2=oppose, 3=neither, 4=support, and 5=strongly support. Nearly 79% of landowners either support or strongly support the mandatory testing of deer killed in the CWD management zone. There was a similarly high level of support for the requirement that deer carcasses remain in the CWD management zone until a test was performed and confirmed not positive. Landowners were more split between support and opposition on the issuance of unlimited antlerless tags with a one-buck limit, and the allowance of “cross-tagging” (allowing hunters to transfer tags between one another) of antlered deer (Table D2). Respondents subsequently rated the perceived effectiveness of the same regulations on a unipolar scale ranging from 1=not at all effective to 5=extremely effective. Landowners perceived carcass movement restrictions and mandatory testing to be the most effective management strategies. While allowing the use of either an “A” or “B” deer license, and issuance of unlined antlerless tags with a one-buck limit were seen as the least effective among the strategies evaluated (Table D3).

Potential changes to deer season

Landowners were asked to evaluate a number of potential changes to the deer season structure and deer hunting regulations on a scale where 1=strongly oppose, 2=slightly oppose, 3=neither, 4=slightly support, and 5=strongly support (Table D4). Delaying the firearms deer season (moving the start date later in the year) was not well supported by respondents. Eliminating the 4 point per side antler point restriction was evaluated with equal parts support and opposition among landowners, as was the notion of allowing buck cross tagging. Around 40% of landowners either support or strongly support combining the 3A and 3B deer seasons.

Perceptions of incentives for access and harvest

Landowners were asked to evaluate several potential financial and non-financial incentives the MNDNR could offer to help facilitate hunting access and sustained participation in deer hunting in the southeast CWD management zone on a scale where 1=strongly oppose, 2=oppose, 3=neither, 4=support and 5=strongly support. There was strong support (>68%) for expanding the venison donation program as a potential tool to help manage CWD. Between 40 and 50% of landowners either supported or strongly supported the issuance of replacement or additional tags or free licenses to hunters that killed CWD positive deer. Around 40% of landowners supported the development of a tax break mechanism for landowners that provide public hunting access. On average, landowners did not support the use of financial payments either to hunters or landowners

for deer shot, or for providing hunting access. Interestingly, the option that received the least support was the issuance of a lifetime deer license to a hunter that shoots a CWD positive deer (Table D5).

Respondents were asked directly if they support the use of financial incentives to facilitate harvest and access in the CWD management zone. Only 28% of respondents indicated that they did. Individuals that did support the use of financial incentives were asked to state the maximum amount they would support paying to hunters and landowners if that money came from MNDNR or a private group (Table D7). Landowners, on average, would pay a maximum of \$530 to hunters and \$392 to landowners if the source was the MNDNR. On average, landowners would support paying maximums of \$163 and \$402 to hunters and landowners respectively if that money were paid by a private group. These values, however, were spread across a large range (Table D7).

Trust in MNDNR

Landowners expressed moderate levels of trust in the MNDNR with respect to perceptions of shared values, and decision making processes (Table D8). Greater than 50% of landowners agreed or strongly agreed with statements regarding the MDNR's ability to address the threat of CWD and provide information landowners need to make informed decisions about CWD (Table D9). Responses were recorded on a scale where 1=strongly disagree, 2=disagree, 3=neither, 4=agree, and 5=strongly agree.

Table D1. Southeast MN landowners' perception of MDNR's CWD management

Question	Too aggressive	About right	Not aggressive enough
Perception of CWD management	20.4	55.0	24.5

Table D2. Southeast MN landowners' support for existing CWD management strategies

Question	Strongly oppose	Oppose	Neither	Support	Strongly support	M (SD)
Mandatory CWD testing	3.1	3.7	14.5	43.1	35.6	4.04 (0.96)
Unlimited harvest of antlerless deer, with only one buck allowed per hunter per year	10.9	15.3	28.0	29.5	16.2	3.25 (1.21)
Cross-tagging and harvest of any antlered buck, with no antler point restriction in effect	15.1	14.1	38.4	20.7	11.6	3.00 (1.19)
Requirement that carcasses remain within the disease management zone until a "CWD not detected" result is confirmed	4.7	6.4	21.9	37.6	29.4	3.81 (1.08)
Allowing the use of A or B license during any firearms season	9.3	6.8	37.6	27.6	18.7	3.39 (1.14)
Unlimited \$2.50 disease management tags for harvest of antlerless deer	11.3	10.3	27.8	28.8	21.8	3.39 (1.25)

Table D3. Southeast MN landowners' perceived effectiveness of existing CWD management strategies

Question	Not at all effective				Extremely effective	M (SD)
	1	2	3	4	5	
Mandatory CWD testing	10.2	10.7	30.1	30.8	18.3	3.36 (1.92)
Unlimited harvest of antlerless deer, with only one buck allowed per hunter per year	14.1	17.5	35.9	23.9	8.6	2.95 (1.15)
Cross-tagging and harvest of any antlered buck, with no antler point restriction in effect	12.3	10.9	31.9	24.0	21.1	3.31 (1.26)
Requirement that carcasses remain within the disease management zone until a "CWD not detected" result is confirmed	8.2	10.9	26.5	33.4	21.0	3.48 (1.18)
Allowing the use of A or B license during any firearms season	13.4	10.6	42.9	21.2	11.9	3.08 (1.15)
Unlimited \$2.50 disease management tags for harvest of antlerless deer	13.4	12.5	31.4	26.8	15.9	3.19 (1.23)

Table D4. Southeast MN landowners support for proposed changes to existing deer hunting regulations

Question	Strongly oppose	Oppose	Neither	Support	Strongly support	M (SD)
Eliminate the 4-point per side antler point restriction	20.4	10.0	29.5	14.9	25.2	3.14 (1.43)
Allow buck cross-tagging	15.1	6.8	40.3	19.6	18.2	3.19 (1.25)
Combine the 3A and 3B deer season. The 3A and 3B deer seasons would be combined into a single, 16-day season where both 3A and 3B hunters could participate	15.1	12.2	31.3	21.2	20.4	3.20 (1.31)
Delay the firearms deer season one week. The season would open the Saturday closest to November 15 th	16.0	13.4	37.1	16.7	16.8	3.05 (1.27)
Delay the firearms deer season until late November. The season would open the Saturday closest to November 20 th	23.3	15.4	36.6	12.8	12.0	2.75 (1.28)
Delay the firearms deer season until December	38.7	15.6	31.6	5.7	8.4	2.29 (1.26)

Table D5. Southeast MN landowners' support for incentives to manage CWD

Question	Strongly oppose	Oppose	Neither	Support	Strongly support	M (SD)
Pay landowners to allow people to hunt their property	24.0	20.3	30.0	17.2	8.5	2.66 (1.25)
Pay landowners for CWD positive deer killed on their property	19.5	17.7	31.9	20.1	10.8	2.85 (1.25)
Pay hunters for every CWD positive deer they kill	21.7	19.2	30.2	20.6	8.3	2.75 (1.24)
Expanded venison donation program where meat is distributed to local communities	3.7	3.0	24.9	44.9	23.5	3.81 (0.95)
Lifetime deer hunting license for killing a CWD positive deer	24.3	22.2	34.4	11.4	7.7	2.56 (1.19)
For each deer killed in the CWD zone, receive one lottery ticket for entry into a drawing to win equipment	23.0	18.3	33.4	17.2	8.2	2.69 (1.23)
Pay landowner for every deer shot on their property	24.7	20.7	28.0	16.0	10.7	2.67 (1.29)
Work with legislature to develop program to give tax breaks to landowners who allow public hunting	17.2	14.9	27.9	25.5	14.5	3.05 (1.29)
Financial contribution to a charity of your choice for killing a CWD positive deer	20.4	16.2	40.0	16.6	6.9	2.74 (1.16)
Provide hunters with an extra buck tag for killing a CWD positive buck	15.6	10.1	25.4	32.0	16.8	3.24 (1.29)
Provide hunters with an extra buck tag for killing any CWD positive deer	17.0	12.1	26.1	29.8	15.0	3.14 (1.29)
Provide free deer license for the following year if hunter provides a CWD positive deer	16.5	11.7	28.7	28.4	14.7	3.13 (1.28)

Table D6. Percent of Southeast MN landowners that support using financial incentives to manage CWD

Question	Percent
Percent of landowners that support the use of financial incentives	28.1

Table D7. Average maximum amount Southeast MN landowners support paying as an incentive to manage CWD by source

Question	Hunter M (SD)	Landowner M (SD)
A private group	\$530.54 (1578.77)	\$392.48 (1204.73)
Minnesota DNR	\$163.91 (307.16)	\$402.70 (1195.42)

Table D8. Southeast MN landowners' perceptions of shared values with MNDNR

Question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	M (SD)
...shares similar values as me	9.9	15.3	34.2	36.4	4.3	3.10 (1.04)
...shares similar opinions as me	10.2	17.8	38.4	30.3	3.3	2.99 (1.01)
...thinks in a similar way as me	10.6	18.9	40.9	26.7	2.9	2.92 (1.00)
...takes similar actions as I would	11.8	19.1	39.8	26.2	3.2	2.90 (1.02)
...shares similar goals as me	10.0	15.5	35.7	34.7	4.2	3.08 (1.03)
...does a good job of managing deer in Minnesota	12.5	14.2	32.3	36.2	4.8	3.07 (1.09)
... is open and honest about things they do and say related to deer management	11.2	15.7	32.1	35.2	5.8	3.09 (1.09)
...can be trusted to make decisions about deer management that are good for the resource	12.2	13.8	33.6	34.1	6.4	3.09 (1.10)
...will make decisions about deer management in a way that is fair	9.9	12.5	34.7	37.8	5.0	3.16 (1.04)
...has deer managers and biologists who are well-trained for their jobs	6.5	6.1	38.1	40.7	8.6	3.39 (0.96)
...listens to landowners' concerns	15.0	16.5	31.9	30.5	6.1	2.96 (1.15)

Table D9. Southeast MN landowners trust in MNDNR to address CWD

Question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	M (SD)
...provide me with enough information to decide what actions I should take regarding CWD	5.7	10.9	28.5	48.0	7.0	3.40 (0.97)
...provide the best available information on CWD in Minnesota	5.5	8.3	24.8	52.4	9.0	3.51 (0.96)
...provide timely information regarding CWD issues	5.0	8.3	28.6	50.2	7.9	3.48 (0.94)
...provide truthful information about human safety issues related to CWD	5.9	9.4	26.7	47.8	10.2	3.47 (1.00)
...provide truthful information about deer population estimates	8.7	10.1	27.5	46.0	7.7	3.34 (1.05)
...provide truthful information about how CWD spreads	6.0	8.2	25.6	50.4	9.8	3.50 (0.99)
...provide truthful information about the number of CWD-positive deer discovered in Minnesota	5.5	5.7	22.0	54.0	12.8	3.63 (0.97)
...make good decisions regarding CWD issues	9.7	10.9	30.6	40.7	8.1	3.27 (1.07)
...follow the best available science in managing CWD	6.7	8.7	29.3	44.8	10.4	3.43 (1.02)
...properly address CWD in Minnesota	8.0	10.3	29.7	43.1	9.0	3.35 (1.05)

Part E. Stated Choice Experiment: Preferences for a Chronic Wasting Disease Management Program

Landowners were presented with 7 scenarios about a potential CWD management program. For each scenario respondents were asked to choose between two alternative CWD management programs, or an option for “neither” where the status quo would remain. Each alternative was described by attributes that were experimentally manipulated such that a meaningful tradeoff would have to be made between the alternatives. The choice between alternatives revealed the relative importance of each of the attributes to the landowner in a potential CWD management program. These attributes included targets for reducing deer density (0%, 25%, and 50%), financial payments made to hunters for harvesting a CWD positive deer (\$0, \$1,000, and \$2,000), financial payments to landowners for a CWD positive deer shot on their property (\$0, \$1,000, and \$2,000), the form of a financial incentive offered to a landowner (none, a tax break, and a monetary payment per acre), the use of targeted culling (yes, no), and the imposition of a deer feeding ban (yes, no). The relative influence of these program attributes in landowners’ choice of CWD management program are presented in Table E1. If a program attribute is found to have a statistically significant and negative effect on landowners’ choice of an alternative, it indicates that attribute is important to landowners and that attribute is not preferred. If a program attribute is found to have a statistically significant and positive effect on landowners’ choice of alternative, it indicates that the attribute is important to landowners and that attribute is preferred.

Landowners, on average, preferred the status quo over a potential CWD management program. This preference is demonstrated by the significant and negative effect reported for the alternative specific constants for alternatives A and B, where the status quo option is the reference group. That is, on average, landowners prefer an alternative other than the ones presented to them in the scenarios. However, all program attributes exerted a statistically significant effect on choice of alternative CWD management program. The odds that a landowner would select an alternative was positively related to density reduction, a financial payment to a landowner, the form of the incentive and the imposition of a deer feeding ban. That is, the greater the hypothetical reduction in deer density in the alternatives presented, the more likely the landowner was to select that alternative. The larger the hypothetical financial payment to the landowner for a CWD positive deer shot on their property, the more likely the landowner was to choose that alternative. A financial incentive, either in the form of a payment or tax break was preferred over alternatives where no incentive was offered. Finally, alternatives where a deer feeding ban was present were preferred over alternatives where it was not. The odds that a landowner selected an alternative was negatively influenced by financial payments to hunters, and the use of targeted culling. That is, as the size of the financial payment to hunters increased, the odds a landowner selected that alternative fell. Similarly, landowners were less likely to choose an alternative CWD management program if targeted culling was a component of that program.

These results shed light on the social acceptability of potential CWD management program attributes. They suggest that financial payments to hunters for shooting CWD positive deer are not a preferred option among landowners. However financial payments made to landowners if a CWD positive deer is shot on their property, and the potential for a tax break or financial payment per acre of land offered for public hunting were both significant and positive predictors of program choice.

Table E1. Choice model results

Variable	Coeff. (SE)	Odds Ratio	z-value	p-value
Density reduction	0.092 (0.03)	1.096	3.72	<0.01
Financial payment to hunter	-0.290 (0.03)	0.748	11.60	<0.01
Financial payment to landowner	0.062 (0.02)	1.064	2.53	0.011
Form of incentive	0.096 (0.02)	1.101	3.98	<0.01
Use of targeted culling (yes)	-0.300 (0.04)	0.741	7.68	<0.01
Feeding ban (yes)	0.209 (0.04)	1.233	5.17	<0.01
Alternative specific constant (A)	-1.303 (0.12)	0.272	10.76	<0.01
Alternative specific constant (B)	-1.314 (0.12)	0.269	10.80	<0.01

1. Model results are for alternative specific conditional logit estimated in Stata v 15

Part F. Feelings about Your Land

Landowners were asked their agreement with several statements about their attachment to their land on a scale where 1=strongly disagree, 2=disagree, 3=neither, 4=agree, and 5=strongly agree. Respondents expressed strong agreement with all statements measuring their identification, dependence and social bonds with their land (Mean greater than 4.0).

Table F1. Southeast MN landowners' feelings about their land

Question	Strongly disagree	Disagree	Neither	Agree	Strongly agree	M (SD)
I strongly identify with my land	0.4	0.7	7.7	36.3	54.9	4.45 (0.70)
I feel my land is a part of me	0.5	1.3	12.3	37.3	48.6	4.32 (0.77)
I feel that my identity is reflected in my land	0.8	2.2	17.7	39.1	40.3	4.16 (0.84)
My land is my favorite place to be	0.7	1.6	11.3	35.0	51.5	4.35 (0.79)
I really miss my land when I am away from it for too long	1.1	4.1	22.4	37.3	35.1	4.01 (0.92)
I enjoy my land more than most other properties	0.7	1.8	16.3	39.5	41.7	4.20 (0.82)
My land means a lot to me	0.4	0.2	5.9	37.4	56.2	4.49 (0.65)
I have a strong emotional bond with my land	0.8	1.5	19.3	35.5	43.0	4.18 (0.85)
I feel a strong sense of belonging with my land	0.8	1.3	16.7	38.2	42.9	4.21 (0.82)
I associate my land with important people in my life	1.2	3.2	20.2	34.6	40.9	4.11 (0.91)
The time spent on my land allows me to bond with my family and friends	0.7	1.7	17.0	37.4	43.2	4.21 (0.83)
My friends and family would be disappointed if I no longer had my land	1.1	2.4	13.9	34.0	48.6	4.27 (0.86)

Part G. About You

Eighty-seven percent of survey respondents self-identified as male (Table G1). Among these individuals the average age was 63.5 (Table G2). Roughly 7% of respondents indicated that they are a member of an organized sporting group (Table G3). The Minnesota Deer Hunters Association and “Local Sportsman Group” were the most common groups identified by respondents at roughly 2.5%.

Table G1. Gender of study participants

Question	Percent
Percent Male	87.0

Table G2. Average age of study participants

Question	M (SD)
Average Age	63.5

Table G3. Percent of study participants that belong to a sporting group

Question	Percent
Percent of landowners that are members of a sporting group	6.8

Table G4. Percent of study participants that belong to different sporting groups

Question	Percent
Minnesota Deer Hunters Association	2.4
Quality Deer Management Association	0.8
Local Sportsman Group	2.5
Bluffland Whitetails Association	1.4
Whitetails Unlimited	1.9
Backcountry Hunters and Anglers	0.3
Other	1.2

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SURVEY OF SOUTHEAST MINNESOTA LANDOWNERS

**A study of landowners' opinions and preferences
about deer populations and chronic wasting disease.**



Thank you for helping conserve Minnesota wildlife!

Please return your completed questionnaire in the enclosed envelope. The envelope is self-addressed and no postage is required.

Questions about this study should be directed to:

Adam Landon
Division of Fish and Wildlife
Minnesota Department of Natural Resources
Email: Adam.Landon@state.mn.us

**mn DEPARTMENT OF
NATURAL RESOURCES**

PART A. ABOUT YOUR PROPERTY Please provide us with some information about how you use your property in southeast Minnesota. Answer each question as accurately as you can.

Q1. How many **total acres did you own or lease in southeast Minnesota** at the end of 2018?

_____ **Acres Owned** _____ **Acres Leased**

Q2. Considering your land in southeast MN, what **best describes you as a landowner?** (Please choose only one.)

_____ Corn/soybean grower _____ Cattle producer _____ Poultry producer _____ Dairy producer
_____ Hobby farmer _____ Vegetable grower _____ Recreationist (e.g., hunter)
_____ Homeowner _____ Other (please list): _____

Q3. Is your **property in southeast MN posted?** Posting is displaying signs on the property line that say private land.

_____ Yes _____ No → **PLEASE SKIP TO QUESTION 5**

Q4. How much do you **agree/disagree** with the following **as reasons for posting?** (Circle one number for each.)

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Control who uses my land	1	2	3	4	5
Human safety	1	2	3	4	5
Liability concerns	1	2	3	4	5
Eliminate trespass	1	2	3	4	5
Keep wildlife for myself/family/friends	1	2	3	4	5
Reduce property damage	1	2	3	4	5
Livestock safety	1	2	3	4	5
Relationship with neighbor	1	2	3	4	5
Better control of deer population	1	2	3	4	5
Family tradition	1	2	3	4	5
Conflict with other recreational users	1	2	3	4	5
Other:	1	2	3	4	5

PART B. DEER HUNTING AND YOUR PROPERTY Please provide us with some information about deer hunting and your property in southeast Minnesota. Answer each question as accurately as you can.

Q5. Did you hunt deer in Minnesota in 2016, 2017, or 2018? If so, which seasons did you hunt? (Check all that apply)

2016: _____ Archery _____ Firearm _____ Muzzleloader

2017: _____ Archery _____ Firearm _____ Muzzleloader

2018: _____ Archery _____ Firearm _____ Muzzleloader

_____ I did not hunt deer in Minnesota in 2016, 2017, or 2018 → **PLEASE SKIP TO QUESTION 8**

Q6. Which **ONE** deer permit area did you **hunt most often** during the most recent year that you hunted? (Choose one)

_____ 338 _____ 339 _____ 341 _____ 342 _____ 343 _____ 344 _____ 345 _____ 346 _____ 347 _____ 348 _____ 349 _____ 603

If you did not hunt one of the deer permit areas listed above, please tell us which one you did hunt _____

Q7. How much of your **deer hunting** did you do on each of the following **types of land** during the most recent year that you hunted deer in Minnesota (*Circle one number for each.*)

	None	Some	Most	All
Private land that I own	1	2	3	4
Private land that I lease for hunting	1	2	3	4
Private land that I do not own or lease	1	2	3	4
Public land	1	2	3	4

Q8. Did you **allow deer hunting on your property** during the 2018 deer seasons?

____ Yes ____ No → **PLEASE SKIP TO QUESTION 13**

Q9. Who did you **allow to hunt deer** on your property in 2018? (*Check all that apply.*) Please also estimate the number of people who hunted deer on your property in 2018.

____ Myself or family members ____ people
 ____ Friends or neighbors ____ people
 ____ Strangers who ask permission ____ people
 ____ Specific groups of people who are affiliated with an organized hunting group ____ people
 ____ People who lease my property ____ people
 ____ Other (please list: _____) ____ people

Q10. Do you **impose any deer harvest restrictions** on your property (*Please choose only one.*)

____ Antlerless harvest is restricted, but hunters can take any legal buck
 ____ Buck harvest is restricted to only large antlered bucks, but hunters can take any antlerless deer
 ____ Buck harvest restricted to only large antlered bucks, and antlerless harvest is also restricted
 ____ No restrictions on the type of deer that can be harvested
 ____ Don't know
 ____ Other (please list: _____)

Q11. Do you **lease any of your property** for deer hunting?

____ Yes ____ No → **PLEASE SKIP TO QUESTION 13**

Q12. How much do you **agree/disagree** with the following statements about your **decision to lease your property to hunters** (*Circle one number for each.*)

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
I have better control over who is using my land.	1	2	3	4	5
I have better control over the type of deer that are harvested.	1	2	3	4	5
I am managing my property for mature bucks.	1	2	3	4	5
Leasing allows me to earn extra money from my property.	1	2	3	4	5
I feel pressure from neighbors who also lease their property.	1	2	3	4	5
I see leasing as the future way landowners can manage their property.	1	2	3	4	5
Other (please list):	1	2	3	4	5

Q13. How much do you agree/disagree with the following statements about your decision to allow or not allow deer hunting on your property (*Circle one number for each.*)

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Hunting will reduce the number of deer on my property.	1	2	3	4	5
Hunting is a tradition in my family.	1	2	3	4	5
I feel pressure from my neighbors to allow hunting.	1	2	3	4	5
Hunting will reduce the number of mature bucks on my property.	1	2	3	4	5
Allowing other hunters on my property will reduce my or my family's opportunity to hunt deer.	1	2	3	4	5
Hunters cause too many problems.	1	2	3	4	5
I am concerned about the liability of other hunters on my property.	1	2	3	4	5
I am opposed to deer hunting in general.	1	2	3	4	5
I am not opposed to hunting, but I want to provide a refuge for deer.	1	2	3	4	5
Hunting reduces my privacy.	1	2	3	4	5
Hunting reduces damage caused by deer on my property.	1	2	3	4	5
Hunting improves the quality of habitat on my property.	1	2	3	4	5
Hunting on my property will help keep deer from being over-abundant in the area.	1	2	3	4	5
Letting others hunt on my property encourages a hunting tradition.	1	2	3	4	5
Hunting puts my livestock at risk.	1	2	3	4	5

Q14. How much do you agree/disagree with the following statements about deer hunters (*Circle one number for each.*)

Deer hunters...	Strongly disagree	Disagree	Neither	Agree	Strongly agree
...share similar values as me.	1	2	3	4	5
...share similar opinions as me.	1	2	3	4	5
...think in a similar way as me.	1	2	3	4	5
...take similar actions as I would.	1	2	3	4	5
...share similar goals as me.	1	2	3	4	5
...are open and honest about things they do and say related to deer hunting.	1	2	3	4	5
...can be trusted to make decisions about deer hunting that are good for the resource.	1	2	3	4	5
...listen to landowners' concerns.	1	2	3	4	5

PART C. OPINIONS ABOUT DEER MANAGEMENT AND CHRONIC WASTING DISEASE (CWD). *Please answer the following questions about your preferences for managing chronic wasting disease in southeast Minnesota.*

Q15. In general, do you think reducing deer densities to help control the spread of chronic wasting disease is: (Circle one number for each.)

	Extremely	Moderately	Slightly	Neither	Slightly	Moderately	Extremely	
Foolish	-3	-2	-1	0	+1	+2	+3	Wise
Worthless	-3	-2	-1	0	+1	+2	+3	Valuable
Bad	-3	-2	-1	0	+1	+2	+3	Good

Q16. Over the past 5 years, what trend have you seen in the deer population on or around your property? (Circle one.)

A lot fewer deer	Moderately fewer deer	Slightly fewer deer	About the same number of deer	Slightly more deer	Moderately more deer	Many more deer
1	2	3	4	5	6	7

Q17. Do you think the deer population on or around your property is: (Circle one.)

Much too low	Moderately too low	Slightly too low	About right	Slightly too high	Moderately too high	Much too high
1	2	3	4	5	6	7

Q18. When you think about chronic wasting disease (CWD) in Minnesota, how much of the following feelings do you experience? (Circle one number for each.)

	None						A lot
Worry	1	2	3	4	5	6	7
Uncertainty	1	2	3	4	5	6	7
Anger	1	2	3	4	5	6	7

Q19. How much do you agree/disagree with the following statements about regulations designed to manage Chronic Wasting Disease (CWD)? (Circle one number for each.)

CWD regulations should...	Strongly disagree	Disagree	Neither	Agree	Strongly agree
... be designed to reduce deer densities.	1	2	3	4	5
... take precedent over all other deer hunting regulations.	1	2	3	4	5
... be no different than deer hunting regulations in surrounding areas.	1	2	3	4	5
...be designed to limit disease spread.	1	2	3	4	5
...be passive and let nature take its course.	1	2	3	4	5
...be aggressive as possible in the short term (3-5 years).	1	2	3	4	5
...consider the long-term impacts on deer populations.	1	2	3	4	5
...not impact local economies.	1	2	3	4	5
...not impact hunter participation.	1	2	3	4	5
...provide a financial incentive for harvest.	1	2	3	4	5
...provide a non-financial incentive for harvest.	1	2	3	4	5

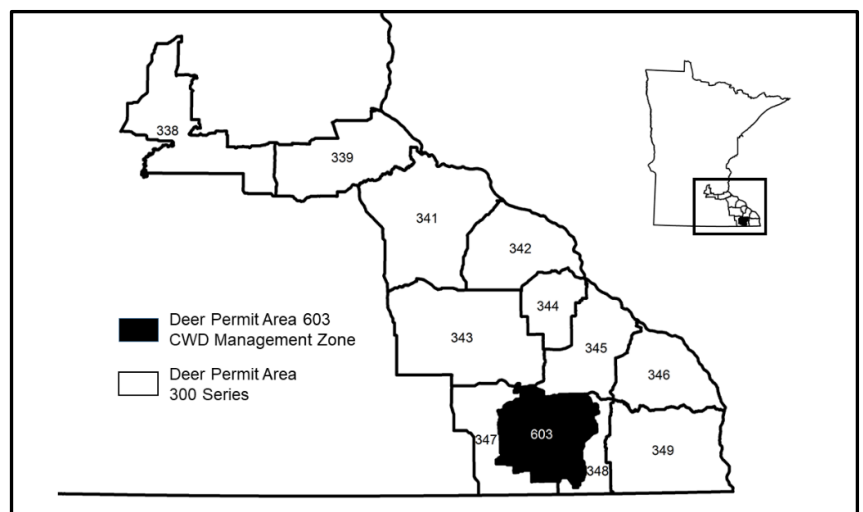
Q20. How **concerned** you are about the following **outcomes** related to chronic wasting disease (CWD).
(Circle one number for each.)

How concerned are you that CWD will...	Not at all concerned							Extremely concerned
...spread throughout the deer population <u>on or around your property.</u>	1	2	3	4	5	6	7	
...dramatically reduce the deer population <u>on or around your property.</u>	1	2	3	4	5	6	7	
...affect the health of the deer population <u>on or around your property.</u>	1	2	3	4	5	6	7	
...have the potential to kill the entire deer population <u>on or around your property.</u>	1	2	3	4	5	6	7	
...threaten deer hunting opportunity.	1	2	3	4	5	6	7	
...threaten the future of deer hunting for your children and grandchildren.	1	2	3	4	5	6	7	
...affect the future existence of deer on the Minnesota landscape.	1	2	3	4	5	6	7	
...spread to livestock.	1	2	3	4	5	6	7	
...have economic impacts on businesses that depend on deer hunting.	1	2	3	4	5	6	7	
...lead to declining land values.	1	2	3	4	5	6	7	
...spread because of deer and elk farms.	1	2	3	4	5	6	7	
...cause your family to stop eating deer meat.	1	2	3	4	5	6	7	
...cause you to have concerns about eating deer meat.	1	2	3	4	5	6	7	
...threaten your personal health or the health of your family.	1	2	3	4	5	6	7	
...cause disease in humans.	1	2	3	4	5	6	7	
...cause disease in you personally.	1	2	3	4	5	6	7	

PART D. MANAGEMENT & SPECIAL REGULATIONS TO ADDRESS CHRONIC WASTING DISEASE (CWD).

Questions in this section pertain to the **2018 chronic wasting disease management zone**, which is **deer permit area 603**, as shown on the map. The intent of these regulations is to reduce deer densities, limit the potential for disease transmission, and remove any additional CWD-positive deer from the landscape.

Please tell us how you feel about deer management regulations in the CWD management zone.



Q21. Do you think the Minnesota DNR's management of chronic wasting disease is: (*Please choose one.*)

_____ Too aggressive _____ About right _____ Not aggressive enough

Q22. First, please indicate if you **oppose or support** these **existing** regulations **in the chronic wasting disease (CWD) disease management zone (deer permit area 603)** in Minnesota. Then, indicate how **effective** you believe the regulation is in stopping the spread of CWD. (*Circle one for each*)

	How much do you <u>support or oppose</u> this regulation?					How <u>effective</u> do you believe this regulation is in reducing the transmission of CWD?				
	Strongly oppose	Oppose	Neither	Support	Strongly support	Not at all effective				Extremely effective
Mandatory CWD testing.	1	2	3	4	5	1	2	3	4	5
Unlimited harvest of antlerless deer, with only one buck allowed per hunter per year.	1	2	3	4	5	1	2	3	4	5
Cross-tagging and harvest of any antlered buck, with no antler point restriction in effect.	1	2	3	4	5	1	2	3	4	5
Requirement that carcasses remain within the disease management zone until a "CWD not detected" result is confirmed.	1	2	3	4	5	1	2	3	4	5
Allowing the use of A or B license during any firearms season.	1	2	3	4	5	1	2	3	4	5
Unlimited number of \$2.50 disease management tags for harvest of antlerless deer.	1	2	3	4	5	1	2	3	4	5

Q23. Do you **oppose or support** the following regulations **outside the CWD management zone** (deer permit area 603). (*Circle one number for each.*)

	Strongly oppose	Slightly oppose	Neither	Slightly support	Strongly support
<u>Eliminate</u> the 4-point to one side antler point restriction.	1	2	3	4	5
<u>Allow</u> buck cross-tagging.	1	2	3	4	5
<u>Combine</u> the 3A and 3B deer seasons. The 3A and 3B deer seasons would be combined into a single, 16-day season where both 3A and 3B hunters could participate.	1	2	3	4	5
<u>Delay</u> the firearms deer season one week. The season would open the Saturday closest to November 15 th .	1	2	3	4	5
<u>Delay</u> the firearms deer season until late November. The season would open the Saturday closest to November 20 th .	1	2	3	4	5
<u>Delay</u> the firearms deer season until December.	1	2	3	4	5

Q24. Some states are considering offering incentives that motivate landowners to provide access to hunters, and for hunters to harvest more deer to better manage CWD. We would like to know how strongly you support or oppose potential incentive programs. (Circle one number for each.)

	Strongly oppose	Oppose	Neutral	Support	Strongly support
Pay landowners to allow people to hunt their property.	1	2	3	4	5
Pay landowners for CWD positive deer killed on their property.	1	2	3	4	5
Pay hunters for CWD positive deer they kill.	1	2	3	4	5
Expanded venison donation program where meat is distributed to local communities.	1	2	3	4	5
Lifetime deer hunting license for killing a CWD positive deer.	1	2	3	4	5
For each deer killed in the CWD zone, receive one lottery ticket for entry into a drawing to win equipment.	1	2	3	4	5
Pay landowners for every deer shot on their property.	1	2	3	4	5
Work with Legislature to develop program to give tax breaks to landowners who allow public hunting.	1	2	3	4	5
Financial contribution to a charity of your choice for killing a CWD positive deer.	1	2	3	4	5
Provide hunters with an extra buck tag for killing a CWD positive <u>buck</u> .	1	2	3	4	5
Provide hunters with an extra buck tag for killing <u>any</u> CWD positive deer.	1	2	3	4	5
Provide free deer license for the following year if hunter provides a CWD positive deer.	1	2	3	4	5

Q25. Do you support paying incentives to hunters and landowners who harvest CWD positive deer?

_____ **Yes** _____ **No → PLEASE SKIP TO QUESTION 27**

Q26. If you support paying incentives to hunters who harvest CWD positive deer, what maximum amount is acceptable?

A private group: Amount paid to hunter \$ _____ Amount paid to landowner \$ _____

The Minnesota DNR: Amount paid to hunter \$ _____ Amount paid to landowner \$ _____

Q27. How much do you agree/disagree with the following statements about the Minnesota DNR?

(Circle one number for each.)

The Minnesota DNR...	Strongly disagree	Disagree	Neither	Agree	Strongly agree
... shares similar values as me.	1	2	3	4	5
... shares similar opinions as me.	1	2	3	4	5
... thinks in a similar way as me.	1	2	3	4	5
... takes similar actions as I would.	1	2	3	4	5
... shares similar goals as me.	1	2	3	4	5
...does a good job of managing deer in Minnesota.	1	2	3	4	5
...is open and honest about things they do and say related to deer management.	1	2	3	4	5
...can be trusted to make decisions about deer management that are good for the resource.	1	2	3	4	5
...will make decisions about deer management in a way that is fair.	1	2	3	4	5
...has deer managers and biologists who are well-trained for their jobs.	1	2	3	4	5
...listens to landowners' concerns.	1	2	3	4	5

Q28. How much do you agree/disagree with the following statements about the Minnesota DNR and chronic wasting disease (CWD)? (Circle one number for each.)

I trust the MDNR to...	Strongly disagree	Disagree	Neither	Agree	Strongly agree
...provide me with enough information to decide what actions I should take regarding CWD.	1	2	3	4	5
...provide the best available information on CWD in Minnesota.	1	2	3	4	5
...provide timely information regarding CWD issues.	1	2	3	4	5
...provide truthful information about human safety issues related to CWD.	1	2	3	4	5
...provide truthful information about deer population estimates.	1	2	3	4	5
...provide truthful information about how CWD spreads.	1	2	3	4	5
...provide truthful information about the number of CWD-positive deer discovered in Minnesota.	1	2	3	4	5
...make good deer management decisions regarding CWD issues.	1	2	3	4	5
...follow the best available science in managing CWD.	1	2	3	4	5
...properly address CWD in Minnesota.	1	2	3	4	5

PART E. PREFERENCES FOR A CHRONIC WASTING DISEASE (CWD) MANAGEMENT PROGRAM.

Q29. Please tell us your preferences for strategies that MDNR can adopt to manage Chronic Wasting Disease (CWD). Several of the options in the scenarios below reference the CWD management zone, this is deer permit area 603 and a map locating the zone is found under Section D earlier in this questionnaire. For each of the scenarios below, please choose the option with the combination of disease management strategies that you most prefer. If you would not support either option, please choose “I do not choose either option.” (*Please choose one option for each of the 7 scenarios.*)

SCENARIO #1	OPTION A	OPTION B
Reduce deer herd in CWD management zone:	50% reduction	25% reduction
Pay hunter for killing a CWD positive deer:	\$1,000 per deer	\$0 per deer
Pay landowner if CWD positive deer killed on property:	\$2,000 per deer	\$1,000 per deer
Incentivize landowners to allow public hunting access:	Tax break per acre	No incentive
Use professionals to cull deer in CWD management zone:	Yes	No
Continue deer feeding ban outside CWD mgmt. zone:	Yes	No
<input type="checkbox"/> I DO NOT CHOOSE EITHER OPTION	<input type="checkbox"/> I CHOOSE A	<input type="checkbox"/> I CHOOSE B

SCENARIO #2	OPTION A	OPTION B
Reduce deer herd in CWD management zone:	50% reduction	No change
Pay hunter for killing a CWD positive deer:	\$1,000 per deer	\$2,000 per deer
Pay landowner if CWD positive deer killed on property:	\$0 per deer	\$1,000 per deer
Incentivize landowners to allow public hunting access:	Monetary payment per acre	Monetary payment per acre
Use professionals to cull deer in CWD management zone:	No	Yes
Continue deer feeding ban outside CWD mgmt. zone:	No	No
<input type="checkbox"/> I DO NOT CHOOSE EITHER OPTION	<input type="checkbox"/> I CHOOSE A	<input type="checkbox"/> I CHOOSE B

SCENARIO #3	OPTION A	OPTION B
Reduce deer herd in CWD management zone:	25% reduction	No change
Pay hunter for killing a CWD positive deer:	\$0	\$2,000
Pay landowner if CWD positive deer killed on property:	\$0	\$2,000
Incentivize landowners to allow public hunting access:	Monetary payment per acre	No incentive
Use professionals to cull deer in CWD management zone:	No	Yes
Continue deer feeding ban outside CWD mgmt. zone:	Yes	Yes
<input type="checkbox"/> I DO NOT CHOOSE EITHER OPTION	<input type="checkbox"/> I CHOOSE A	<input type="checkbox"/> I CHOOSE B

SCENARIO #4	OPTION A	OPTION B
Reduce deer herd in CWD management zone:	No change	25% reduction
Pay hunter for killing a CWD positive deer:	\$2,000	\$2,000
Pay landowner if CWD positive deer killed on property:	\$0	\$2,000
Incentivize landowners to allow public hunting access:	Tax break per acre	Tax break per acre
Use professionals to cull deer in CWD management zone:	Yes	No
Continue deer feeding ban outside CWD mgmt. zone:	Yes	No
<input type="checkbox"/> I DO NOT CHOOSE EITHER OPTION	<input type="checkbox"/> I CHOOSE A	<input type="checkbox"/> I CHOOSE B

SCENARIO #5	OPTION A	OPTION B
Reduce deer herd in CWD management zone:	50% reduction	50% reduction
Pay hunter for killing a CWD positive deer:	\$1,000	\$0
Pay landowner if CWD positive deer killed on property:	\$2,000	\$1,000
Incentivize landowners to allow public hunting access:	No incentive	Monetary payment per acre
Use professionals to cull deer in CWD management zone:	Yes	Yes
Continue deer feeding ban outside CWD mgmt. zone:	No	Yes
<input type="checkbox"/> I DO NOT CHOOSE EITHER OPTION	<input type="checkbox"/> I CHOOSE A	<input type="checkbox"/> I CHOOSE B

SCENARIO #6	OPTION A	OPTION B
Reduce deer herd in CWD management zone:	25% reduction	No change
Pay hunter for killing a CWD positive deer:	\$0	\$0
Pay landowner if CWD positive deer killed on property:	\$1,000	\$0
Incentivize landowners to allow public hunting access:	No incentive	Tax break per acre
Use professionals to cull deer in CWD management zone:	No	Yes
Continue deer feeding ban outside CWD mgmt. zone:	Yes	No
<input type="checkbox"/> I DO NOT CHOOSE EITHER OPTION	<input type="checkbox"/> I CHOOSE A	<input type="checkbox"/> I CHOOSE B

SCENARIO #7	OPTION A	OPTION B
Reduce deer herd in CWD management zone:	50% reduction	No change
Pay hunter for killing a CWD positive deer:	\$2,000	\$1,000
Pay landowner if CWD positive deer killed on property:	\$1,000	\$2,000
Incentivize landowners to allow public hunting access:	Tax break per acre	No incentive
Use professionals to cull deer in CWD management zone:	No	No
Continue deer feeding ban outside CWD mgmt. zone:	Yes	Yes
<input type="checkbox"/> I DO NOT CHOOSE EITHER OPTION	<input type="checkbox"/> I CHOOSE A	<input type="checkbox"/> I CHOOSE B

PART F. FEELINGS ABOUT YOUR LAND. *Please tell us a little about what your land in southeast Minnesota means to you.*

Q30. How much do you agree/disagree with the following statements about your land in southeast Minnesota? (*Circle one number for each.*)

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
I strongly identify with my land.	1	2	3	4	5
I feel my land is a part of me.	1	2	3	4	5
I feel that my identity is reflected in my land.	1	2	3	4	5
My land is my favorite place to be.	1	2	3	4	5
I really miss my land when I am away from it for too long.	1	2	3	4	5
I enjoy my land more than most other properties.	1	2	3	4	5
My land means a lot to me.	1	2	3	4	5
I have a strong emotional bond with my land.	1	2	3	4	5
I feel a strong sense of belonging with my land.	1	2	3	4	5
I associate my land with important people in my life.	1	2	3	4	5
The time spent on my land allows me to bond with my family and friends.	1	2	3	4	5
My friends and family would be disappointed if I no longer had my land.	1	2	3	4	5

PART G. ABOUT YOU. *Please tell us a little about yourself, this information is strictly anonymous and helps us to get to know the needs of landowners in the region.*

Q31. What is your gender? ☐ Male ☐ Female

Q32. What is your age? Years

Q33. Are you a member of an organized deer hunting group?

☐ Yes ☐ No

Q34. If yes, which group(s) do you belong to?

☐ Minnesota Deer Hunters Association

☐ Quality Deer Management Association

☐ Local Sportsman Group

☐ Bluffland Whitetails Association

☐ Whitetails Unlimited

☐ Backcountry Hunters and Anglers

☐ Other:

THANK YOU!

Please return your completed questionnaire in the enclosed self-addressed envelope, no postage is required.