DEPARTMENT OF NATURAL RESOURCES

2018 Minnesota Bowhunter Observation Survey Report

Tyler R. Obermoller, Wildlife Research Biologist
Andrew S. Norton, Ungulate Research Scientist
Lou Cornicelli, Wildlife Research Manager

INTRODUCTION

White-tailed deer (*Odocoileus virginianus*) hunting season recommendations should incorporate objective and reliable information to move populations towards a desired density goal. Because regulatory decisions (e.g., seasons and bag limits) are adjusted for each hunting season, agencies require annual information. In Minnesota, deer are managed by individual permit areas (N = 130) with traditional firearm seasons lengths of 9 (200-series areas), 16 (100-series areas), or 18 (300-series areas; 2 seasons) days. Bag limits also vary by permit area and range from bucks only (1 antlered deer) to intensive (up to 3 antlerless deer) management designations. Additionally, early antlerless seasons are used in limited situations. To inform these annual decisions, the Minnesota Department of Natural Resources (MNDNR) uses mandatory hunter-reported harvest, winter severity, and hunter effort to make inference about population trends (Norton and Giudice 2017). These indices are sensitive to varying hunting season regulations and changes in the relationship between winter severity and deer survival. Confidence in harvest-based population trends are improved by collecting annually recurrent information to independently estimate the population trend (i.e., lambda [λ]). Additional data collection to improve deer population estimates were also recommended by the Office of Legislative Auditors, who conducted an independent evaluation of the MNDNR deer population management program (OLA 2016). Winter aerial surveys can provide an index, but financial and environmental (i.e., adequate snow cover) constraints limit their use to every 5- to 10-years, and are not considered reliable across much of northern Minnesota where predominant coniferous cover results in insufficient detection probability (Haroldson 2014) or across southwestern Minnesota where deer movements vary throughout the year (e.g., winter migrations).

Several Midwestern states have explored the use of annual hunter observation surveys for monitoring white-tailed deer population trends (Rolley et al. 2016). Early archery season (Saturday closest to September 15 to the Saturday closest to November 6) observation surveys are desirable because they are longer than firearm seasons (9 or 16-day season starting the Saturday closest to November 6). Also, bowhunters typically employ stationary hunting methods (e.g., tree stand, ground blind) which allow more time to observe undisturbed wildlife (Norton and Clark 2016). Thus, our objective was to evaluate the utility of bowhunter observation surveys in Minnesota for monitoring trends in white-tailed deer and other wildlife populations. Our secondary objective was to compare trends in fawn:adult female ratios from bowhunter observations to other recruitment metrics. In Minnesota, landscape types vary more than other Midwestern states. Because of the variability of habitat, we chose to evaluate results among three ecozones: 1) farmland, 2) transition, and 3) forest (Figure 1). To evaluate the most efficient data collection strategy, we developed both a mail and online survey instrument.

METHODS

We modeled our survey after the Iowa Department of Natural Resources (IADNR) bowhunter observation survey (Norton and Clark 2016). The primary differences between our survey and the IADNR bowhunter survey were the species monitored, age-sex classification of deer, and the addition of a separate online survey. Specifically, we asked hunters to differentiate between antlered, adult female, fawn, and unknown white-tailed deer age-sex classes, and asked hunters to document badger *(Taxidea taxus),* bear *(Ursus americanus),* bobcat *(Lynx rufus),* coyote *(Canis latrans),* fisher *(Martes pennanti),* gray fox *(Urocyon cinereoargenteus),* gray wolf *(Canis lupus),* and wild turkey *(Meleagris gallopavo)* observations (Appendix I). In addition to

recording deer permit area (DPA) for hunting trip observations, we asked hunters to provide a distance and direction from the nearest town. On the online survey, we also collected more precise locations (e.g., latitude and longitude), weather information, and whether a deer was harvested.

In 2017, our sampling frame was individuals that purchased an archery deer hunting license for the 2014, 2015, and 2016 seasons and hunted outside of the Twin Cities (DPA 603) and Duluth (DPA 182) metropolitan areas (n = 47,960). To increase our sample size in 2018, we included individuals that purchased an archery deer hunting license for only 2 seasons (2016 and 2017; n = 59,172). In Minnesota, collection of email addresses is not mandatory and only 24% (n = 11,971) of bowhunters had an email on file. Therefore, to draw our samples we first randomly selected 18,000 individuals to receive a mail survey, regardless of whether they provided an email. We mailed a one-page, front and back, hunting diary log with a cover letter and postage paid return envelope to paper survey participants (Appendix I). The remaining individuals with an email on file received the online survey (n = 11,320). We also provided online survey participants the option to print and then mail the observation diary log (Appendix I). Sampling rates for the mailed survey were higher than the online survey in all ecozones because of sampling design (Table 1).

We evaluated differences in mean age and response rates between the mail and online surveys. We also evaluated differences between timing of hunting trips, hunting trips per hunter, hours hunted per trip, and observation rates between the mailed and emailed respondents. The survey design for response data were clustered by individual hunter, and provided separate estimates for each ecozone. We estimated variances using Taylor series linearization and constructed 95% confidence intervals using the Normal approximation. We used t-tests to compare all responses between mail and online respondents. We used an alpha value of 0.05 to determine significant differences between mail and online response groups. For observation rates, we applied a Bonferroni correction to account for 13 species or cohort categories, resulting in a critical alpha value of 0.004. We estimated hours hunted per hunting trip and observation rates per hour using Program R and the survey library (Lumley 2004, R Development Core Team 2016).

We did not compare hunter observation rates among ecozones because hunter distribution, similar to deer populations, are not randomly distributed. Thus, hunter observation rates among ecozones vary by hunter distribution. For example, deer densities are highest in the transition ecozone (Norton and Giudice 2017), but hunter observation rates per 1,000 hours were greatest in the farmland ecozone. Therefore, we only compared the relative proportion of species hunters observed across ecozones.

Results presented here are from the second year of surveys and we intend to conduct the concurrent mail and online surveys for an additional year to evaluate the trend inference between survey modes. After the final year of data collection, we will compare correlations for each species and cohorts between the two survey modes. We will also compare the correlation between the results from the bowhunter survey indices and recruitment rates with estimates from harvest modeling techniques and antlered harvest catch-per-unit-effort. Finally, we will simulate a stochastic stage-structured population projection model through 50 years, parameterized based on relevant literature or data collected in Minnesota, and use the 5^{th} and 95^{th} percentiles of λ to determine lower and upper bounds for population growth rates. We will use the bounds to evaluate biological believability of the index provided by the bowhunter observation surveys. For example, if the index were to suggest the population doubled in a single year, we would know this growth rate is unrealistic for a wild deer population based on white-tailed deer natural history.

RESULTS

After removing undeliverable samples, we administered 17,729 mail and 11,319 online surveys. Of those, we received 1,359 mail and 332 online responses, which resulted in adjusted response rates of 0.077 and 0.029, respectively (Table 1). Response rates were comparable among regions; however, they differed between survey modes (ranges: mail response rate, 0.073–0.081; online response rates, 0.028–0.032; Table 1). Average age of respondents was older than the sample for both the mail ($\bar{x}$ = 53 vs 45 years) and online ($\bar{x}$ = 48 vs 41) surveys. Online respondents also averaged 35% fewer trips per hunter ($\bar{x}$ = 6.19, SE = 0.29) compared to mail respondents ($\bar{x}$ = 9.54, SE = 0.17; Figure 2). Mean hunting observation dates occurred later for mailed ($\bar{x}$ = 11 October) vs online ($\bar{x}$ = 8 October) responses (Figure 3). Despite lower response rates and fewer hunter observations later in the season, hours hunted per trip (online $\bar{x}$ = 3.12, SE = 0.07, mail $\bar{x}$ = 3.15, SE = 0.03) and hunter observation rates per hour among species did not differ between survey modes (Figures 4-10; Table 2, Appendix II).

Overall, the percent of antlered deer among total deer observations was greatest in the transition ecozone ($\bar{x}$ = 0.19), followed by the farmland ecozone ($\bar{x}$ = 0.18), then the forest ecozone ($\bar{x}$ = 0.15). The greatest observed fawn:doe ratio was in the transition ecozone ($\bar{x}$ = 0.84), followed by the farmland ecozone ($\bar{x}$ = 0.67) and forest ecozone ($\bar{x}$ = 0.64, Figures 5–7). Among other species surveyed, diversity was greater in the forest ecozone with relatively more bear, bobcat, wolf, fisher, and gray fox observations compared to the transition and farmland ecozones. Turkeys had the highest proportion reported (compared to all other species) in the transition ecozone (Appendix II).

For the hunter-harvested data recorded on the online responses, 92 hunters harvested 101 deer: 51 adult does, 41 adult bucks, 5 buck fawns, 3 doe fawns, and 1 unknown. The adult bucks averaged 7.6 points (SE = 0.67, range = 2–18, *n* = 40) with an inside spread of 13.0 inches (SE = 0.77, range = 2–21, *n* = 35).

DISCUSSION

Although mean age, response rates, and trips per hunter were significantly different between online and mail respondents, similar observation rates suggested that inferences about population trends could be obtained from either survey mode. However, the low response rates and low number of trips per hunter from the online survey results in a reduced amount of information. Email respondents recorded fewer observations later in the season then mailed respondents, leading to fewer overall trips per hunter. Because email respondents could input data throughout the hunting season, we postulate they inputted their early season observations, but failed to input their late season observations, whereas, mailed respondents recorded observations on their datasheet until the survey period was done, and then sent in their datasheet.

In the future, we should explore methods that increase response rates, especially for the online survey, such as sending a reminder email halfway through the observation season or adding an incentive for participation. In addition, we intend to share the results from the second year of this survey with future participants to generate interest and increase participation. More importantly, we do not currently know if trends in observation rates among years will be similar between survey modes. Although trends can be compared with 2 years of data, adding an additional year will provide more reliable information when comparing trends among survey mode or region. We also hope this survey will contribute to our knowledge of population trends and, if so, help determine the minimum spatial scale required to provide reliable inferences.

ACKNOWLEDGMENTS

We thank all bowhunters that responded to the survey. We also thank the MNDNR Farmland Wildlife Populations and Research Group staff that provided feedback on earlier versions of the survey, and Katie Steffl and Tonya Klinkner for entering and proofing all data from the survey

responses. Finally, we thank Veronique St-Louis for their assistance with the sampling design and statistical analysis.

Table 1. Sampling statistics from the bowhunter observation survey in Minnesota, USA, 15 September – 2 November 2018.

Mode	Ecozone	Sampling Frame	Sample	Sampling Rate	Number of Responses	Sampling Frame Mean Age (SE)	Sample Mean Age (SE)	Responses Mean Age (SE)
Online	State	59,172	11,319	0.19	332	44 (0.06)	41 (0.13)	48 (0.31)
	Forest	16,289	3,227	0.20	103	47 (0.12)	44 (0.25)	51 (0.57)
	Transition	34,134	6,465	0.19	184	43 (0.08)	41 (0.17)	47 (0.39)
	Farmland	8,749	1,628	0.19	45	43 (0.16)	40 (0.35)	44 (0.82)
Mail	State	59,172	17,729	0.30	1,359	44 (0.06)	45 (0.12)	53 (0.12)
	Forest	16,289	5,442	0.33	413	47 (0.12)	47 (0.21)	57 (0.21)
	Transition	34,134	6,246	0.18	503	43 (0.08)	43 (0.19)	52 (0.21)
	Farmland	8,749	6,041	0.69	443	43 (0.16)	44 (0.20)	52 (0.22)

Table 2. Statewide mean (± standard error) and 95% confidence intervals of online and mailed responses for hours hunted per hunting trip and observation rates per 1,000 hours from the bowhunter observation survey in Minnesota, USA, 15 September – 2 November 2018.

	Survey Mode			
	Online		Mail	
Parameter	Mean (SE)	95% CI	Mean (SE)	95% CI
Hours/Trip	3.12 (0.07)	2.98 – 3.26	3.15 (0.03)	3.08 – 3.22
Antlered Deer/1,000 Hours	179.78 (12.77)	154.75 – 204.81	197.77 (7.84)	182.42 – 213.13
Adult Female Deer/1,000 Hours	441.03 (28.29)	385.58 – 496.49	475.21 (15.45)	444.94 – 505.49
Fawn Deer/1,000 Hours	326.53 (24.81)	277.9 – 375.17	349.59 (14.55)	321.09 – 378.10
Unknown Deer/1,000 Hours	98.15 (13.77)	71.16 – 125.13	77.22 (4.31)	68.77 – 85.67
Total Deer/1,000 Hours	1045.49 (64.61)	918.85 – 1172.13	1099.81 (35.45)	1030.33 – 1169.28
Turkeys/1,000 Hours	272.16 (30.91)	211.58 – 332.75	334.10 (18.87)	297.12 – 371.07
Bears/1,000 Hours	4.21 (1.51)	1.25 – 7.16	2.77 (0.40)	1.99 – 3.55
Coyotes/1,000 Hours	13.24 (2.44)	8.46 – 18.02	16.67 (1.18)	14.36 – 18.98
Bobcats/1,000 Hours	0.47 (0.35)	0 – 1.15	0.76 (0.17)	0.43 – 1.09
Wolves/1,000 Hours	2.18 (1.61)	0 – 5.33	4.16 (1.33)	1.56 – 6.76
Fisher/1,000 Hours	2.03 (0.87)	0.32 – 3.73	1.47 (0.22)	1.04 – 1.90
Gray Foxes/1,000 Hours	1.56 (0.61)	0.35 – 2.76	2.33 (0.41)	1.52 – 3.13
Badgers/1,000 Hours	0.62 (0.31)	0.01 – 1.23	0.42 (0.10)	0.22 – 0.61

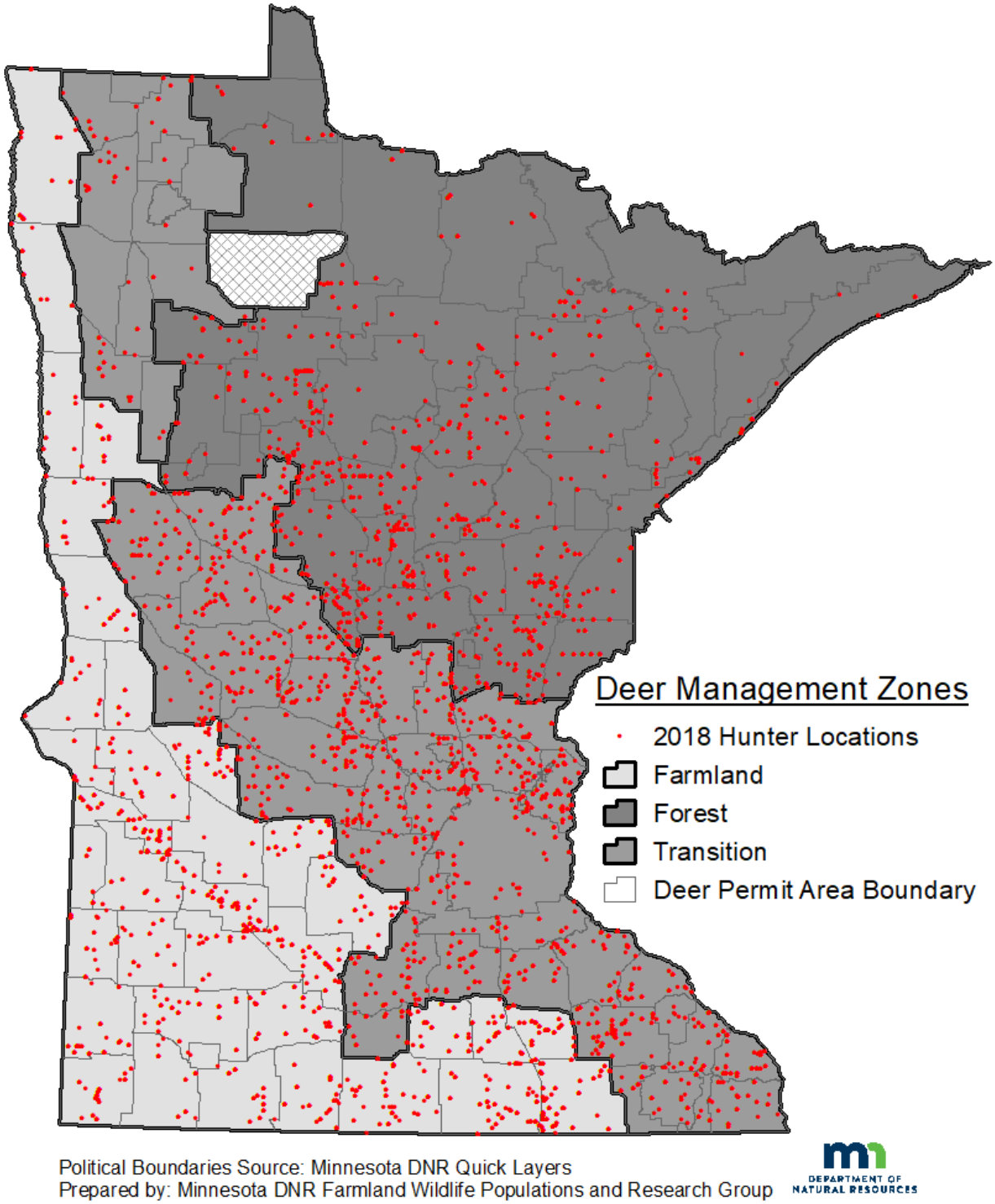

Figure 1. Deer management zones used to describe results of bowhunter observation surveys in Minnesota, USA during 2018. Red circles depict hunter locations (*n* = 12,828) during the early archery season (15 September – 2 November 2018). Generally, forested deer permit areas (DPAs) were composed of ≥60% woody cover, transition DPAs were composed of 6%-50% woody cover, and farmland DPAs were composed of ≤5% woody cover

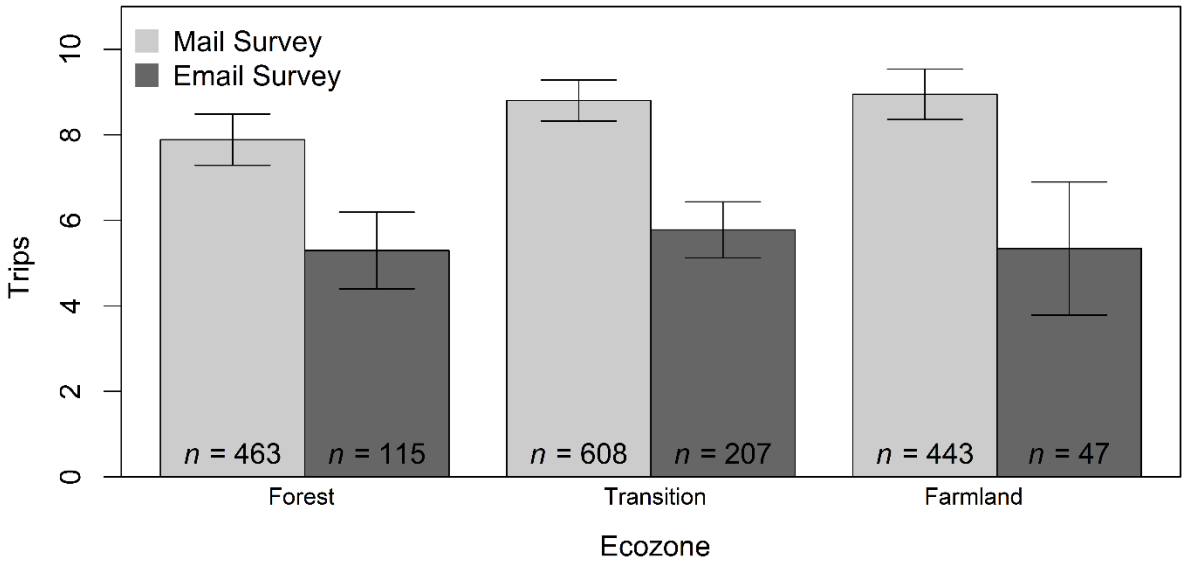

Figure 2. Mean hunting observation trips per bowhunter by ecozone and survey type with 95% Confidence Intervals during the early archery season (15 September – 2 November 2018) in Minnesota, USA. Trips per hunter were different between mail and online survey respondents (P< = 0.001).

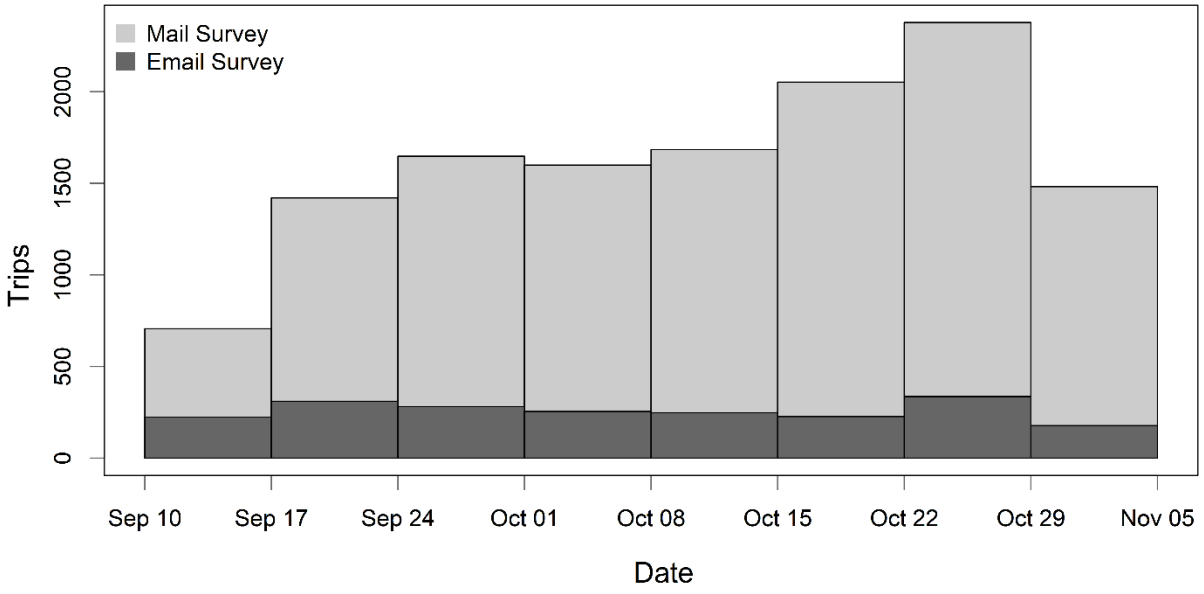

Figure 3. Timing of hunting observation trips for mail and online respondents during the early archery season (15 September – 2 November 2018) in Minnesota, USA.

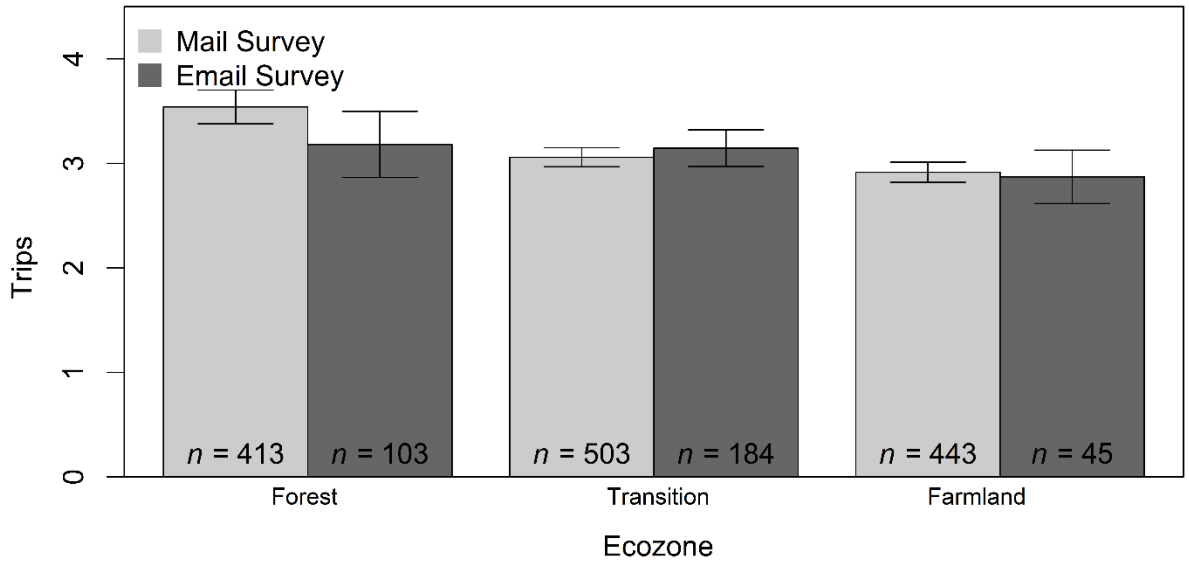

Figure 4. Mean hours hunted per trip with 95% Confidence Intervals for mail and online respondents during the early archery season (15 September – 2 November 2018) in Minnesota, USA. Online and mail respondents did not differ (P =0.73) in number of hours hunted per trip.

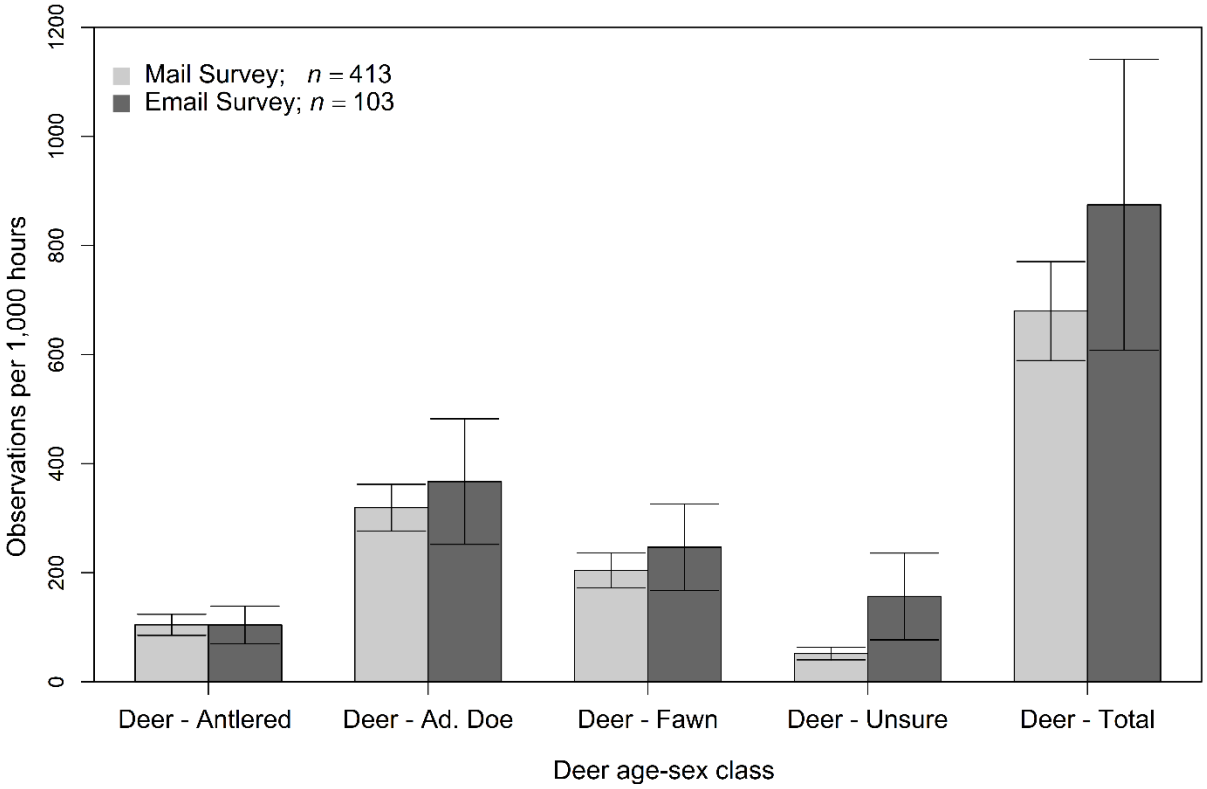

Figure 5. Mean deer observation rates per 1,000 hours with 95% Confidence Intervals in the forest ecozone during the early archery season (15 September – 2 November 2018) in Minnesota, USA.

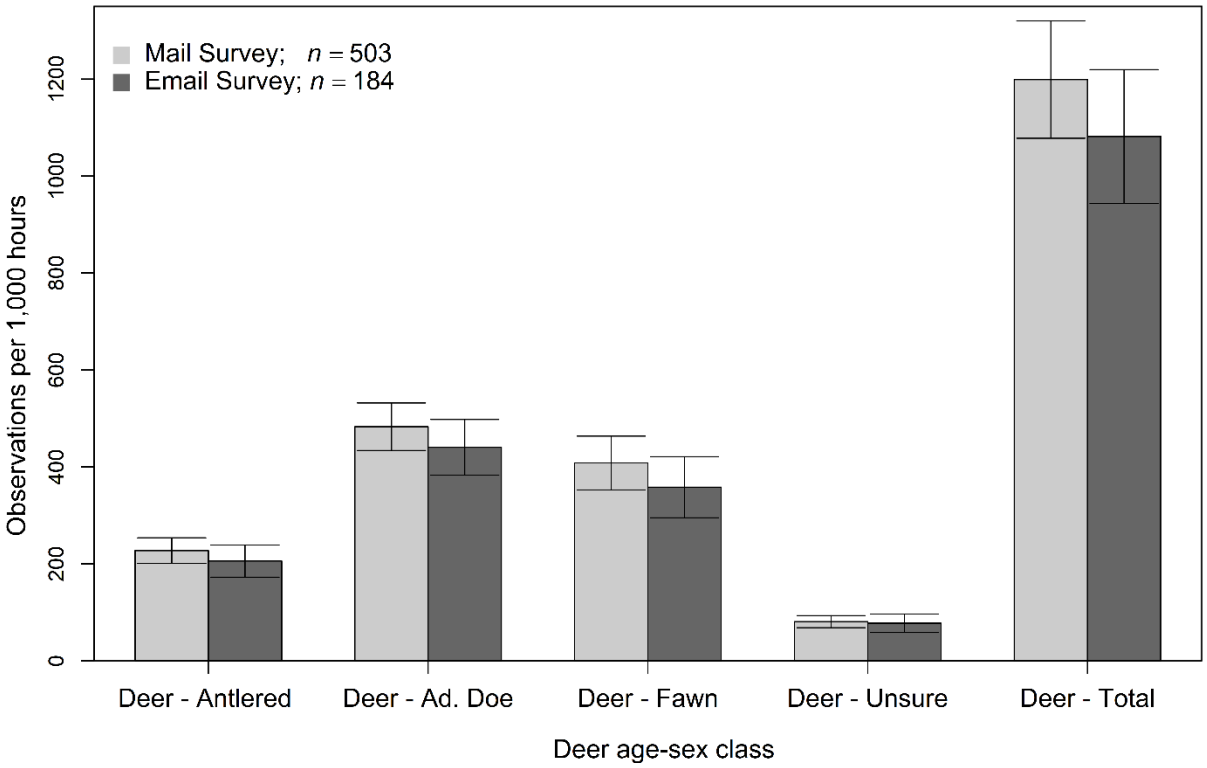

Figure 6. Mean deer observation rates per 1,000 hours with 95% Confidence Intervals in the transition ecozone during the early archery season (15 September – 2 November 2018) in Minnesota, USA.

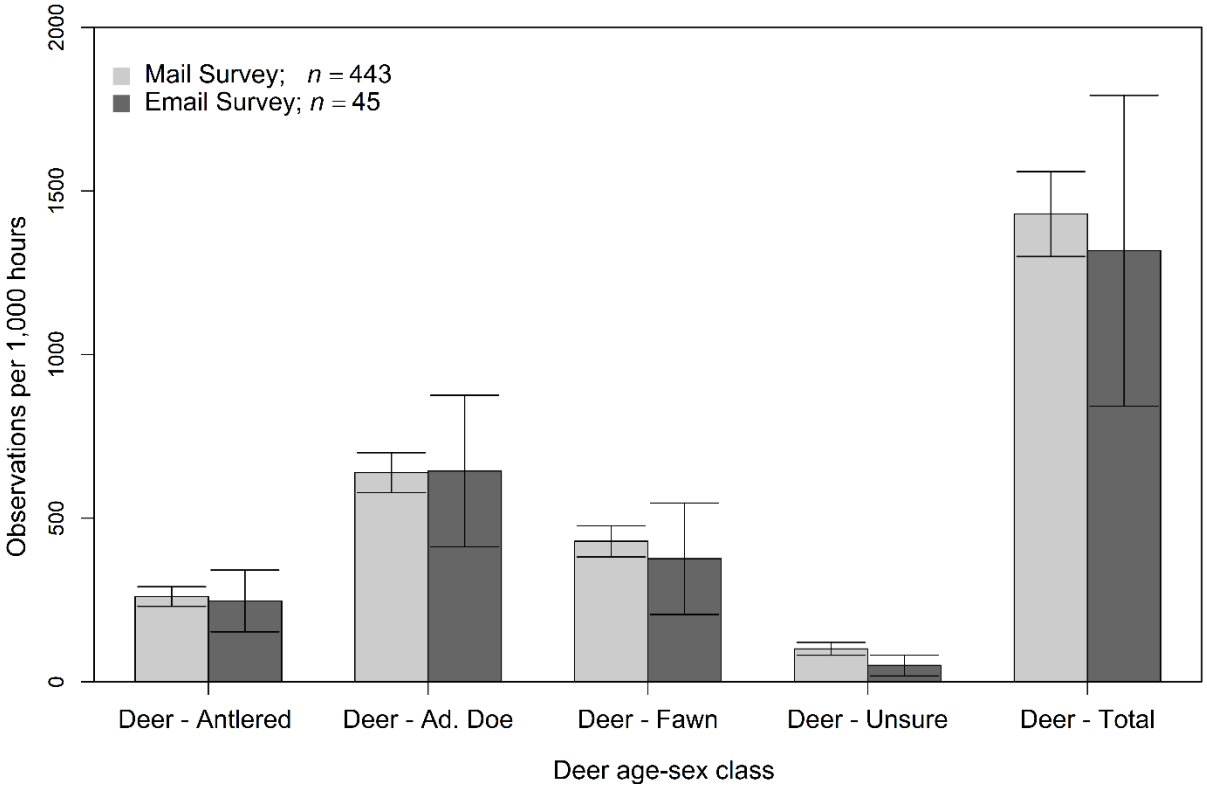

Figure 7. Mean deer observation rates per 1,000 hours with 95% Confidence Intervals in the farmland ecozone during the early archery season (15 September – 2 November 2018) in Minnesota, USA.

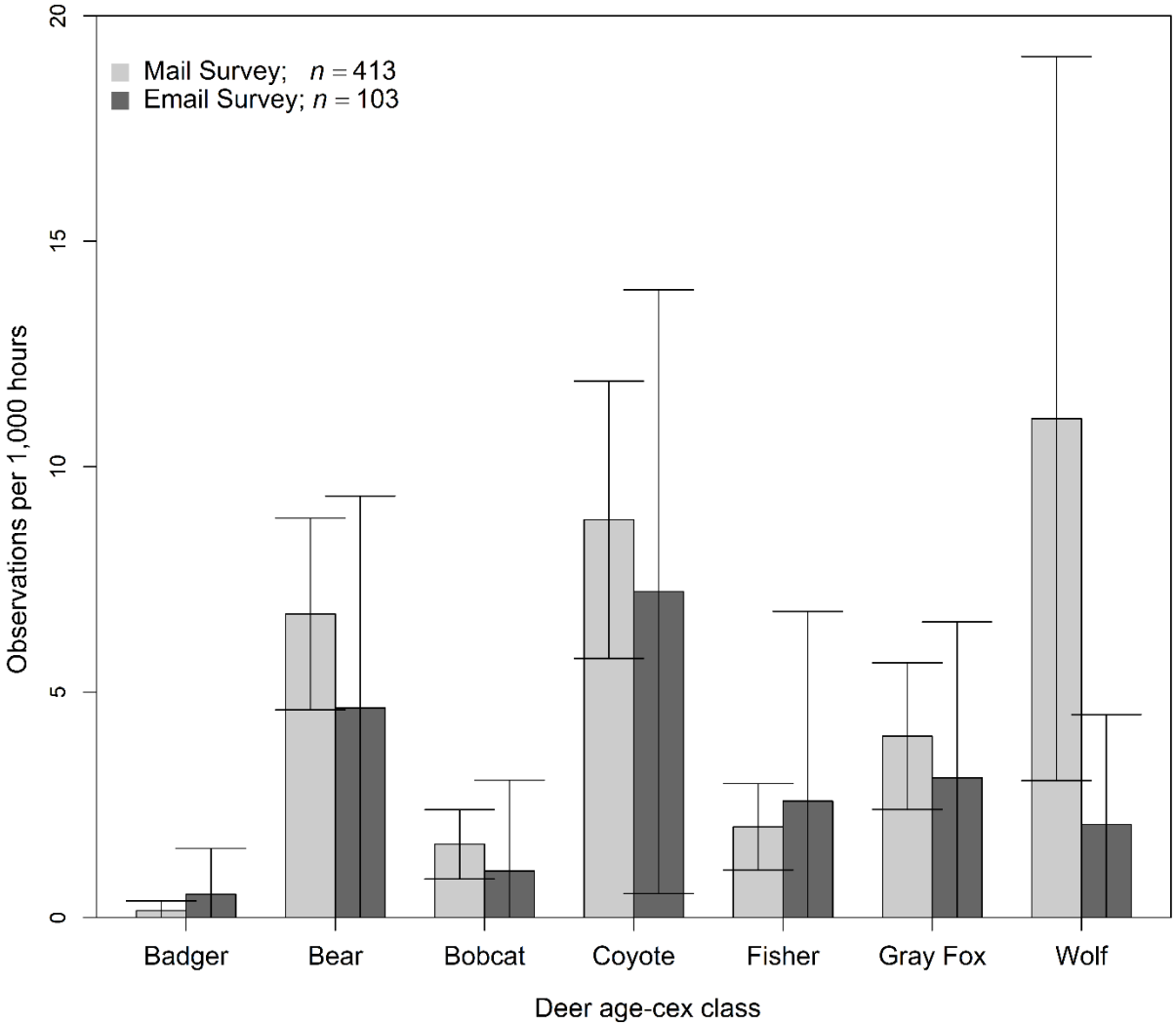

Figure 8. Mean observation rates of other species per 1,000 hours with 95% Confidence Intervals in the forest ecozone during the early archery season (15 September – 2 November 2018) in Minnesota, USA.

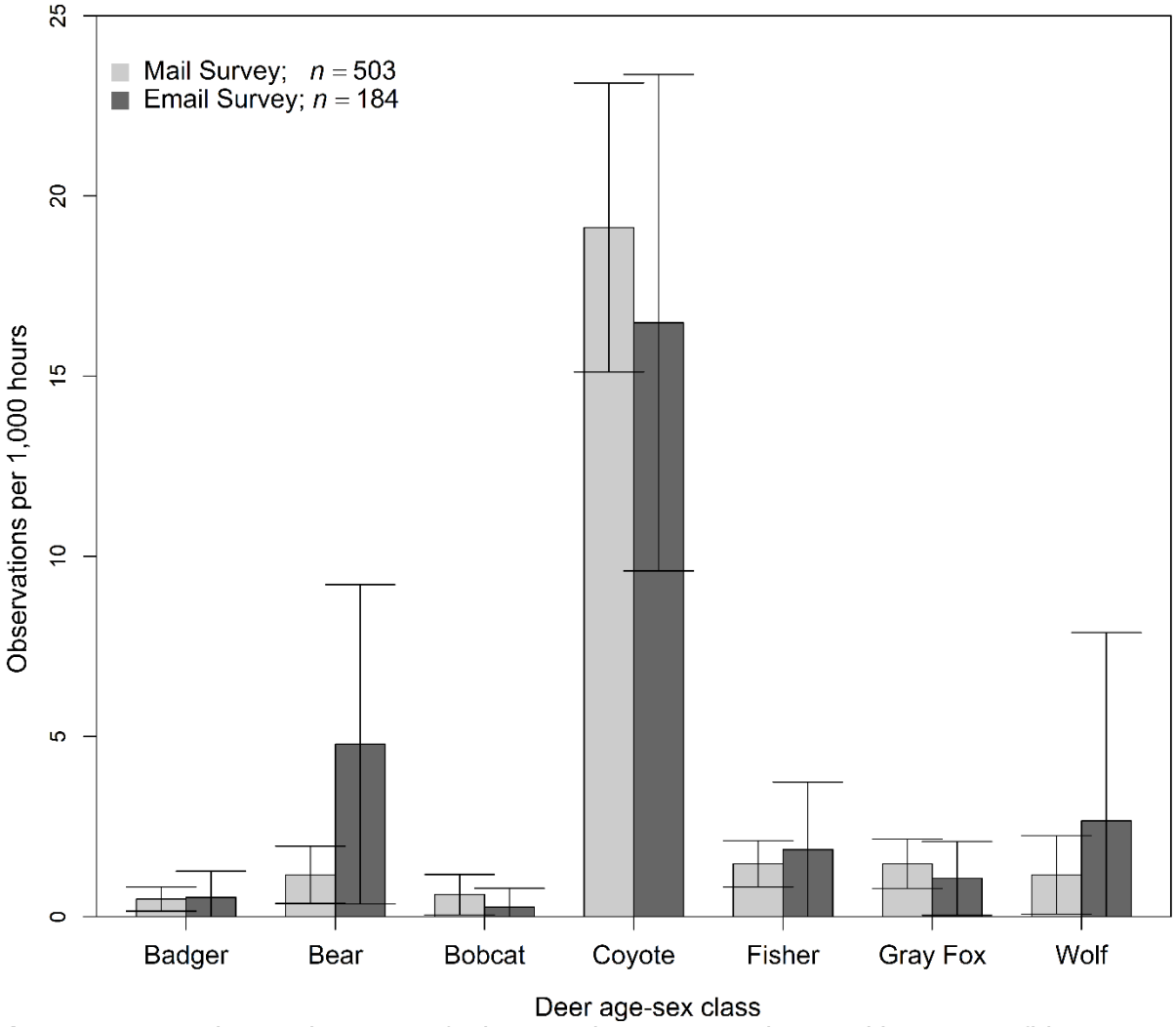

Figure 9. Mean observation rates of other species per 1,000 hours with 95% Confidence Interval in the transition ecozone during the early archery season (15 September – 2 November 2018) in Minnesota, USA.

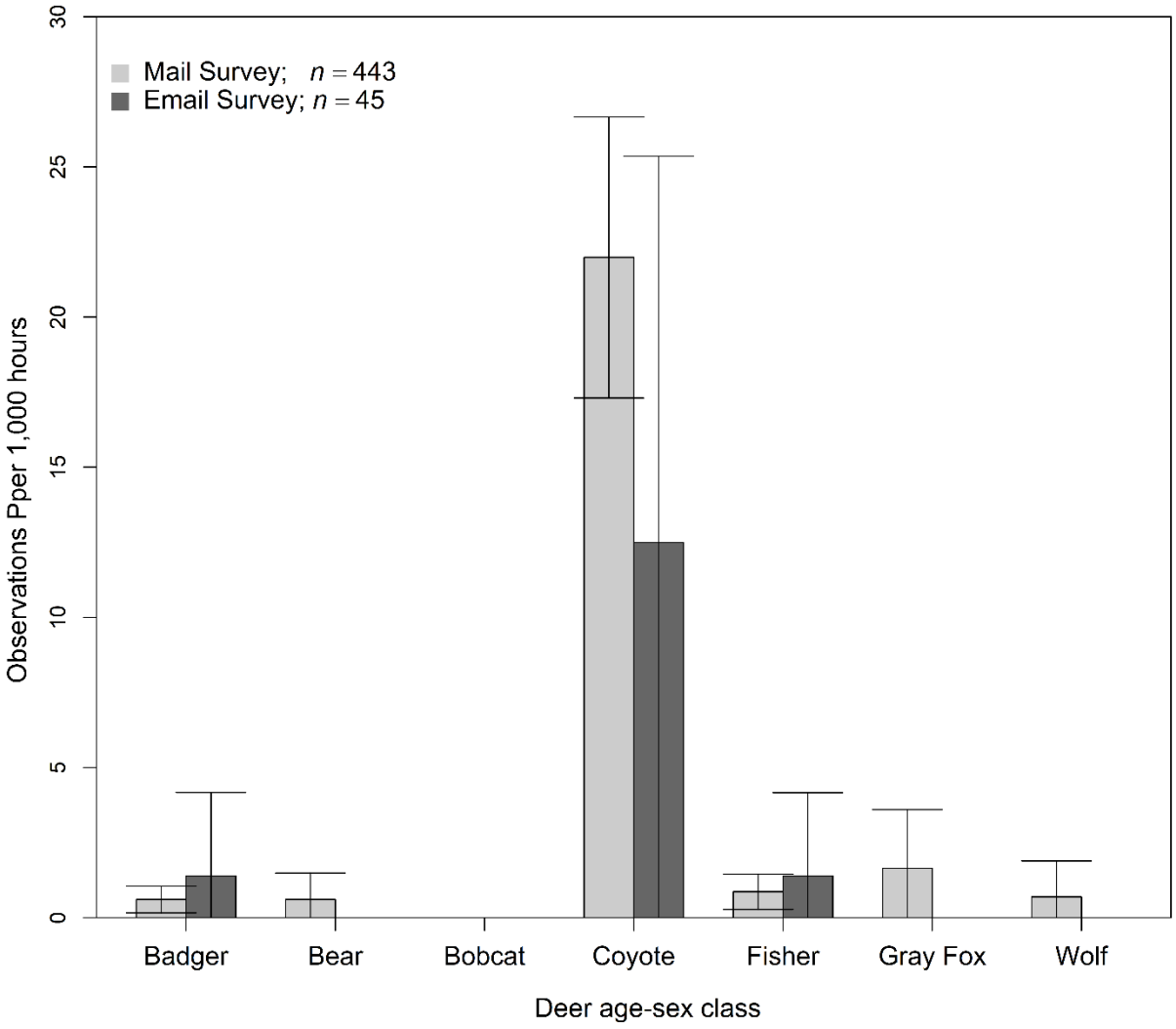

Figure 10. Mean observation rates of other species per 1,000 hours with 95% Confidence Intervals in the farmland ecozone during the early archery season (15 September – 2 November 2018) in Minnesota, USA.

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APPENDIX I. Mailed bowhunter observation survey for the early archery season (15 September – 2 November 2018) in Minnesota, USA.

DEPARTMENT OF NATURAL RESOURCES

September 3, 2018

2018 Bowhunter Observation Survey
HUNTER NAME
ADDRESS LINE 1
ADDRESS LINE 2

Dear Hunter,

You have been selected from a list of dedicated bowhunters to participate in the "2018 Bowhunter Observation Survey." This is a new survey that is designed to enlist bowhunters to help monitor deer population trends. You were randomly selected from a list of people who purchased an archery license over the last 2 years. We chose dedicated bowhunters because of the amount of time you spend hunting deer. The valuable information you provide for this survey promotes better management of Minnesota's deer herd, in addition to a better understanding of trends in other wildlife populations.

This survey is being conducted only during the early bow season, **Sept. 15 – Nov. 2, 2018**. Your help with this survey is very important, as it is new and we would like to conduct annually if we can collect good data.

All you have to do is record when and where you hunt, how many hours you hunt, and the number of animals you see while bowhunting. It is important to return your completed form in the postage paid envelope enclosed, and place it in the mail by November 9, 2018. If you finish all of your bowhunting prior to this date, please return the form earlier.

We have provided 4 columns for hunt locations. If you hunt more than 4 locations, pick your top 4. If you hunted fewer than 4, just leave the other columns blank. For each column, please provide the following,

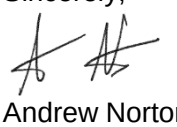
- **Deer Permit Area (DPA)**. This is the 3-digit area you are hunting.
- **Nearest Town**. Please record the closest Incorporated town to your hunting location
- **Direction from Town**. Please use one of the 8 possible directions (N, NE, E, SE, S, SW, W, NW)
- **Distance from Town**. Please estimate the straight line distance between the town you listed and your hunting location

For the rest of the survey, the first row shows you an example of how we'd like you to complete the log. Some key points,

- **Area #**. The number that corresponds to the location information you listed above
- **Hours Hunting**. Please round to the nearest half hour. We ask that you use decimal points (ex – 2.5)
- **Deer Observed**. Please record what you see that day. Please record a '0' if you didn't see anything
- **Other Species**. Only write something if you see one of these animals. If left blank, we'll assume it's '0'

Please use 1 row for each day you hunted. In other words, if you hunted 6 days, you'd have 6 rows of data. This is the second year of the survey. If you participated in the survey last year, we thank you. Results from the 1st year of the survey can be found at https://files.dnr.state.mn.us/wildlife/deer/reports/bhs/bhs_2017.pdf. Thank you for your dedication to the sport of bowhunting, and we wish you a safe, enjoyable, and successful hunting season.

Sincerely,



Andrew Norton, Ungulate Project Leader
andrew.norton@state.mn.us; 507-642-8478

Hunter name and address:	MNDNR # from your license:

Thank you for participating in the 2018 Bowhunter Observation Survey. Please return this original form when you have finished bowhunting or by November 9, 2018, whichever comes first. When finished, place the form in the postage-paid, self-addressed return envelope. For questions, please call the Madelia wildlife research office at (507) 642-8478.

Hunt Location Information: Please record up to 4 locations where you will bowhunt. Please fill out the table below for those areas, along with the other information. When you record observations, you will use the location number (1, 2, 3, 4) to fill out the appropriate line of data. If you hunt more than 4 areas, please use your MOST FREQUENT 4. We realize some data may be lost if you hunt a lot of different areas.

1)	2)	3)	4)
DPA (3 digit number): _____	DPA (3 digit number): _____	DPA (3 digit number): _____	DPA (3 digit number): _____
Nearest town: _____	Nearest town: _____	Nearest town: _____	Nearest town: _____
Direction from town: _____	Direction from town: _____	Direction from town: _____	Direction from town: _____
Distance from town: _____	Distance from town: _____	Distance from town: _____	Distance from town: _____

				DEER OBSERVED (Record 0 if not seen)				**OTHER SPECIES OBSERVED (Only write if you see one of these)**							
Month	Day	Area # (1,2,3,4)	# Hours Hunting (rounded to nearest 1/2 hour)	Antlered	Adult Female	Fawn	Unknown	Wild Turkey	Coyote	Black Bear	Bobcat	Gray Wolf	Fisher	Gray Fox	Badger
Ex) 9	16	2	2.5	1	1	0	2				1		1		

RESPOND ONLY IN THE SPACES PROVIDED, RETURN ORIGINAL FROM (NO PHOTOCOPIES) BY NOVEMBER 9, 2018

				DEER OBSERVED (Record 0 if not seen)				OTHER SPECIES OBSERVED (Only write if you see one of these)							
Month	Day	Area # (1,2,3,4)	# Hours Hunting (round to nearest 1/2 hour)	Antlered	Adult Female	Fawn	Unknown	Wild Turkey	Coyote	Black Bear	Bobcat	Gray Wolf	Fisher	Gray Fox	Badger

RESPOND ONLY IN THE SPACES PROVIDED, RETURN ORIGINAL FROM (NO PHOTOCOPIES) BY NOVEMBER 9, 2018

APPENDIX II. Mean observation rates of other species per 1,000 hours and hours per trip with 95% Confidence Intervals by ecozone during the early archery season (15 September – 2 November 2018) in Minnesota, USA.

Parameter	Ecozone	Survey Mode	Mean	95% CI
Hours/Trip	Forest	Online	3.18 (SE = 0.16)	2.86 - 3.50
Antlered Deer/1,000 Hours	Forest	Online	104.28 (SE = 17.64)	69.72 - 138.85
Adult Female Deer/1,000 Hours	Forest	Online	367.06 (SE = 58.75)	251.92 - 482.21
Fawn Deer/1,000 Hours	Forest	Online	246.77 (SE = 40.46)	167.48 - 326.07
Unknown Deer/1,000 Hours	Forest	Online	156.43 (SE = 40.57)	76.91 - 235.95
Total Deer/1,000 Hours	Forest	Online	874.55 (SE = 136.12)	607.77 - 1141.33
Turkeys/1,000 Hours	Forest	Online	235.93 (SE = 51.83)	134.35 - 337.51
Bears/1,000 Hours	Forest	Online	4.65 (SE = 2.40)	0 - 9.35
Coyotes/1,000 Hours	Forest	Online	7.23 (SE = 3.42)	0.53 - 13.92
Bobcats/1,000 Hours	Forest	Online	1.03 (SE = 1.03)	0 - 3.04
Wolves/1,000 Hours	Forest	Online	2.07 (SE = 1.24)	0 - 4.50
Fisher/1,000 Hours	Forest	Online	2.58 (SE = 2.15)	0 - 6.79
Gray Foxes/1,000 Hours	Forest	Online	3.10 (SE = 1.77)	0 - 6.56
Badgers/1,000 Hours	Forest	Online	0.52 (SE = 0.52)	0 - 1.53
Hours/Trip	Forest	Mail	3.54 (SE = 0.08)	3.38 - 3.70
Antlered Deer/1,000 Hours	Forest	Mail	104.38 (SE = 9.85)	85.08 - 123.69
Adult Female Deer/1,000 Hours	Forest	Mail	319.26 (SE = 21.82)	276.49 - 362.04
Fawn Deer/1,000 Hours	Forest	Mail	204.28 (SE = 16.42)	172.11 - 236.45
Unknown Deer/1,000 Hours	Forest	Mail	51.77 (SE = 5.90)	40.2 - 63.33
Total Deer/1,000 Hours	Forest	Mail	679.69 (SE = 46.27)	589.01 - 770.38
Turkeys/1,000 Hours	Forest	Mail	221.07 (SE = 29.89)	162.48 - 279.66
Bears/1,000 Hours	Forest	Mail	6.73 (SE = 1.08)	4.61 - 8.86
Coyotes/1,000 Hours	Forest	Mail	8.82 (SE = 1.52)	5.75 - 11.90
Bobcats/1,000 Hours	Forest	Mail	1.62 (SE = 0.39)	0.86 - 2.39
Wolves/1,000 Hours	Forest	Mail	11.07 (SE = 4.10)	3.04 - 19.09
Fisher/1,000 Hours	Forest	Mail	2.01 (SE = 0.49)	1.05 - 2.97
Gray Foxes/1,000 Hours	Forest	Mail	4.02 (SE = 0.83)	2.40 - 5.65
Badgers/1,000 Hours	Forest	Mail	0.15 (SE = 0.11)	0 - 0.37
Hours/Trip	Transition	Online	3.15 (SE = 0.09)	2.97 - 3.32
Antlered Deer/1,000 Hours	Transition	Online	205.77 (SE = 16.96)	172.52 - 239.02
Adult Female Deer/1,000 Hours	Transition	Online	440.25 (SE = 29.34)	382.74 - 497.76
Fawn Deer/1,000 Hours	Transition	Online	358.10 (SE = 32.18)	295.04 - 421.17
Unknown Deer/1,000 Hours	Transition	Online	77.36 (SE = 9.67)	58.41 - 96.32
Total Deer/1,000 Hours	Transition	Online	1081.48 (SE = 70.39)	943.51 - 1219.45
Turkeys/1,000 Hours	Transition	Online	290.31 (SE = 39.97)	211.96 - 368.66
Bears/1,000 Hours	Transition	Online	4.79 (SE = 2.26)	0.36 - 9.22
Coyotes/1,000 Hours	Transition	Online	16.48 (SE = 3.51)	9.59 - 23.37
Bobcats/1,000 Hours	Transition	Online	0.27 (SE = 0.27)	0 - 0.79
Wolves/1,000 Hours	Transition	Online	2.66 (SE = 2.67)	0 - 7.89
Fisher/1,000 Hours	Transition	Online	1.86 (SE = 0.95)	0 - 3.73
Gray Foxes/1,000 Hours	Transition	Online	1.06 (SE = 0.52)	0.04 - 2.09
Badgers/1,000 Hours	Transition	Online	0.53 (SE = 0.37)	0 - 1.26

Parameter	Ecozone	Survey Mode	Mean	95% CI
Hours/Trip	Transition	Mail	3.06 (SE = 0.05)	2.97 - 3.15
Antlered Deer/1,000 Hours	Transition	Mail	227.28 (SE = 13.49)	200.84 - 253.71
Adult Female Deer/1,000 Hours	Transition	Mail	482.85 (SE = 24.98)	433.88 - 531.81
Fawn Deer/1,000 Hours	Transition	Mail	408 (SE = 28.29)	352.55 - 463.46
Unknown Deer/1,000 Hours	Transition	Mail	80.71 (SE = 6.39)	68.19 - 93.22
Total Deer/1,000 Hours	Transition	Mail	1198.84 (SE = 61.70)	1077.91 - 1319.77
Turkeys/1,000 Hours	Transition	Mail	414.6 (SE = 32.53)	350.84 - 478.37
Bears/1,000 Hours	Transition	Mail	1.16 (SE = 0.41)	0.37 - 1.96
Coyotes/1,000 Hours	Transition	Mail	19.12 (SE = 2.05)	15.11 - 23.13
Bobcats/1,000 Hours	Transition	Mail	0.61 (SE = 0.29)	0.05 - 1.17
Wolves/1,000 Hours	Transition	Mail	1.16 (SE = 0.56)	0.07 - 2.25
Fisher/1,000 Hours	Transition	Mail	1.47 (SE = 0.33)	0.82 - 2.11
Gray Foxes/1,000 Hours	Transition	Mail	1.47 (SE = 0.35)	0.78 - 2.15
Badgers/1,000 Hours	Transition	Mail	0.49 (SE = 0.17)	0.15 - 0.82
Hours/Trip	Farmland	Online	2.87 (SE = 0.13)	2.62 - 3.13
Antlered Deer/1,000 Hours	Farmland	Online	247.05 (SE = 48.27)	152.45 - 341.65
Adult Female Deer/1,000 Hours	Farmland	Online	644.00 (SE = 118.22)	412.29 - 875.71
Fawn Deer/1,000 Hours	Farmland	Online	376.13 (SE = 87.00)	205.61 - 546.64
Unknown Deer/1,000 Hours	Farmland	Online	49.97 (SE = 16.22)	18.17 - 81.76
Total Deer/1,000 Hours	Farmland	Online	1317.14 (SE = 242.22)	842.4 - 1791.88
Turkeys/1,000 Hours	Farmland	Online	274.81 (SE = 107.52)	64.07 - 485.55
Bears/1,000 Hours	Farmland	Online	0.00	0 - 0
Coyotes/1,000 Hours	Farmland	Online	12.49 (SE = 6.56)	0 - 25.35
Bobcats/1,000 Hours	Farmland	Online	0.00	0 - 0
Wolves/1,000 Hours	Farmland	Online	0.00	0 - 0
Fisher/1,000 Hours	Farmland	Online	1.39 (SE = 1.42)	0 - 4.16
Gray Foxes/1,000 Hours	Farmland	Online	0.00	0 - 0
Badgers/1,000 Hours	Farmland	Online	1.39 (SE = 1.42)	0 - 4.17
Hours/Trip	Farmland	Mail	2.91 (SE = 0.05)	2.82 - 3.01
Antlered Deer/1,000 Hours	Farmland	Mail	260.44 (SE = 15.43)	230.21 - 290.67
Adult Female Deer/1,000 Hours	Farmland	Mail	638.85 (SE = 31.11)	577.88 - 699.83
Fawn Deer/1,000 Hours	Farmland	Mail	429.39 (SE = 24.36)	381.65 - 477.14
Unknown Deer/1,000 Hours	Farmland	Mail	100.75 (SE = 10.06)	81.02 - 120.47
Total Deer/1,000 Hours	Farmland	Mail	1429.44 (SE = 66.15)	1299.79 - 1559.08
Turkeys/1,000 Hours	Farmland	Mail	346.48 (SE = 33.13)	281.55 - 411.40
Bears/1,000 Hours	Farmland	Mail	0.61 (SE = 0.45)	0 - 1.49
Coyotes/1,000 Hours	Farmland	Mail	21.98 (SE = 2.39)	17.30 - 26.67
Bobcats/1,000 Hours	Farmland	Mail	0.00	0 - 0
Wolves/1,000 Hours	Farmland	Mail	0.69 (SE = 0.61)	0 - 1.89
Fisher/1,000 Hours	Farmland	Mail	0.87 (SE = 0.30)	0.28 - 1.45
Gray Foxes/1,000 Hours	Farmland	Mail	1.64 (SE = 1.00)	0 - 3.60
Badgers/1,000 Hours	Farmland	Mail	0.61 (SE = 0.23)	0.16 - 1.05