DEPARTMENT OF NATURAL RESOURCES

2017 Bowhunter Observation Survey Report

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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, the information agencies use is required each year. 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 between 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 is improved by collecting annually recurrent information to independently estimate the population trend (i.e., lambda [λ]). Collection of additional data that improves deer population estimates was also a recommendation of 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).

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 observation surveys are desirable because they are longer than firearm seasons, and 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, the early archery season (Saturday closest to September 15 to the Saturday closest to November 6) concludes earlier and 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). On the online survey, we also collected more precise location and weather information. 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.

Our sampling frame (N = 47,960) was individuals who purchased an archery deer hunting license for the 2014, 2015, and 2016 seasons, and hunted outside of the Twin Cities metropolitan area (DPA 601) and the Duluth metropolitan area (DPA 182). In Minnesota, collection of email addresses is not mandatory and only 21% (N = 10,202) had an email on file. To draw our two samples, we first randomly selected 9,000 individuals to receive a paper survey, regardless of whether or not they had an email on file. 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 = 8,249). We also provided email survey participants the option to complete the survey online or print off an observation diary log (Appendix I). Sampling rates among ecozones between the two survey modes were comparable and ranged from 0.151 to 0.185 (Table 1).

We evaluated the mean age difference and response rates from the sample and responses between the mail and email 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. Variances were estimated using Taylor series linearization, and 95% confidence intervals were constructed using the Normal approximation. We used t-tests to compare all responses between email and mailed respondents, with the exception of the timing of hunting trips, which we did not statistically compare. We used an alpha value of 0.05 to determine if there was a significant difference between email and mail 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).

Although results presented in this report are only from the first year of hunter observations, we intend to conduct the concurrent mail and email surveys an additional two years in order to effectively evaluate the trend inference between survey modes. We will first 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 with 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 from the bowhunter observation surveys. For example, if the index were to suggest the population doubled in a single year, we know from white-tailed deer natural history, this growth rate is unrealistic in a wild deer population.

RESULTS

After removing undeliverable samples, we administered 8,825 mail and 8,165 email surveys. Of those, we received 971 paper and 441 email responses, which resulted in adjusted response rates of 0.110 and 0.050, respectively (Table 1). Response rates were comparable among regions, however they differed between survey modes, with mail response rates ranging 0.097 to 0.110 and email response rate ranging 0.048 to 0.054 (Table 1). Average age of respondents was older than the sample for both the mail ($\bar{x}$ = 53 vs 45 years) and email ($\bar{x}$ = 48 vs 43) surveys. Email respondents also averaged less than 2/3 as many trips per hunter ($\bar{x}$ = 5.86, SE = 0.296) compared to the mail responses ($\bar{x}$ = 9.88, SE = 0.221; Figure 2). Although we did not statistically evaluate the timing of the trips, it was apparent email respondents were less likely to record observations later in the season relative to mail respondents (Figure 3). Despite lower response rates and fewer observations later in the season, hours hunted per trip (email $\bar{x}$ = 3.04, SE = 0.069, mail $\bar{x}$ = 3.16, SE = 0.045) and observation rates per hour among species did not differ between survey modes, with the exception of gray fox observation rates (Figures 4-10; Table 2, Appendix II).

We did not compare observation rates among ecozones because hunter distribution, similar to deer populations, are not randomly distributed. Thus, detection rates among ecozones vary because of the distribution of hunters. For example, deer densities are highest in the transition ecozone (Norton and Giudice 2017), but deer observation rates per 1,000 hours were highest in the farmland. As a result, among ecozones, we only compared the relative proportion of species or cohorts observed within ecozone. For example, we can compare the ratio of coyote to wolf observations between the forest and transition ecozones. We visually compared these observation rates within ecozone.

Overall, the percent of antlered deer among total deer observations was highest in the farmland ($\bar{x}$ = 0.20), followed by the transition ($\bar{x}$ = 0.19), then the forest ($\bar{x}$ = 0.16). The highest observed fawn:doe ratio was in the transition ($\bar{x}$ = 0.85), followed by the forest ($\bar{x}$ = 0.75), and farmland ($\bar{x}$ = 0.70) (Figures 5–7).

Among the other species surveyed, there was more diversity in the forest ecozone, with relatively more bear, bobcat, wolf, fisher, and gray fox observations compared to the transition and farmland. The highest relative amount of turkeys were reported in the transition ecozone (Figures 8–10).

DISCUSSION

Although mean age, response rates, and trips per hunter were all significantly different between email and mail respondents, similar observation rates suggest that inferences about population trends could be obtained from either survey modes. However, the low response rates and low number of trips per hunter from the email survey results in a reduced amount of

information. We should explore methods that increase response rates, especially for the email survey, such as sending a reminder email halfway through the observation season. It was apparent that email respondents only entered a few observation days, and then lost interest in the survey. In addition, we intend to distribute results from the first year of this survey to generate future interest and increase participation. More importantly, it is currently unknown if trends in observation rates among years will be similar between survey modes. A minimum of one additional year will be necessary to evaluate these trends, and ideally, several years will improve confidence that both survey modes result in similar inferences.

Although the first year's limited sample size should be approached with caution, we found it interesting that fawn:adult female ratios were lowest in the farmland. It will be important to reevaluate this trend after additional survey years. Our intent is to obtain three years of observations to determine if this information contributes to our knowledge of population trends and if so, determine the minimum spatial scale required to provide reliable inferences.

ACKNOWLEGMENTS

We would like to acknowledge all the bowhunters that responded to the survey. We also thank the MDNR Farmland Wildlife Populations and Research staff that provided feedback on earlier versions of the survey, and especially Katie Steffl for entering all the data from the survey responses. Thank you to the MNDNR wildlife biometricians, John Giudice and Veronique St-Louis, for their assistance with the sampling design and statistical analysis.

Table 1. Sampling statistics from the bowhunter observation survey, 2017.

Mode	Ecozone	Sampling Frame	Sample	Sampling Rate	No. Responses	Sampling Frame Mean Age	Sample Mean Age	Responses Mean Age
Email	State	47,960	8,165	0.17	427	45 (SE = 0.07)	43 (SE = 0.15)	48 (SE = 0.27)
	Forest	12,432	2,199	0.18	111	48 (SE = 0.13)	45 (SE = 0.29)	50 (SE = 0.57)
	Transition	28,514	4,863	0.17	263	44 (SE = 0.08)	43 (SE = 0.18)	48 (SE = 0.34)
	Farmland	7,014	1,103	0.16	53	44 (SE = 0.18)	41 (SE = 0.4)	45 (SE = 0.76)
Mail	State	47,960	8,825	0.18	932	45 (SE = 0.07)	45 (SE = 0.15)	53 (SE = 0.14)
	Forest	12,432	2,278	0.18	251	48 (SE = 0.13)	48 (SE = 0.31)	55 (SE = 0.26)
	Transition	28,514	5,261	0.18	556	44 (SE = 0.08)	45 (SE = 0.2)	52 (SE = 0.18)
	Farmland	7,014	1,286	0.18	125	44 (SE = 0.18)	45 (SE = 0.41)	54 (SE = 0.35)

Table 2. Statewide mean and 95% confidence intervals for hours hunted per hunting trip and observation rates per 1,000 hours from email and mail responses, 2017. The only significant difference between mean mail and email responses was gray foxes/1,000 hours.

Parameter	Survey Mode	Mean	95% CI
Hours/Trip	Email	3.04 (SE = 0.07)	2.91 - 3.18
Hours/Trip	Mail	3.16 (SE = 0.05)	3.07 - 3.25
Antlered Deer/1,000 Hours	Email	189.52 (SE = 12.25)	165.51 - 213.54
Antlered Deer/1,000 Hours	Mail	181.27 (SE = 7.77)	166.03 - 196.51
Adult Female Deer/1,000 Hours	Email	424.26 (SE = 30.74)	364 - 484.52
Adult Female Deer/1,000 Hours	Mail	410.48 (SE = 15.87)	379.38 - 441.59
Fawn Deer/1,000 Hours	Email	347.9 (SE = 28.78)	291.5 - 404.3
Fawn Deer/1,000 Hours	Mail	323.73 (SE = 14.33)	295.64 - 351.81
Not Sure Deer/1,000 Hours	Email	87.14 (SE = 10.63)	66.31 - 107.97
Not Sure Deer/1,000 Hours	Mail	73.12 (SE = 4.76)	63.79 - 82.45
Total Deer/1,000 Hours	Email	1,048.83 (SE = 69.53)	912.56 – 1,185.1
Total Deer/1,000 Hours	Mail	988.6 (SE = 35.94)	918.15 – 1,059.04
Turkeys/1,000 Hours	Email	347.77 (SE = 36.76)	275.71 - 419.83
Turkeys/1,000 Hours	Mail	366.56 (SE = 27.6)	312.45 - 420.66
Bears/1,000 Hours	Email	2.89 (SE = 1.03)	0.88 - 4.9
Bears/1,000 Hours	Mail	2.88 (SE = 0.54)	1.83 - 3.94
Coyotes/1,000 Hours	Email	14.33 (SE = 2.48)	9.47 - 19.19
Coyotes/1,000 Hours	Mail	23.59 (SE = 2.68)	18.34 - 28.85
Bobcats/1,000 Hours	Email	1.45 (SE = 0.62)	0.22 - 2.67
Bobcats/1,000 Hours	Mail	1.85 (SE = 0.9)	0.08 - 3.62
Wolves/1,000 Hours	Email	1.18 (SE = 0.54)	0.13 - 2.24
Wolves/1,000 Hours	Mail	3.3 (SE = 0.86)	1.6 - 4.99
Fisher/1,000 Hours	Email	1.31 (SE = 0.52)	0.29 - 2.34
Fisher/1,000 Hours	Mail	2.13 (SE = 0.42)	1.31 - 2.95
Gray Foxes/1,000 Hours	Email	1.45 (SE = 0.51)	0.45 - 2.45
Gray Foxes/1,000 Hours	Mail	6.11 (SE = 1.47)	3.23 - 9
Badgers/1,000 Hours	Email	0.53 (SE = 0.26)	0.02 - 1.03
Badgers/1,000 Hours	Mail	0.24 (SE = 0.09)	0.06 - 0.42

Figure 1. Deer management zones used to describe results of bowhunter observation survey, 2017. 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.

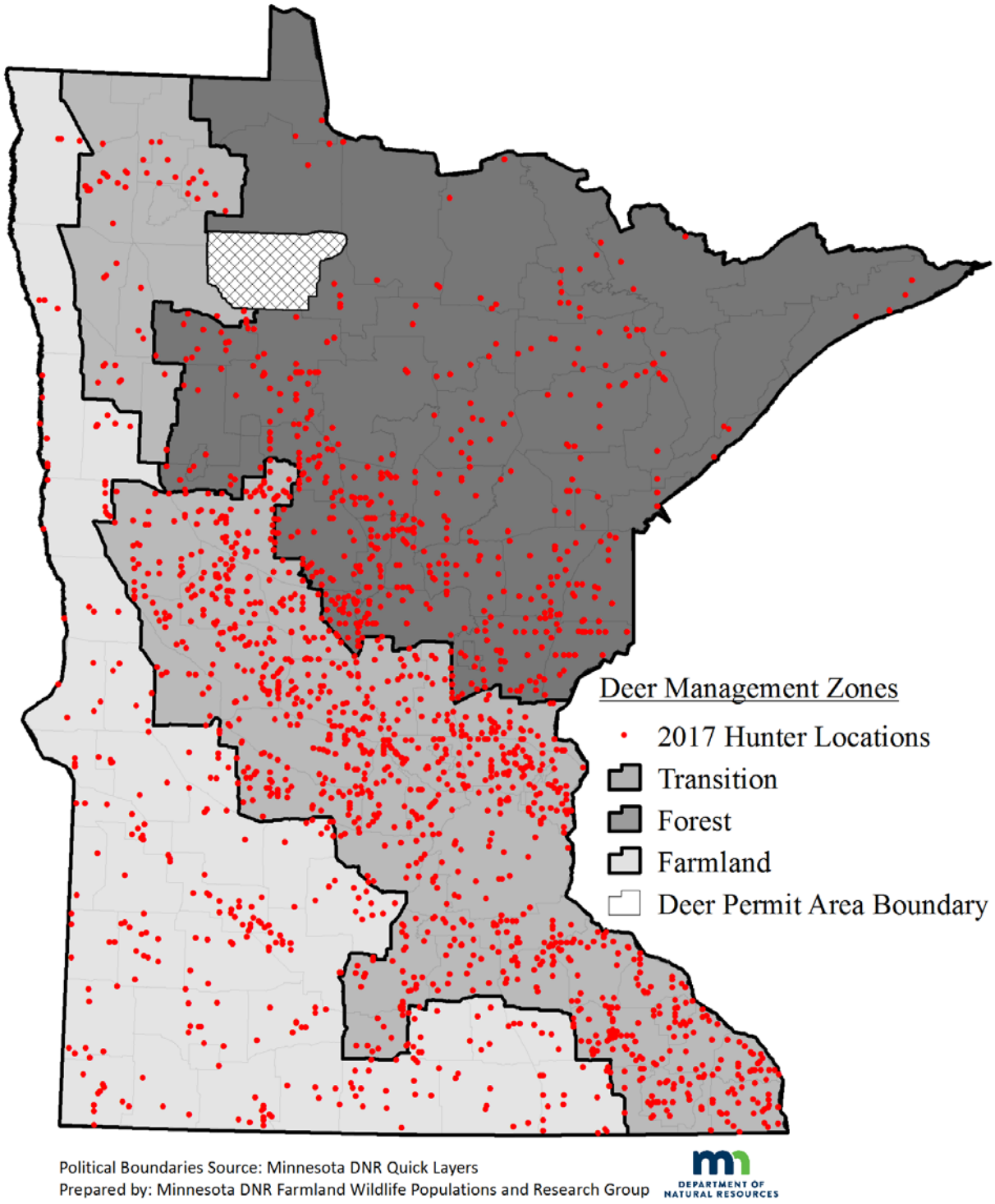


Figure 2. Mean hunting observation trips per bowhunter by ecozone and survey type with 95% CI, 2017. Trips per hunter were significantly ($\alpha = 0.05$) different between mail and email survey respondents.

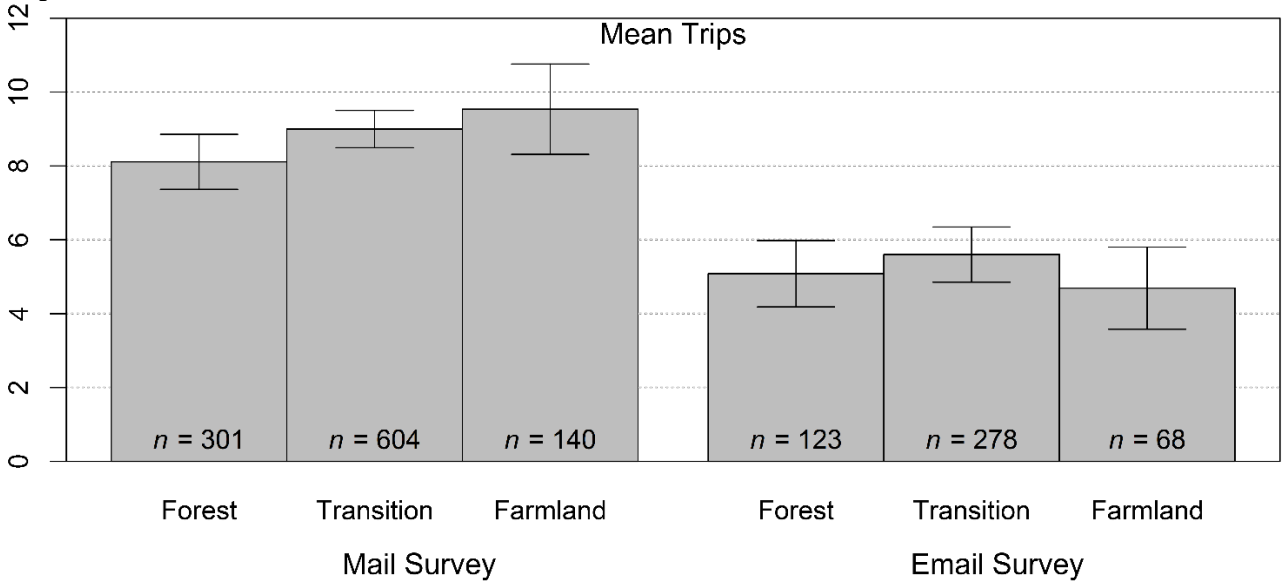


Figure 3. Timing of hunting observation trips for mail and email respondents during the early archery season, 2017.

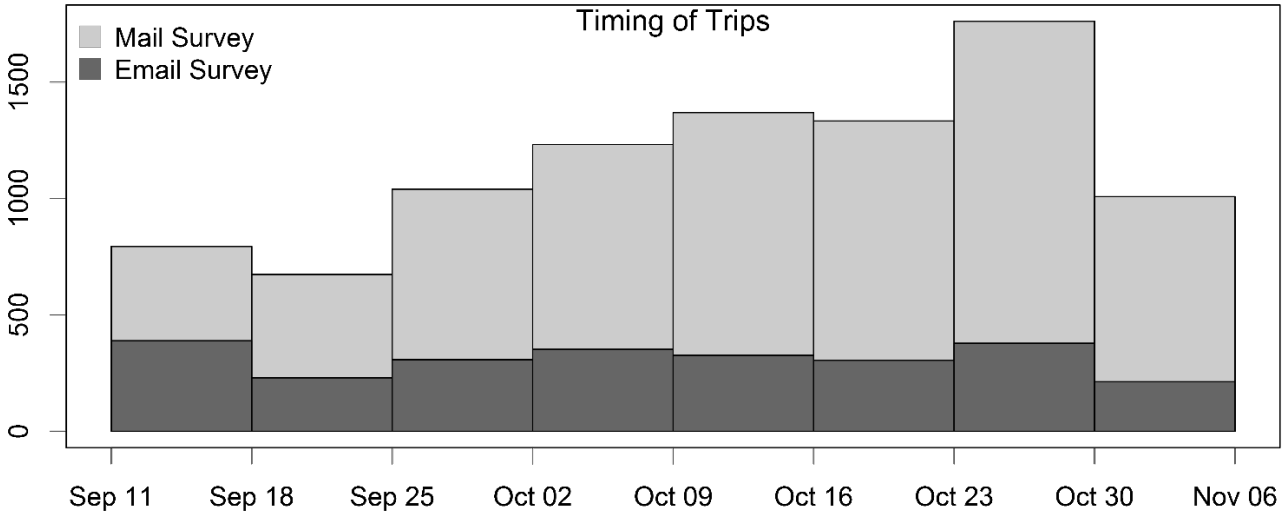


Figure 4. Mean hours per hunting trips with 95% CI for mail and email respondents during the early archery season, 2017. There was no significant difference ($\alpha = 0.05$) between hours hunted for email and mail respondents.

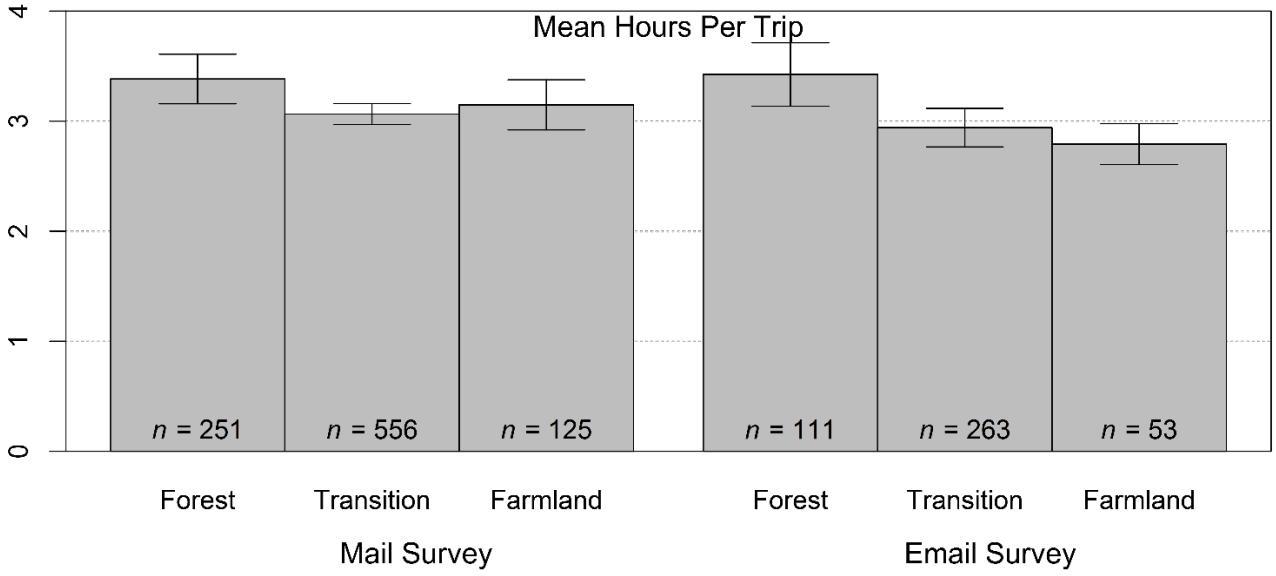


Figure 5. Mean deer observation rates per 1,000 hours with 95% CI in the forest ecozone during the early archery season, 2017. At the statewide scale, there were no significant differences in deer observation rates.

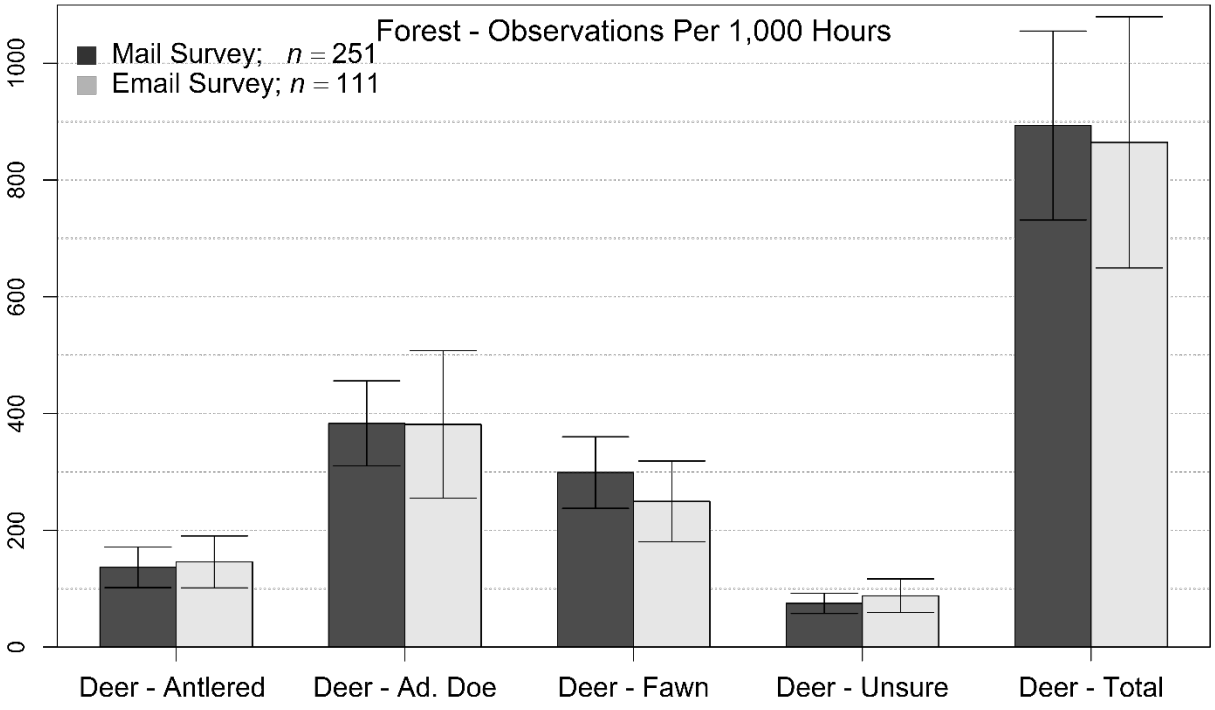


Figure 6. Mean deer observation rates per 1,000 hours with 95% CI in the transition during the early archery season, 2017. At the statewide scale, there were no significant differences in deer observation rates.

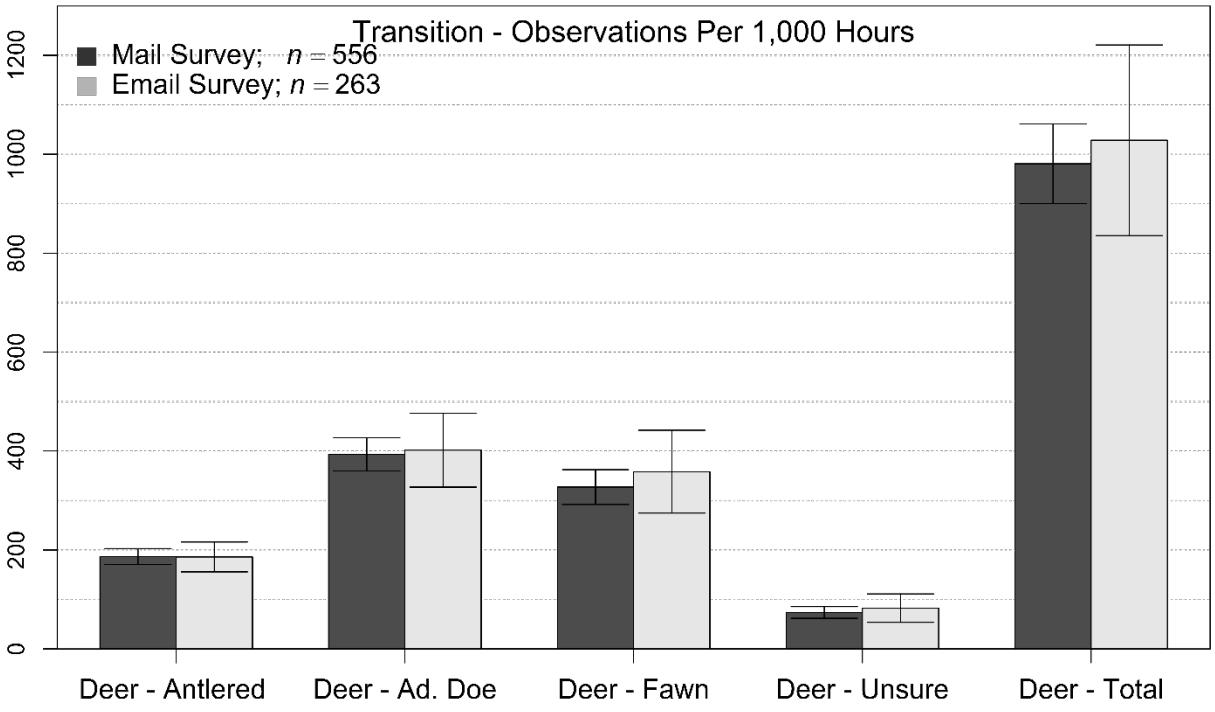


Figure 7. Mean deer observation rates per 1,000 hours with 95% CI in the farmland ecozone during the early archery season, 2017. At the statewide scale, there were no significant differences in deer observation rates.

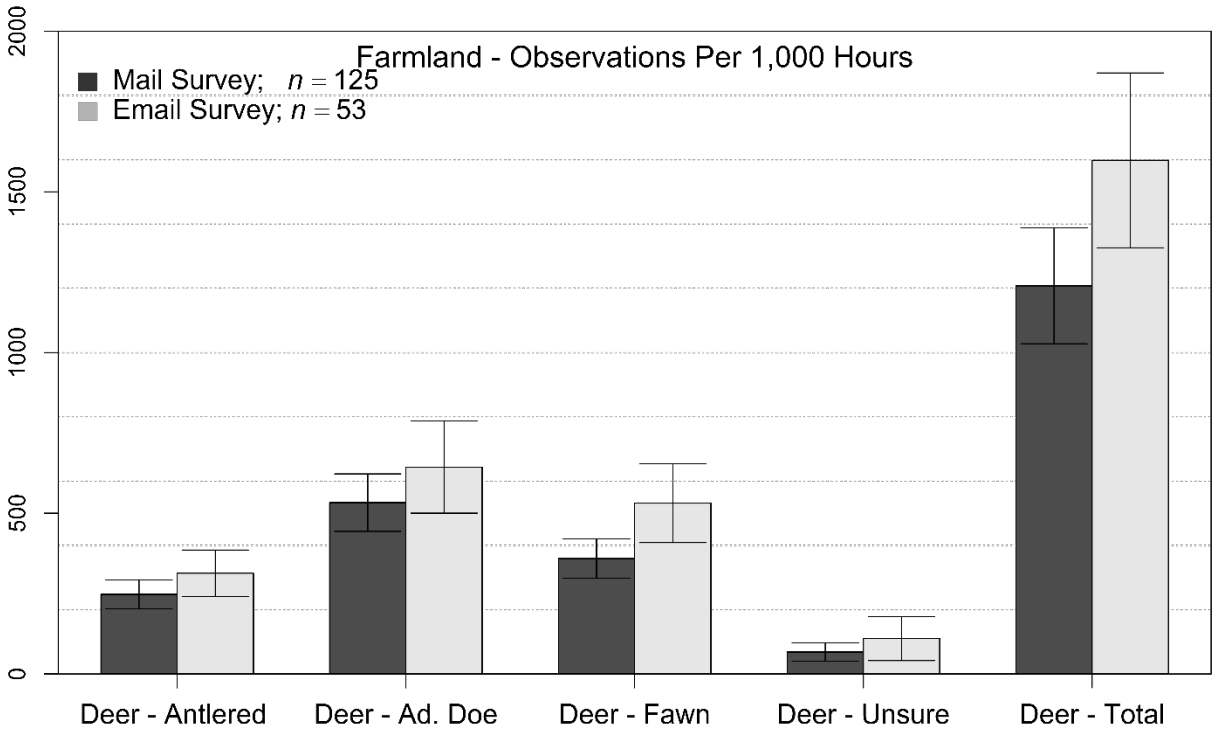


Figure 8. Mean observation rates per 1,000 hours with 95% CI in the forest ecozone during the early archery season, 2017. Observation rates for turkeys (mail $\bar{x}$ = 274.14, SE = 61.82, email $\bar{x}$ = 241.59, SE = 59.60) are not displayed. At the statewide scale, the only significantly different ($\alpha = 0.004$) observation rates between mail and email respondents were for gray fox. Without the Bonferroni correction ($\alpha = 0.05$), significant differences were also found for gray wolf and coyote.

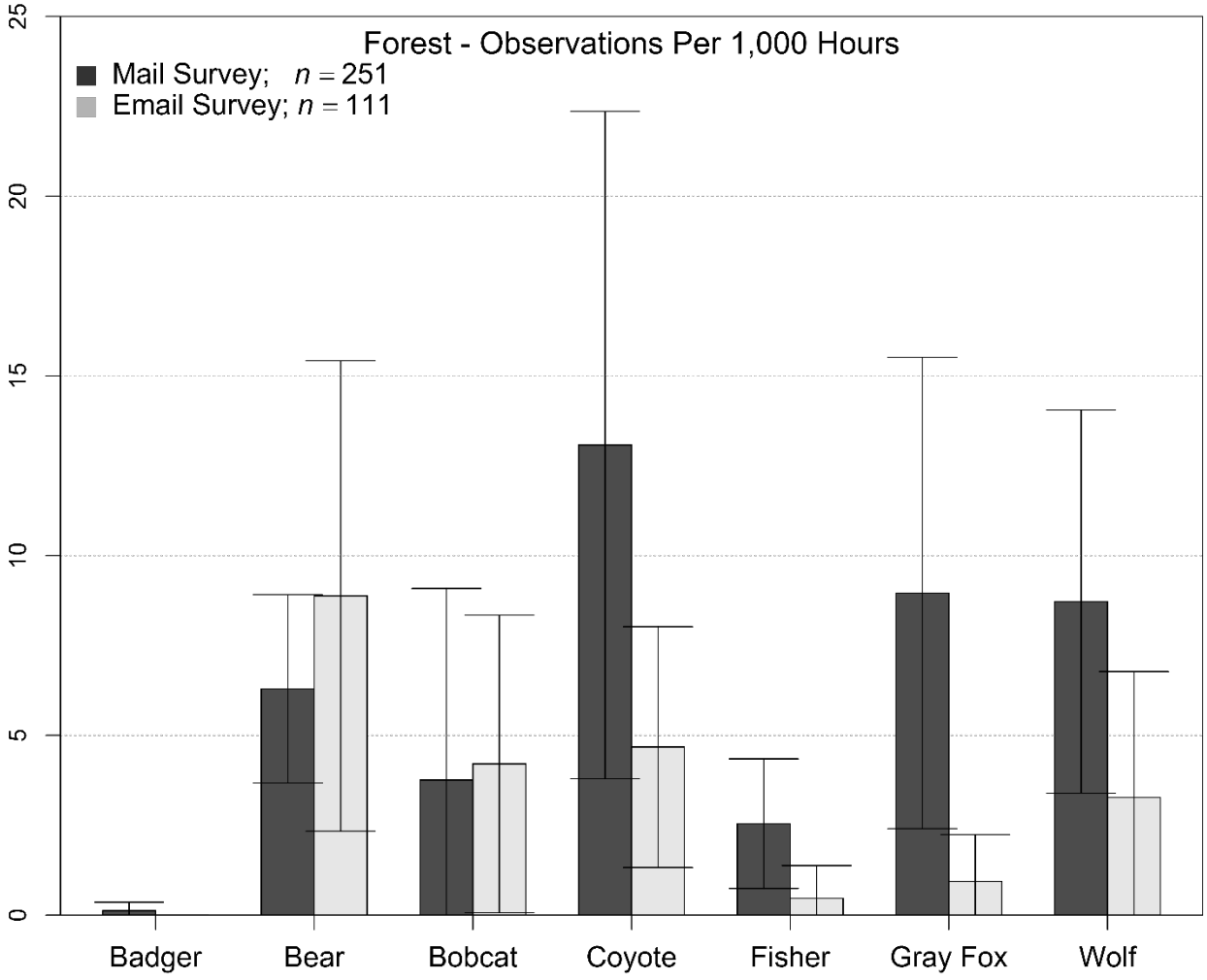


Figure 9. Mean observation rates per 1,000 hours with 95% CI in the transition during the early archery season, 2017. Observation rates for turkeys (mail $\bar{x}$ = 441.82, SE = 35.98, email $\bar{x}$ = 400.17, SE = 45.51) are not displayed. At the statewide scale, the only significantly different (α = 0.004) observation rates between mail and email respondents were for gray fox. Without the Bonferroni correction (α = 0.05), significant differences were also found for gray wolf and coyote.

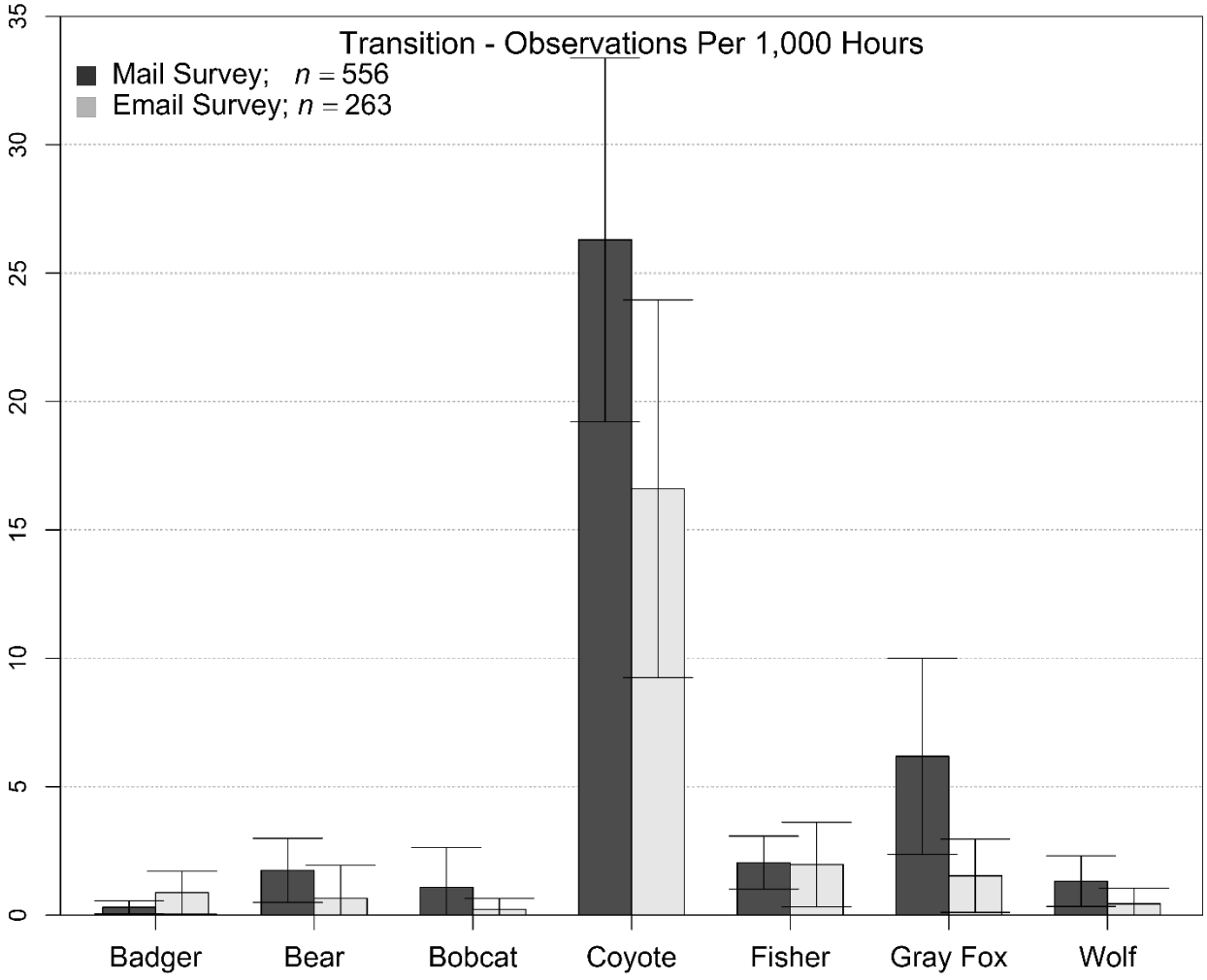
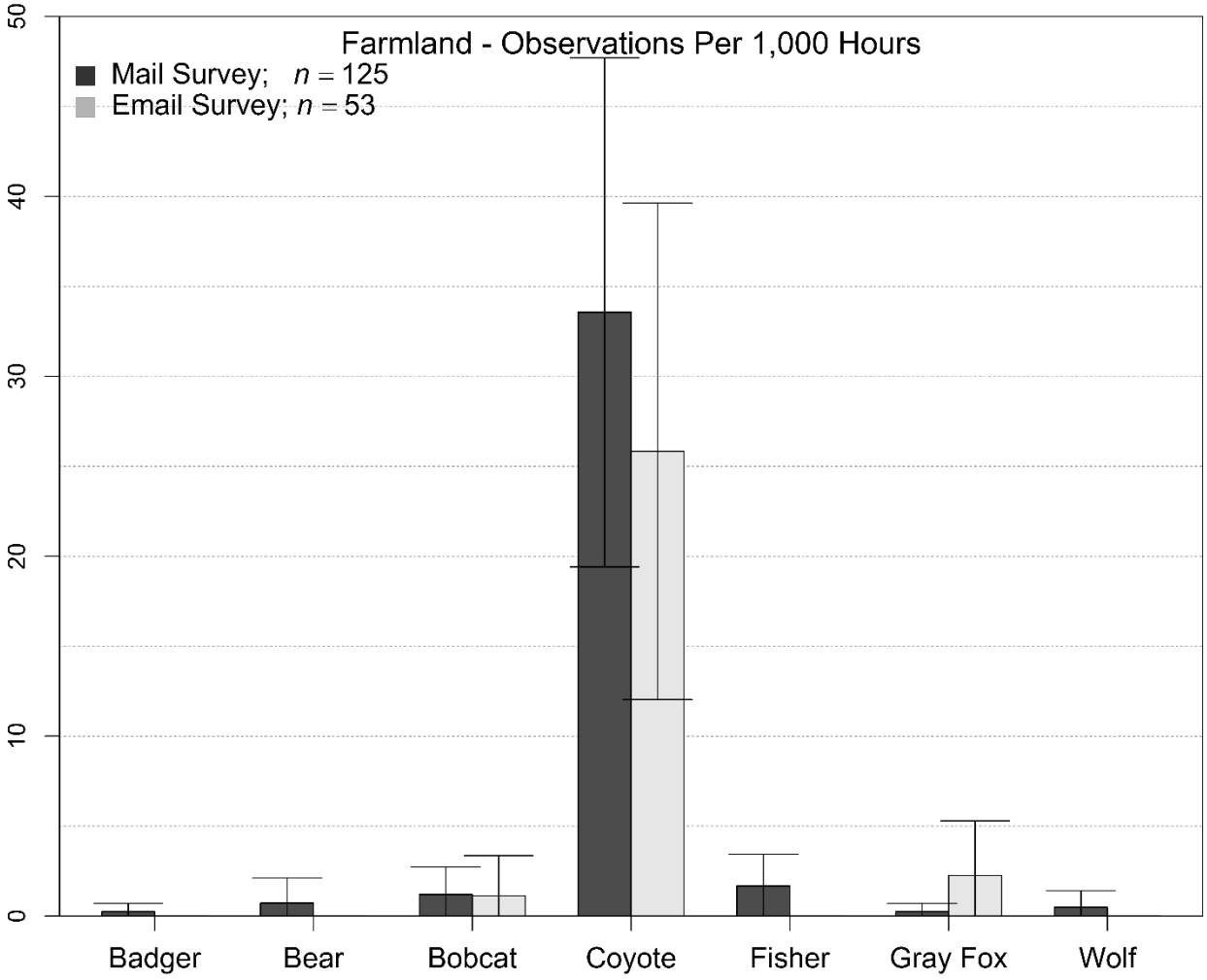


Figure 10. Mean observation rates per 1,000 hours with 95% CI in the farmland ecozone during the early archery season, 2017. Observation rates for turkeys (mail $\bar{x}$ = 249.85, SE = 39.06, email $\bar{x}$ = 333.52, SE = 151.14) are not displayed. At the statewide scale, the only significantly different ($\alpha = 0.004$) observation rates between mail and email respondents were for gray fox. Without the Bonferroni correction ($\alpha = 0.05$), significant differences were also found for gray wolf and coyote.



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APPENDIX I.

DEPARTMENT OF NATURAL RESOURCES

August 20, 2017

2017 Bowhunter Observation Survey
HUNTER NAME
ADDRESS LINE 1
ADDRESS LINE 2

Dear John Doe,

You have been selected from a list of dedicated bowhunters to participate in the "2017 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 3 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. 16 – Nov. 3, 2017**. 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 10, 2017. 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,

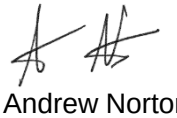
- **Deer Permit Area (DPA)**. This is the 3-digit area you are hunting. For example, when you bought your 2016 license, you said you primarily hunted in DPA **XXX**
- **Nearest Town**. Please record the closest Incorporated town to your hunting location
- **Direction from Town**. Please use one of the 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. As I said, this is the first year we've done this survey. If it's a success, we'll continue it annually. 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
ADDRESS LINE 1
ADDRESS LINE 2

BOWHUNTER OBSERVATION SURVEY 2017

Minnesota Department of Natural Resources

MDNR Number:

999999999

Thank you for participating in the 2017 Bowhunter Observation Survey. Please return this original form when you have finished bowhunting or by November 10, 2017, 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	Not Sure	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 10, 2017

BOWHUNTER OBSERVATION SURVEY 2017

Minnesota Department of Natural Resources

				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	Not Sure	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 10, 2017

APPENDIX II.

Parameter	Ecozone	Survey Mode	Mean	95% CI
Hours/Trip	Forest	Email	3.42 (SE = .15)	3.14 - 3.71
Antlered Deer/1,000 Hours	Forest	Email	145.79 (SE = 22.62)	101.46 - 190.13
Adult Female Deer/1,000 Hours	Forest	Email	381.31 (SE = 64.48)	254.93 - 507.69
Fawn Deer/1,000 Hours	Forest	Email	249.53 (SE = 35.28)	180.39 - 318.67
Not Sure Deer/1,000 Hours	Forest	Email	87.85 (SE = 14.71)	59.03 - 116.67
Total Deer/1,000 Hours	Forest	Email	864.49 (SE = 109.82)	649.24 - 1079.73
Turkeys/1,000 Hours	Forest	Email	241.59 (SE = 59.6)	124.77 - 358.4
Bears/1,000 Hours	Forest	Email	8.88 (SE = 3.34)	2.33 - 15.42
Coyotes/1,000 Hours	Forest	Email	4.67 (SE = 1.71)	1.32 - 8.02
Bobcats/1,000 Hours	Forest	Email	4.21 (SE = 2.11)	0.06 - 8.35
Wolves/1,000 Hours	Forest	Email	3.27 (SE = 1.79)	0 - 6.77
Fisher/1,000 Hours	Forest	Email	0.47 (SE = 0.46)	0 - 1.38
Gray Foxes/1,000 Hours	Forest	Email	0.93 (SE = 0.67)	0 - 2.24
Badgers/1,000 Hours	Forest	Email	0 (SE = 0)	0 - 0
Hours/Trip	Forest	Mail	3.38 (SE = 0.11)	3.16 - 3.61
Antlered Deer/1,000 Hours	Forest	Mail	136.59 (SE = 17.78)	101.74 - 171.43
Adult Female Deer/1,000 Hours	Forest	Mail	383.12 (SE = 37.23)	310.15 - 456.09
Fawn Deer/1,000 Hours	Forest	Mail	298.96 (SE = 31.28)	237.66 - 360.27
Not Sure Deer/1,000 Hours	Forest	Mail	74.71 (SE = 8.88)	57.3 - 92.12
Total Deer/1,000 Hours	Forest	Mail	893.38 (SE = 82.64)	731.41 - 1055.35
Turkeys/1,000 Hours	Forest	Mail	274.14 (SE = 61.82)	152.97 - 395.31
Bears/1,000 Hours	Forest	Mail	6.3 (SE = 1.34)	3.68 - 8.92
Coyotes/1,000 Hours	Forest	Mail	13.08 (SE = 4.74)	3.8 - 22.36
Bobcats/1,000 Hours	Forest	Mail	3.75 (SE = 2.72)	0 - 9.08
Wolves/1,000 Hours	Forest	Mail	8.72 (SE = 2.72)	3.39 - 14.05
Fisher/1,000 Hours	Forest	Mail	2.54 (SE = 0.92)	0.74 - 4.34
Gray Foxes/1,000 Hours	Forest	Mail	8.96 (SE = 3.34)	2.41 - 15.52
Badgers/1,000 Hours	Forest	Mail	0.12 (SE = 0.12)	0 - 0.36
Hours/Trip	Transition	Email	2.94 (SE = 0.09)	2.77 - 3.12
Antlered Deer/1,000 Hours	Transition	Email	185.89 (SE = 15.37)	155.77 - 216.01
Adult Female Deer/1,000 Hours	Transition	Email	401.7 (SE = 38.1)	327.02 - 476.39
Fawn Deer/1,000 Hours	Transition	Email	358.24 (SE = 42.75)	274.44 - 442.03
Not Sure Deer/1,000 Hours	Transition	Email	82.35 (SE = 14.71)	53.52 - 111.18
Total Deer/1,000 Hours	Transition	Email	1028.18 (SE = 98.31)	835.49 - 1220.86
Turkeys/1,000 Hours	Transition	Email	400.17 (SE = 45.51)	310.97 - 489.38
Bears/1,000 Hours	Transition	Email	0.66 (SE = 0.65)	0 - 1.94
Coyotes/1,000 Hours	Transition	Email	16.6 (SE = 3.75)	9.25 - 23.96
Bobcats/1,000 Hours	Transition	Email	0.22 (SE = 0.22)	0 - 0.65
Wolves/1,000 Hours	Transition	Email	0.44 (SE = 0.31)	0 - 1.04
Fisher/1,000 Hours	Transition	Email	1.97 (SE = 0.84)	0.32 - 3.62
Gray Foxes/1,000 Hours	Transition	Email	1.53 (SE = 0.73)	0.1 - 2.96
Badgers/1,000 Hours	Transition	Email	0.87 (SE = 0.43)	0.04 - 1.71

Parameter	Ecozone	Survey Mode	Mean	95% CI
Hours/Trip	Transition	Mail	3.06 (SE = 0.05)	2.97 - 3.16
Antlered Deer/1,000 Hours	Transition	Mail	186.72 (SE = 8.21)	170.62 - 202.82
Adult Female Deer/1,000 Hours	Transition	Mail	393.13 (SE = 16.99)	359.84 - 426.42
Fawn Deer/1,000 Hours	Transition	Mail	327.15 (SE = 17.94)	291.99 - 362.31
Not Sure Deer/1,000 Hours	Transition	Mail	73.61 (SE = 6.03)	61.78 - 85.43
Total Deer/1,000 Hours	Transition	Mail	980.61 (SE = 41.04)	900.17 - 1061.05
Turkeys/1,000 Hours	Transition	Mail	441.82 (SE = 35.98)	371.3 - 512.35
Bears/1,000 Hours	Transition	Mail	1.74 (SE = 0.64)	0.5 - 2.99
Coyotes/1,000 Hours	Transition	Mail	26.3 (SE = 3.61)	19.22 - 33.38
Bobcats/1,000 Hours	Transition	Mail	1.08 (SE = 0.79)	0 - 2.63
Wolves/1,000 Hours	Transition	Mail	1.32 (SE = 0.5)	0.33 - 2.31
Fisher/1,000 Hours	Transition	Mail	2.04 (SE = 0.53)	1.01 - 3.07
Gray Foxes/1,000 Hours	Transition	Mail	6.18 (SE = 1.95)	2.36 - 10
Badgers/1,000 Hours	Transition	Mail	0.3 (SE = 0.13)	0.04 - 0.56
Hours/Trip	Farmland	Email	2.79 (SE = 0.09)	2.61 - 2.98
Antlered Deer/1,000 Hours	Farmland	Email	313.31 (SE = 36.91)	240.96 - 385.66
Adult Female Deer/1,000 Hours	Farmland	Email	643.46 (SE = 73.12)	500.15 - 786.77
Fawn Deer/1,000 Hours	Farmland	Email	531.16 (SE = 62.48)	408.71 - 653.61
Not Sure Deer/1,000 Hours	Farmland	Email	110.05 (SE = 34.97)	41.5 - 178.6
Total Deer/1,000 Hours	Farmland	Email	1597.98 (SE = 138.79)	1325.95 - 1870.01
Turkeys/1,000 Hours	Farmland	Email	333.52 (SE = 151.14)	37.29 - 629.75
Bears/1,000 Hours	Farmland	Email	0 (SE = 0)	0 - 0
Coyotes/1,000 Hours	Farmland	Email	25.83 (SE = 7.04)	12.03 - 39.63
Bobcats/1,000 Hours	Farmland	Email	1.12 (SE = 1.14)	0 - 3.35
Wolves/1,000 Hours	Farmland	Email	0 (SE = 0)	0 - 0
Fisher/1,000 Hours	Farmland	Email	0 (SE = 0)	0 - 0
Gray Foxes/1,000 Hours	Farmland	Email	2.25 (SE = 1.55)	0 - 5.29
Badgers/1,000 Hours	Farmland	Email	0 (SE = 0)	0 - 0
Hours/Trip	Farmland	Mail	3.15 (SE = 0.12)	2.92 - 3.38
Antlered Deer/1,000 Hours	Farmland	Mail	247.47 (SE = 23.04)	202.32 - 292.62
Adult Female Deer/1,000 Hours	Farmland	Mail	533.02 (SE = 45.6)	443.64 - 622.39
Fawn Deer/1,000 Hours	Farmland	Mail	358.83 (SE = 31.38)	297.33 - 420.34
Not Sure Deer/1,000 Hours	Farmland	Mail	68.05 (SE = 14.63)	39.37 - 96.74
Total Deer/1,000 Hours	Farmland	Mail	1207.38 (SE = 91.89)	1027.28 - 1387.47
Turkeys/1,000 Hours	Farmland	Mail	249.85 (SE = 39.06)	173.29 - 326.41
Bears/1,000 Hours	Farmland	Mail	0.71 (SE = 0.71)	0 - 2.11
Coyotes/1,000 Hours	Farmland	Mail	33.55 (SE = 7.22)	19.41 - 47.7
Bobcats/1,000 Hours	Farmland	Mail	1.19 (SE = 0.78)	0 - 2.72
Wolves/1,000 Hours	Farmland	Mail	0.48 (SE = 0.47)	0 - 1.41
Fisher/1,000 Hours	Farmland	Mail	1.67 (SE = 0.9)	0 - 3.43
Gray Foxes/1,000 Hours	Farmland	Mail	0.24 (SE = 0.24)	0 - 0.7
Badgers/1,000 Hours	Farmland	Mail	0.24 (SE = 0.24)	0 - 0.71