



2013 MICHIGAN WOLF HUNTER SURVEY

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ABSTRACT

Wolf hunters were contacted after the 2013 hunting season to estimate hunter participation, hunter satisfaction, and wolves seen and harvested. In 2013, an estimated 951 hunters spent about 8,546 days afield. Hunters reported 617 wolf observations ($\bar{x} = 0.65$ wolf seen/hunter), and they harvested an estimated 25 wolves. About 2.6% of hunters harvested a wolf in 2013. Nearly 45% of hunters rated their overall hunting experience as very good or good. Approximately 62% of hunters hunted on land where they have traditionally hunted. Only 6.2% of wolf hunters (64) had a hunting guide assist with their hunt.

INTRODUCTION

In Michigan, the gray wolf (*Canis lupus*) was extirpated from the Lower Peninsula by 1935 and was nearly extirpated from the Upper Peninsula (Stebler 1944). In 1973, the Michigan population had dwindled to six animals in the Upper Peninsula. This decline caused major concern, and the gray wolf was protected under federal and state endangered species protection statutes in 1974 and 1976, respectively. Recovery of the population began in the late 1980s (Thiel 1988, Mech et al. 1995), and wolves in the Great Lakes region were removed from the federal endangered species list in 2012.

As wolves reached recovery goals, the state of Michigan updated its Wolf Management Plan to aid guiding future management actions. The principal goals of the updated plan were fourfold: (1) maintain a viable Michigan wolf population above a level that would warrant its classification as threatened or endangered, approximately a population of at least 200 wolves (U.S. Fish and Wildlife Service 1992); (2) facilitate wolf-related benefits; (3) minimize wolf-related conflicts; and (4) conduct science-based wolf



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management with socially acceptable methods (Michigan Department of Natural Resources [DNR] 2008). In the winter of 2013, the DNR estimated Michigan's wolf population at 658 individuals. In accordance with the Wolf Management Plan, the objectives of the 2013 wolf hunt were to reduce wolf related conflicts in specific areas of the Upper Peninsula where other control methods were not effective.

In 2013, the DNR made available 1,200 licenses for purchase, of which 1,199 were sold. One additional license was sold, but the sale was voided shortly before the season started. Licenses were valid for any open Wolf Management Unit (Figure 1). Wolves could be harvested with a firearm, crossbow, or archery equipment. Hunters using a crossbow were required to obtain a free crossbow stamp, except hunters with a disability already hunting under a DNR-issued crossbow permit did not need the stamp. Hunters could use bait (e.g., game animals and their parts) to attract wolves. Hunters could only harvest one wolf, and successful hunters were required to take their wolf to an official checking station within 72 hours of killing a wolf.

The Natural Resources Commission and DNR have the authority and responsibility to protect and manage the wildlife resources of the state of Michigan. Harvest surveys are one of the management tools used to accomplish this statutory responsibility. Estimating harvest, hunting effort, and hunter satisfaction are among the primary objectives of these surveys. Estimates derived from harvest surveys, as well as harvest reported by hunters at mandatory checking stations, and other indices, are used to monitor the wolf management program and establish harvest regulations.

METHODS

Following the 2013 wolf hunting season, a questionnaire (Appendix A) was sent to everyone who obtained a wolf hunting license for the 2013 hunting season (1,199 licensees). License buyers receiving the questionnaire were asked to report whether they hunted, number of days spent afield, hunt location, the number of wolves seen, whether they harvested a wolf, and the type of hunting equipment used. Hunters also reported whether other hunters caused interference during their hunt. Successful hunters were asked to report harvest location, type of hunting equipment used, and method used to harvest wolves. Hunters also were asked to report how satisfied they were with the number of wolves seen, number of opportunities they had to take a wolf, and their overall wolf hunting experience.

Although estimating harvest, hunter numbers, and hunting effort were the primary objectives of the harvest survey, this survey also provided an opportunity to collect information about management issues. Questions were added to determine how frequently hunters were assisted by hunting guides and how they chose their hunting site.

Although all wolf hunting license buyers were given an opportunity to report information about their hunting activity, not everybody reported. To extrapolate from the license buyers that completed their questionnaire to all license buyers, estimates were calculated using a simple random sampling design (Cochran 1977). The number of

animals registered was used as an auxiliary variate to improve the estimate of mean days of effort required per registered wolf (i.e., ratio estimate).

A 95% confidence limit (CL) was calculated for each estimate. In theory, the CL can be added and subtracted from the estimate to calculate the 95% confidence interval. The confidence interval is a measure of the precision associated with the estimate and implies that the true value would be within this interval 95 times out of 100.

Unfortunately, there are several other possible sources of error in surveys that are probably more serious than theoretical calculations of sampling error. They include failure of participants to provide answers (nonresponse bias), question wording, and question order. It is very difficult to measure these biases; thus, estimates were not adjusted for these possible biases.

Statistical tests are used routinely to determine the likelihood that the differences among estimates are larger than expected by chance alone. The overlap of 95% confidence intervals was used to determine whether estimates differed. Non-overlapping 95% confidence intervals was equivalent to stating that the difference between the means was larger than would be expected 995 out of 1,000 times, if the study had been repeated (Payton et al. 2003).

RESULTS

Questionnaires were mailed initially during mid-January 2014, and up to two follow-up questionnaires were mailed to nonrespondents. Although 1,199 people were sent the questionnaire, 35 surveys were undeliverable resulting in an adjusted sample size of 1,164. Questionnaires were returned by 875 people, yielding a 75% response rate excluding undeliverables.

In 2013, 1,199 licenses were purchased, and an estimated 951 hunters participated in the wolf hunt. Statewide, these license buyers spent 8,546 days in the field ($\bar{x} = 9.0$ days/hunter, Table 1). Unit B had 606 wolf hunters, the highest number among the units, followed by Unit C with 304 hunters (Table 1, Figure 2). Few hunters (45 ± 8) hunted in more than one unit.

Based on this survey, an estimated 25 wolves were harvested, and the margin of error (95% CL) associated with this estimate was plus or minus 6 wolves. The actual number of wolves presented by hunters at registration stations was 22. Thus, the actual number of wolves taken to registration stations fell within the margin of error of the survey harvest estimate.

Hunters reported 617 wolf observations ($\bar{x} = 0.65$ wolves seen/hunter, Table 2); wolves seen do not represent different animals seen because wolves could be double counted and reported by multiple hunters. Overall, 2.6% of hunters harvested a wolf in 2013. Hunter success ranged from 0.9 – 4.5% among the wolf management units (Table 2). Of the estimated wolves harvested in 2013, 11 were taken on private land and 14 wolves were taken on public land.

Ontonagon, Mackinac, and Baraga county had the highest number of hunters during 2013 (Table 3). Hunters most frequently observed wolves in Ontonagon, Baraga, and Gogebic counties (Table 4). Wolves were primarily harvested in Baraga (7), Houghton (5) and Ontonagon (5) counties. All wolves in 2013 were harvested with a firearm.

About 12% of wolf hunters rated the number of wolves seen during the 2013 hunting season as very good or good, and 57% rated wolf seen as poor or very poor (Figure 3). About 9% of hunters rated the number of chances they had to take a wolf during the 2012 hunting season as very good or good, and 61% rated their chances as poor or very poor. About 45% of hunters rated their hunting experiences as very good or good, and 30% rated their hunting experiences as poor or very poor.

Hunters selected sites to hunt based on numerous reasons; 62% of hunters hunted on land where they traditionally hunted. Furthermore, 75% of hunters were aware of wolf conflicts near the hunting site they selected (Figure 4).

Most hunters ($69 \pm 2\%$) tried multiple methods when attempting to harvest a wolf in 2013 (Figure 5). Approximately 60% of hunters used calling as a method to attract wolves, but only $0.2 \pm 0.2\%$ of hunters were successful with this technique. Nearly 58% hunted for wolves while hunting for other species, and $0.7 \pm 0.4\%$ were successful and about $3.4 \pm 1.5\%$ of hunters that used spotting and stalking method (203) were successful. Approximately $1.7 \pm 0.7\%$ of hunters that hunted wolves over bait were successful; whereas, only $0.8 \pm 0.6\%$ of hunters that tracked wolves were successful. Of the wolves harvested, the most frequent methods used were spotting and stalking (7) and hunting over bait (7) (Table 5).

In 2013, 21% of the hunters reported that interference was a major problem, while 19% experienced minor levels of interference (Table 6). Among hunters reporting interference (major and minor interference combined) in 2012, the most common source of interference was a deer hunter (78%); while 34% of interfered hunters reported interference from other wolf hunters (Figure 6).

Nearly 6.4% of wolf hunters (64) had a hunting guide assist with their hunt. Among the hunters using a hunting guide, 72% of hunters (47) paid for the services provided by the guide. Of the hunters that used a guide, 6% were successful at taking a wolf, whereas only 2% hunters that did not use a guide were successful.

ACKNOWLEDGEMENTS

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Figure 1. Wolf management units open to hunting in Michigan, 2013

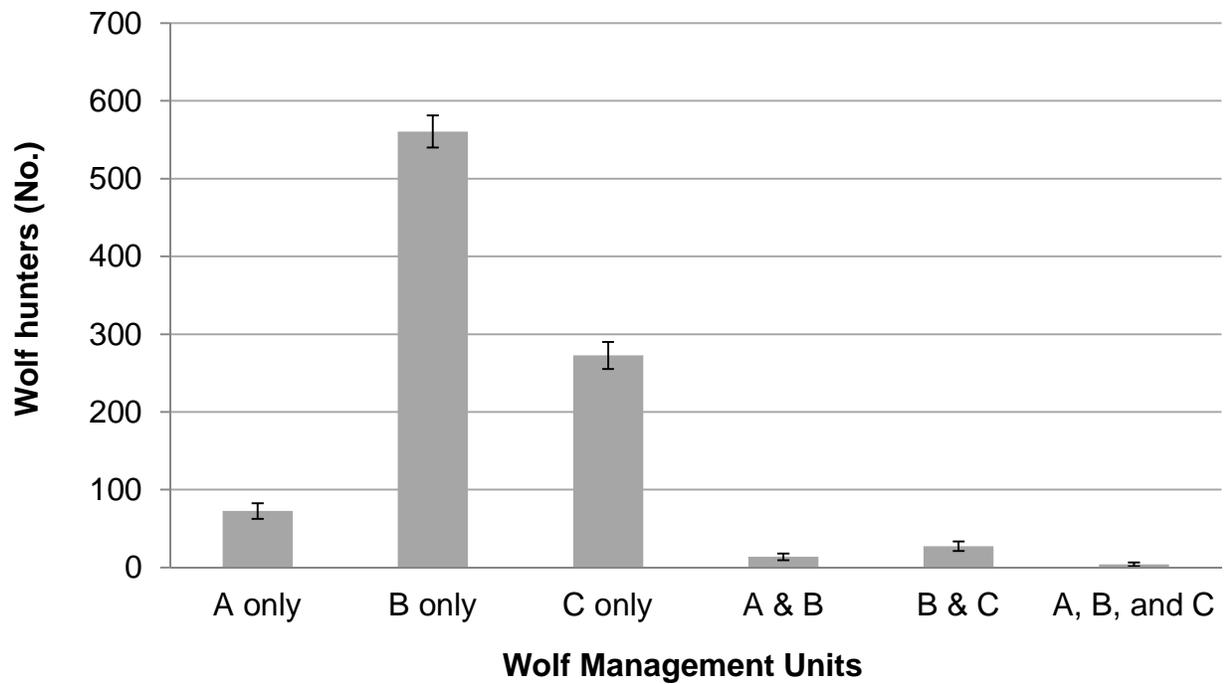


Figure 2. Estimated number of hunters summarized by units hunted during the 2013 wolf hunting season. Error bars represent the 95% confidence limit.

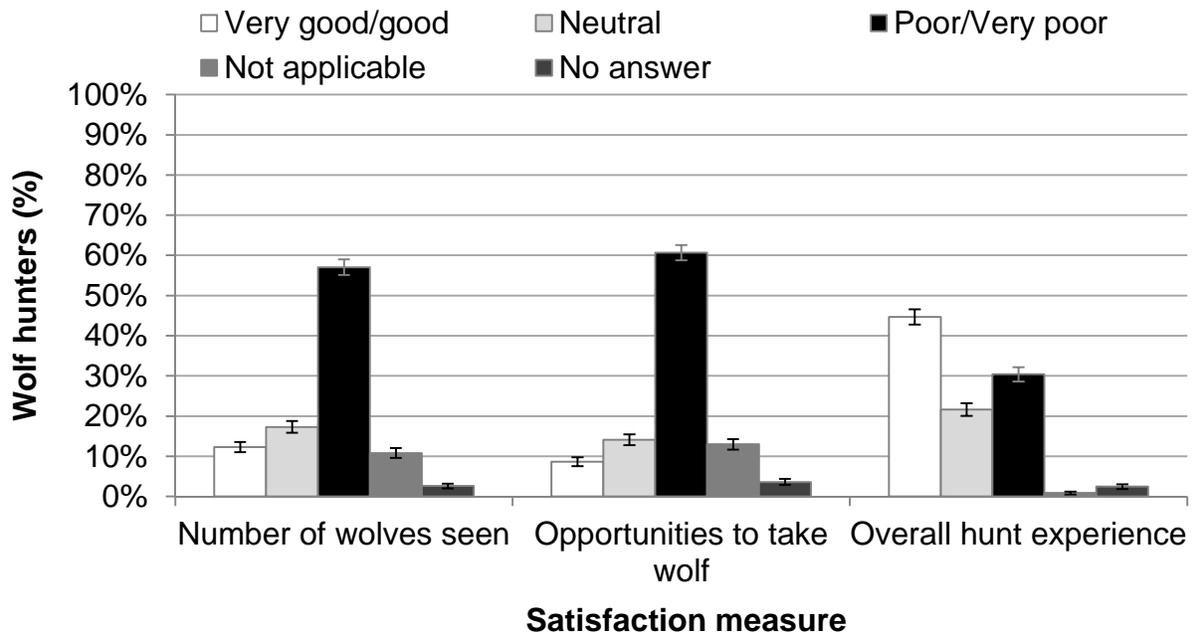


Figure 3. Satisfaction with number of wolves seen, opportunities to take a wolf, and overall hunting experience. Error bars represent the 95% confidence limit.

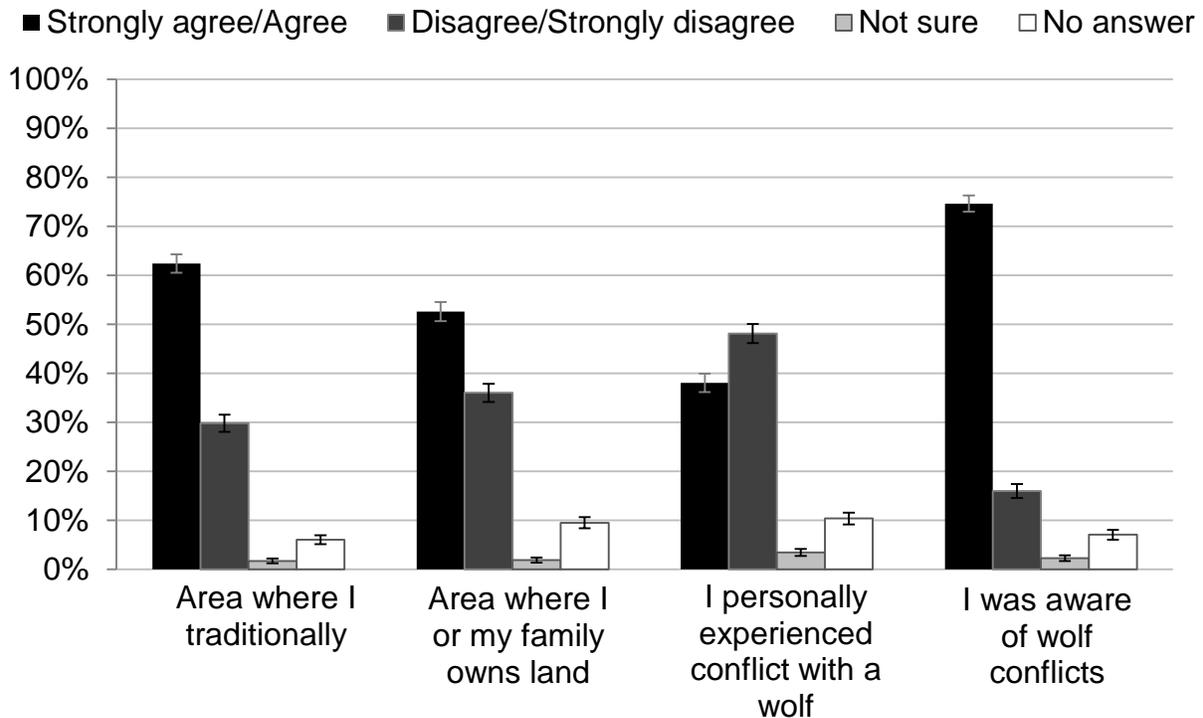


Figure 4. Estimated agreement or disagreement with statements regarding hunting area selection for hunting wolves in Michigan's management units during the 2013 wolf hunting season. Error bars represent the 95% confidence limit.

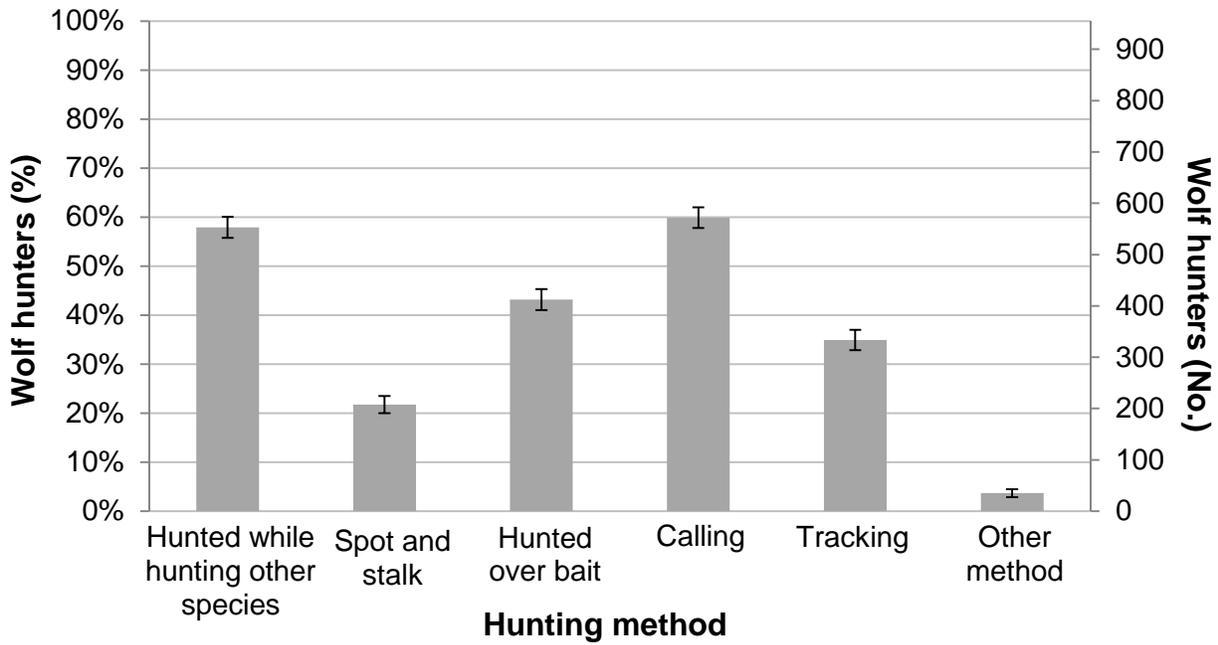


Figure 5. Estimated proportion and number of hunters using various hunting methods during the 2013 wolf hunting season. Hunters could report using multiple methods. Error bars represent the 95% confidence limit.

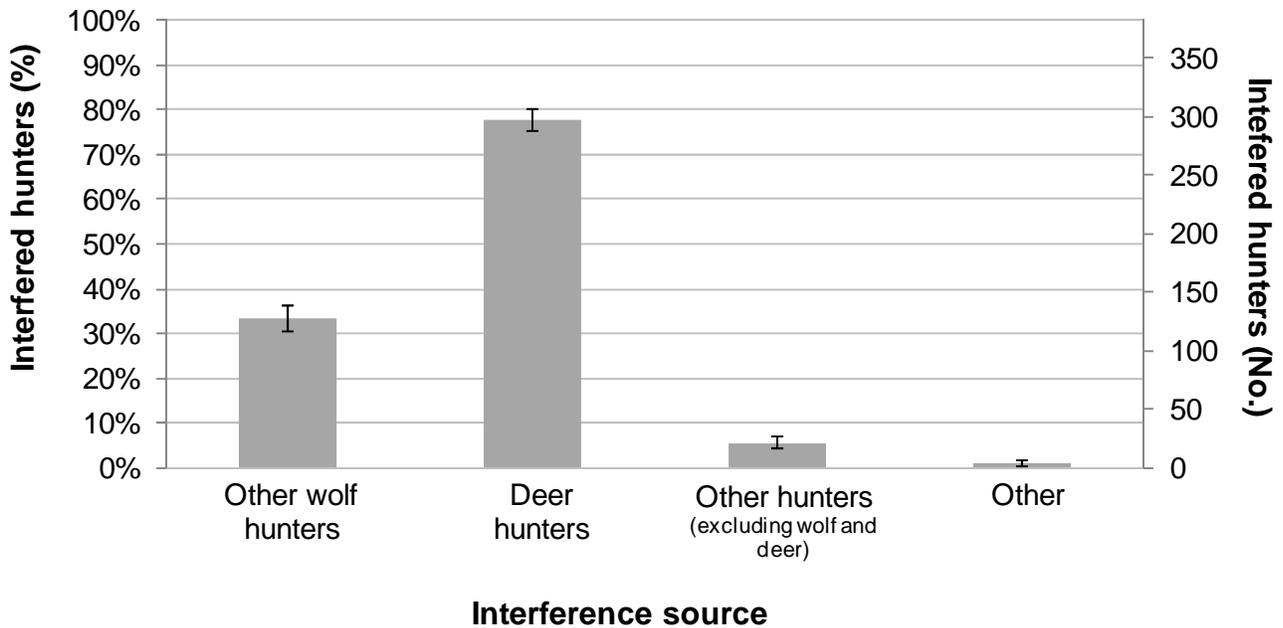


Figure 6. Estimated proportion and number of hunters that experienced interference during the 2013 wolf hunting season, summarized by source of interference. Error bars represent the 95% confidence limit.

Table 1. Estimated number of hunters, harvest, hunting effort, and effort per hunter during the 2013 Michigan wolf hunting season, summarized by management unit.

Unit	Hunters ^a		Harvest		Hunting effort		Effort per hunter (\bar{x})	
	No.	95% CL ^b	No.	95% CL ^b	Days ^c	95% CL ^b	Days ^c	95% CL ^b
A	90	11	4	2	830	137	9.2	1.0
B	606	21	18	5	5,213	281	8.6	0.4
C	304	18	3	2	2,504	235	8.2	0.6
Statewide ^c	951	17	25	6	8,546	336	9.0	0.3

^aStatewide number of hunters does not equal totals for all units because hunters could hunt in multiple units.

^b95% confidence limits.

^cColumn totals may not equal totals for all hunts because of rounding error.

Table 2. Estimated hunter success, wolves seen, average number of wolves seen per hunter, and effort per harvested wolf during the 2013 Michigan wolf hunting season, summarized by management unit.

Unit	Hunter success		Wolves seen ^a		Wolves per hunter (\bar{x})		Effort per wolf harvested (\bar{x})	
	% ^a	95% CL ^b	No.	95% CL ^b	No.	95% CL ^b	Days	95% CL ^b
A	4.5	2.6	107	30	1.18	0.30	202	22.2
B	2.9	0.8	401	55	0.66	0.09	293	66.8
C	0.9	0.6	108	21	0.36	0.06	914	82.1
Statewide ^c	2.6	0.6	617	67	0.65	0.07	347	93.3

^aWolves seen does not represent different animals seen because wolves could be double counted and reported by multiple hunters.

^b95% confidence limits.

^cColumn totals may not equal totals for all hunts because of rounding error.

Table 3. Estimated number of hunters, harvest, hunting effort, and effort per hunter during the 2013 Michigan wolf hunting season, summarized by county.

County	Hunters ^a		Harvest		Hunting effort		Effort per hunter (\bar{x})	
	No.	95% CL ^b	No.	95% CL ^b	Days	95% CL ^b	Days	95% CL ^b
Baraga	238	16	7	3	1,751	177	7.3	0.5
Gogebic	101	11	4	2	900	139	8.9	0.9
Houghton	159	14	5	3	984	115	6.2	0.5
Luce	62	9	0	0	337	71	5.5	0.8
Mackinac	249	17	3	2	2,060	219	8.3	0.7
Ontonagon	278	17	5	3	2,239	191	8.1	0.5
Unknown	47	8	0	0	275	70	5.7	1.1
Statewide ^c	951	17	25	5.9	8,546	336	9.0	0.3

^aColumn totals may not equal totals for all hunts because hunters could hunt in multiple management units.

^b95% confidence limits.

^cColumn totals may not equal totals for all hunts because of rounding error.

Table 4. Estimated hunter success, wolves seen, average number of wolves seen per hunter, and effort per harvested wolf during the 2013 Michigan wolf hunting season, summarized by county.

County	Hunter success		Wolves seen ^a		Wolves per hunter (\bar{x})	
	%	95% CL ^b	No.	95% CL ^b	No.	95% CL ^b
Baraga	2.9	1.3	130	31	0.55	0.12
Gogebic	4.1	2.4	111	30	1.09	0.27
Houghton	3.4	1.7	90	25	0.57	0.15
Luce	0	0	12	6	0.20	0.09
Mackinac	1.1	0.8	90	19	0.36	0.07
Ontonagon	2.0	1.0	151	29	0.54	0.10
Unknown	0	0	32	19	0.68	0.41
Statewide ^c	2.6	0.6	617	67	0.65	0.07

^aWolves seen does not represent different animals seen because wolves could be double counted and reported by multiple hunters.

^b95% confidence limits.

^cColumn totals may not equal totals for all hunts because of rounding error.

Table 5. Methods used to harvest wolves during the 2013 Michigan wolf hunting season

Hunting Method	Number harvested	95% CL ^a
Hunted while hunting other species	4	2
Spot and stalk	7	3
Hunted over bait	7	3
Calling	1	1
Tracking	3	2
Unknown	3	2

^a95% confidence limits.

Table 6. Estimated level of interference among hunters during the 2013 Michigan wolf hunting season.

Interference level	Proportion of hunters	95% CL ^a	Number of hunters	95% CL ^a
Major problem	21	1.6	200	15
Minor problem	19	1.5	177	15
Not a problem	59	1.9	562	21
Unknown	1	0.4	12	4

^a95% confidence limits.

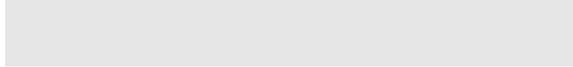
Appendix A

2013 Michigan Wolf Harvest Questionnaire



2013 MICHIGAN WOLF HUNTING SURVEY

This information is requested under authority of Part 435, 1994 PA 451, M.C.L. 324.43539.



Our survey provides you with a unique opportunity to directly affect the management of wolves in Michigan. It is important that you complete this questionnaire even if you did not hunt or harvest a wolf in Michigan this past year (November 15-December 31).

1. Did you hunt wolves in Michigan during the 2013 season?

¹ Yes ² No, you are done with the survey.

2. Please report the number of days for each county that you hunted wolves and the number of wolves seen during your hunt in the following table.

COUNTY HUNTED (See map)	MANAGEMENT UNIT HUNTED (See map)	NUMBER OF DAYS HUNTED	TYPE OF LAND (Record land ownership type where hunting occurred)	NUMBER OF WOLVES SEEN
			¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
			¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
			¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
			¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
			¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	

3. Indicate how strongly you agree or disagree with the following statements about the reasons why you selected your hunt area for hunting wolves in Michigan. (Select one choice per statement.)

Strongly Agree Agree Disagree Strongly Disagree Not Sure

- | | | | | | |
|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| a. I selected my hunt area because this was the area where I traditionally hunt other game species. | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> | 5 <input type="checkbox"/> |
| b. I selected my hunt area because either I own land or my family/friends own land in this area. | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> | 5 <input type="checkbox"/> |
| c. I selected my hunt area because I had experienced a conflict with a wolf in this area. | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> | 5 <input type="checkbox"/> |
| d. I selected my hunt area because I was aware of wolves causing problems in this area. | 1 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input type="checkbox"/> | 5 <input type="checkbox"/> |

4. What method(s) did you use to hunt wolves during the 2013 wolf season? (select all that apply)

- | | |
|---|--|
| 1 <input type="checkbox"/> Hunted while hunting other species | 2 <input type="checkbox"/> Spot and stalk |
| 3 <input type="checkbox"/> Hunted over bait | 4 <input type="checkbox"/> Calling |
| 5 <input type="checkbox"/> Tracking | 6 <input type="checkbox"/> Other (Please describe _____) |

5. Did you take a wolf and put your kill tag on the wolf?

- 1 Yes 2 No, skip to #7

6. If your harvest tag was put on a wolf, please answer the following:

a. In what county was it harvested? (Please write in the county name)

b. In what management unit was it harvested? (Please write in the management unit)

c. On what type of land was the wolf harvested?

- 1 Private 2 Public 3 Not sure

d. What was the primary method you used to harvest your wolf? (select one)

- | | |
|--|---|
| 1 <input type="checkbox"/> Taken while hunting another species | 2 <input type="checkbox"/> Spot and stalk |
| 3 <input type="checkbox"/> Hunting over bait | 4 <input type="checkbox"/> Calling |
| 5 <input type="checkbox"/> Tracking | 6 <input type="checkbox"/> Other (Please describe: _____) |

e. What device was used to harvest your wolf?

- 1 Firearm 2 Crossbow 3 Bow (recurve, compound, or long bow)

7. While you were wolf hunting, how much did interference from other people affect your hunt?

1 Major problem 2 Minor problem 3 Not a problem, skip to #9

8. If you experienced interference, what was the source of the interference?

(Select all that apply)

1 Other wolf hunters 2 Deer hunters 3 Other hunters, not including wolf or deer hunters 4 DNR employees

4 Other (Please specify _____)

9. How would you rate the following for your 2013 wolf hunting season:

(Select one choice per item.)

	Very Good	Good	Neutral	Poor	Very Poor	Not Applicable
a. Number of wolf you saw.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
b. Number of opportunities you had to take a wolf.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
c. Your overall wolf hunting experience.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>

10. Did you have a guide help you during a portion or your entire wolf hunt?

1 Yes

2 No, you are done with the survey.

11. Did you pay the guide for their help?

1 Yes

2 No

Michigan Wolf Management Units

