

MICHIGAN DEPARTMENT OF NATURAL RESOURCES  
Wildlife Division Report No. 3012

September 1985

DEER HUNTERS' OPINION SURVEY, 1984\*

by

Edward E. Langenau, Jr., Earl J. Flegler, Jr., and Harry R. Hill

Abstract

The "Deer Hunter Opinion Survey" was expanded to include archery, as well as firearm, deer hunters. About 76% of 2,455 sample licensees returned questionnaires after 4 mailings. We estimated that 697,649 separate individuals hunted deer in Michigan during 1984. About 5% of the hunters were estimated to be women, the mean age of deer hunters was determined to be 40.4, and 68% of the hunters lived in Southern Lower Michigan (Region III). The percentage of Michigan residents that hunted deer was highest for 35-44 year-old males and 25-34 year-old females. Michigan residents of Regions I and II were 3-4 times more likely than Region III residents to hunt deer. Michigan deer hunters were found to be very experienced -- they had tagged an average of 6.7 deer during an average of 17.7 firearm and 3.0 archery deer hunting seasons. Hunters that participated only in the firearm season comprised the largest (69%) group of deer hunters, followed by people who hunted in both archery and firearm deer hunting seasons (27%), and those who hunted only in the archery season (4%). We estimated that 8.67 million days of deer hunting occurred in Michigan during 1984. About 2.80 million days of archery deer hunting took place between October 1 and November 14, 4.98 million days of hunting was produced during the regular firearm season (November 15-30), 0.65 million days during the late archery season (December 1 - January 1) and 0.24 million days during the muzzleloader season (December 1-10). About 29% of the hunters said they hunted deer over bait in 1984. For all seasons, 16% of all deer hunting time was spent using bait (1.42 million days), and 17% of all deer taken in Michigan in 1984 were reportedly shot over bait. Hunters put out an estimated 3.3 million bushels of baiting material in Michigan during 1984. About 75% of the bait was put on private land and 25% on public land. Baiting material was comprised mostly of apples (32%), carrots (27%), sugar beets (23%), and corn (10%). About 54% of the hunters thought it was illegal to hunt deer over bait. Since 31% of the hunters never baited but said they might like to try it, an increased knowledge about the legality of baiting would increase participation. This would also increase controversy, because 33% of the hunters thought it should be illegal to hunt deer over bait in Michigan. Baiting had little impact on harvest; about the same number of deer were tagged/100 days with and without the use of bait.

Introduction

More than 30 years of hunter opinion information has been gathered from surveys of firearm deer hunters (e.g., Ryel 1983). A continuing theme in these surveys has been one or more questions concerning hunter opinions toward

---

\*A contribution of Federal Aid in Wildlife Restoration, Michigan Pittman-Robertson Projects W-124-R and W-127-R.

the harvest of antlerless deer. The surveys have also been designed to provide pertinent information on management issues, such as the attitude of hunters towards the day on which deer season opens.

This year, Wildlife Division staff requested information on the incidence of baiting, hunter attitudes toward the use of bait, and impacts of baiting on harvest of deer. Since the number of bowhunters in Michigan increased so dramatically in the late 1970's, it was decided that the deer hunter opinion survey should include all deer hunters and not just those who participated in the regular firearm deer hunting season. Also, it was felt that the series of questions on attitudes toward antlerless hunting could be deleted, at least from the 1984 survey.

G. E. Burgoyne initiated this study through requests to J. E. Vogt and C. L. Bennett. Questionnaire mailings and coding were coordinated by M. L. Moss, with the assistance of C. D. Port and A. C. Metoyer. J. M. Wickham typed the manuscript. T. F. Reis selected the sample licensees.

### Methods

A mail questionnaire was designed to evaluate selected characteristics, behaviors, and attitudes of Michigan deer hunters. The draft survey was pre-tested. The final questionnaire (Appendix I) was sent to a random sample of 1,516 firearm deer hunters and 939 archery deer hunters taken from 1983 passbook files. Questionnaire items concerned the 1984 hunt. This may have resulted in a sampling bias towards more dedicated and ardent individuals that hunted in both 1983 and 1984. Four mailings were sent, about 2 weeks apart, to sample individuals that did not respond.

### Results and Discussion

About 74% of the firearm deer hunters and 78% of the archery deer hunters returned questionnaires.

#### Number of Hunters

Specific groups of licensees were analyzed in detail (Appendix II). We estimated that 732,992 separate license buyers purchased a total of 912,604 deer hunting licenses. About 35,343 of the licensees did not actually hunt deer in 1984. Thus, there were 697,649 individuals that were estimated to have hunted deer in Michigan during 1984.

As discussed by Ryel et al. (1970), deer hunting in Michigan is not a "dying sport". The proportion of the Michigan population that hunted deer increased 7-fold between 1920 and 1968 and has remained stable until the present. Although the number of archery deer hunting licenses sold increased dramatically in the 1970's, there was still the same number of individual hunters; i.e., more hunters bought 2 licenses. A stable population of deer hunters has therefore spent more days afield, harvested more deer, and paid more fees to hunt deer since 1977 (Langenau 1985).

#### Hunter Characteristics and Behaviors

Deer hunters averaged 40.4 years of age. About 5% of the hunters were female and 95% were male (Table 1).

Table 1. Sex and age distribution of Michigan deer hunters in 1984.

Age Class	Estimated Number of Hunters		
	Male	Female	Totals
<19	52,364	1,163	53,527
19-24	73,383	2,063	75,446
25-34	151,940	11,290	163,230
35-44	144,844	7,276	152,120
45-54	101,663	6,188	107,851
55-64	66,721	5,363	72,084
>64	69,228	4,163	73,391
Totals	660,143	37,506	697,649

The sex and age of resident deer hunters were compared to the sex and age of the Michigan population of deer hunting age. Men were 19 times more likely than women to hunt deer (19% of eligible males hunted deer, compared to 1% of the females). Peak rates of participation in deer hunting were found for 25-34 year-old females and for 35-44 year-old males (Fig. 1).

The residence of hunters was classified by DNR administration Region (I = Upper Peninsula, II = Northern Lower Peninsula, III = Southern Lower Peninsula). About 9% of the hunters lived in Region I, 21% in Region II, 68% in Region III, and 2% were from other states. Since 4% of the Michigan population lived in Region I, compared to 8% in Region II and 88% in Region III, residents in Region I were 2.9 times as likely to be deer hunters as residents in lower Michigan. Region II residents were 3.4 times as likely to be deer hunters compared to Region III residents.

We asked hunters to indicate how many deer they had tagged and how many different deer seasons they had hunted. Deer hunters had the most experience during firearm seasons. They had taken a mean of 6.1 deer during 17.7 firearm seasons for a lifetime success of 0.3 deer tagged/season hunted. Lifetime success rates were 0.2 for archery deer (0.6 deer/3.0 seasons).

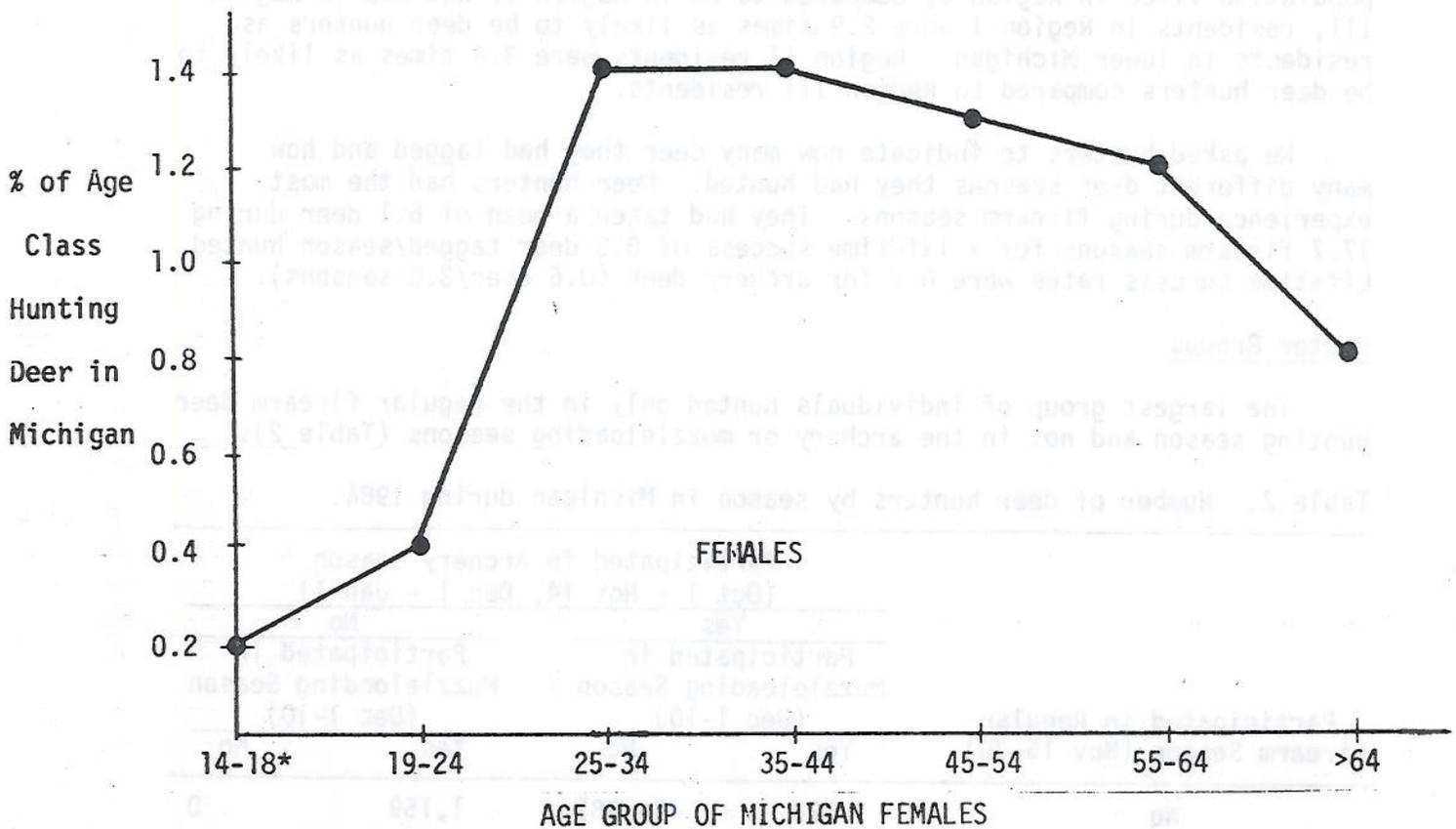
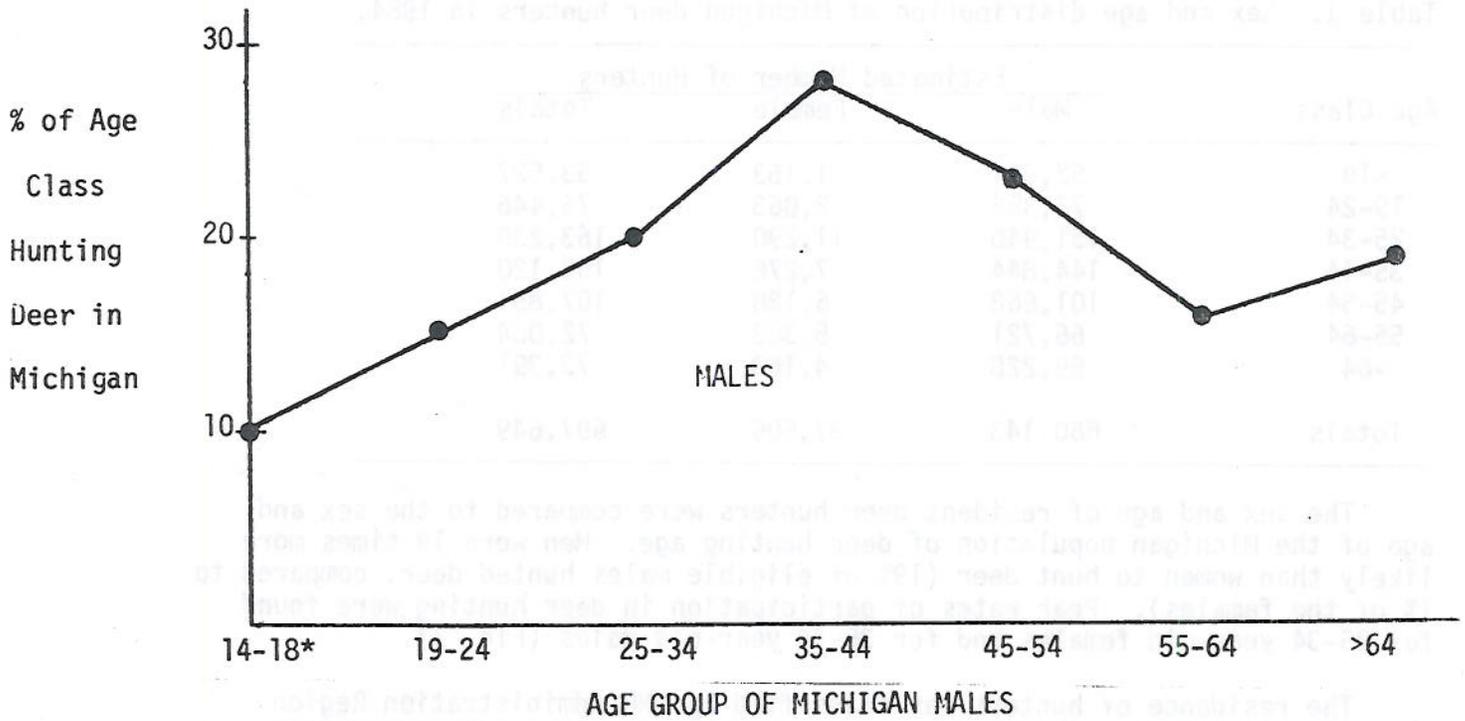
#### Hunter Groups

The largest group of individuals hunted only in the regular firearm deer hunting season and not in the archery or muzzleloading seasons (Table 2).

Table 2. Number of deer hunters by season in Michigan during 1984.

Participated in Regular Firearm Season (Nov 15-30)	Participated in Archery Season (Oct 1 - Nov 14, Dec 1 - Jan 1)			
	Yes		No	
	Participated in Muzzleloading Season (Dec 1-10)		Participated in Muzzleloading Season (Dec 1-10)	
	Yes	No	Yes	No
No	127	24,581	1,159	0
Yes	26,211	162,120	27,825	455,626

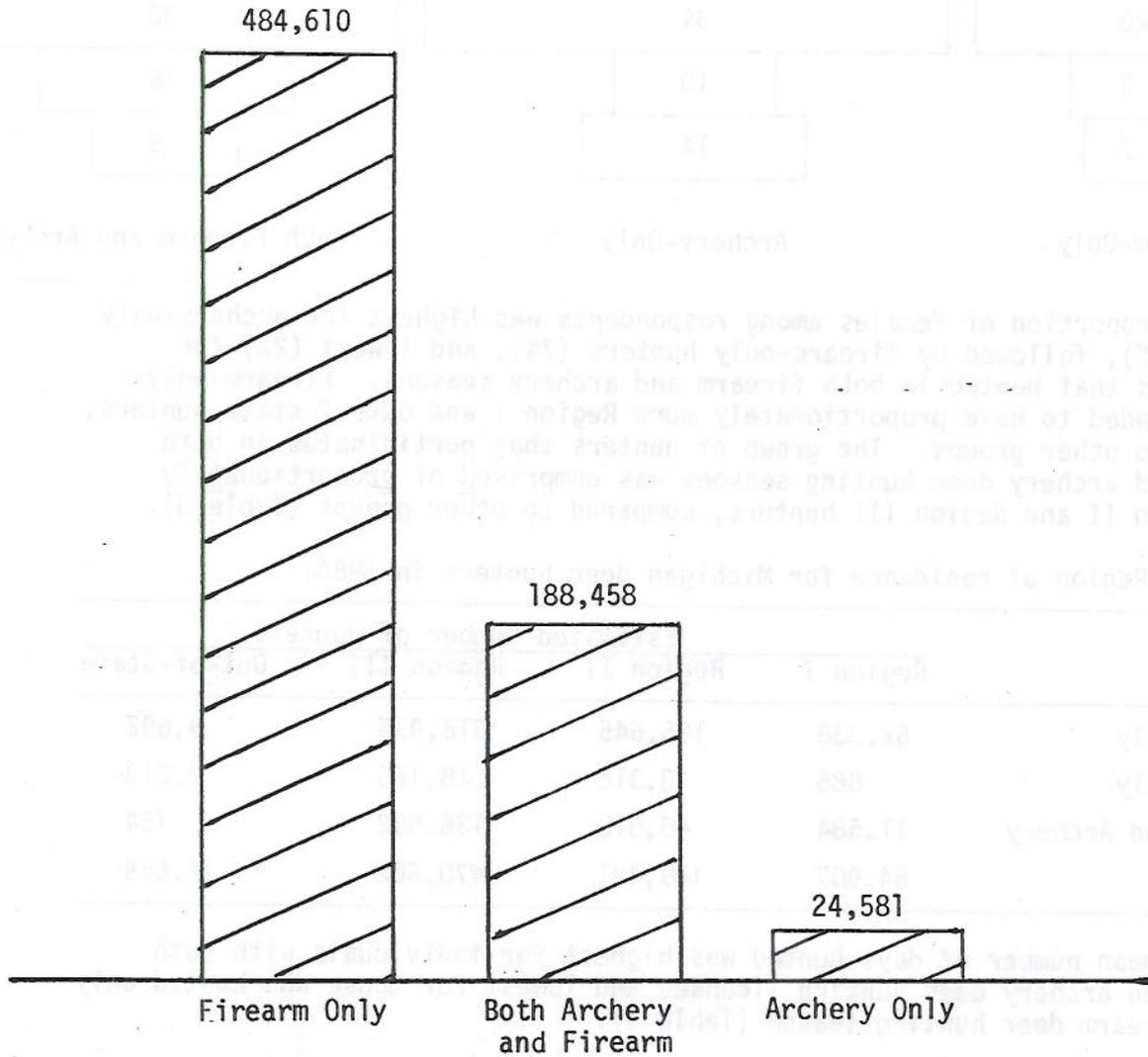
Figure 1. Relationship between the sex and age of resident deer hunters in Michigan and the sex and age of the Michigan population.



\*12 and 13-year-olds were not considered, even though they could hunt deer with bows and arrows, but not with firearms.

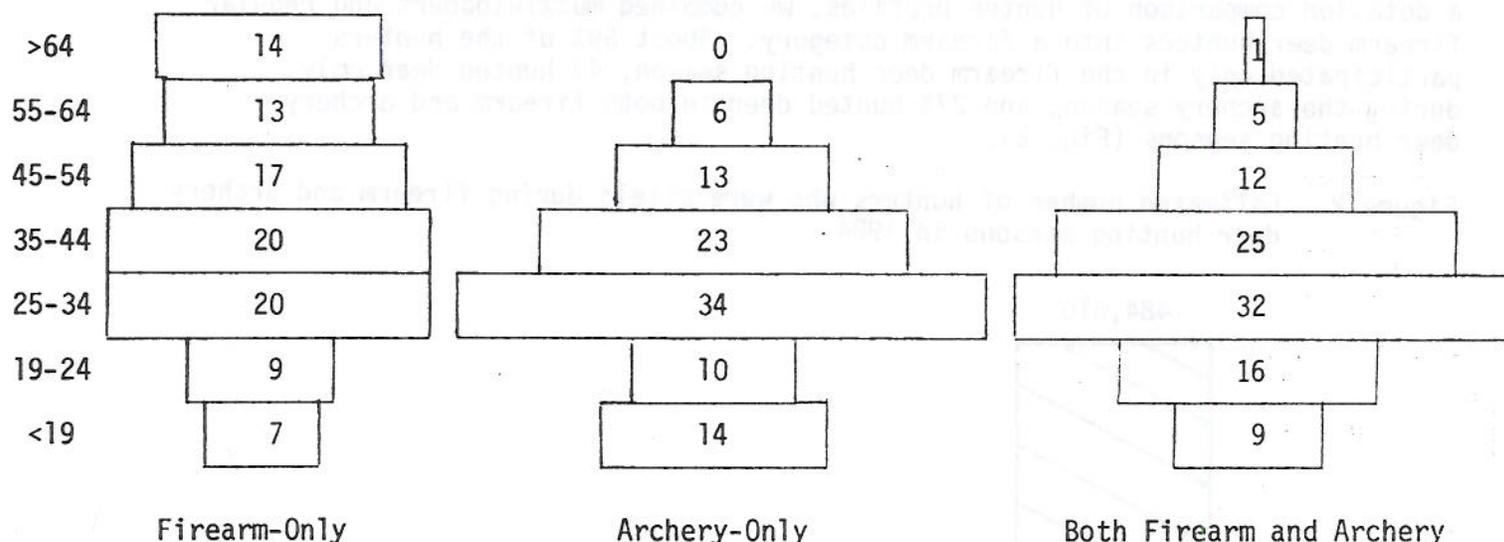
Since the number of individuals in some categories was too small to permit a detailed comparison of hunter profiles, we combined muzzleloaders and regular firearm deer hunters into a firearm category. About 69% of the hunters participated only in the firearm deer hunting season, 4% hunted deer only during the archery season, and 27% hunted deer in both firearm and archery deer hunting seasons (Fig. 2).

Figure 2. Estimated number of hunters who were afield during firearm and archery deer hunting seasons in 1984.



Respondents that participated only in the firearm deer hunting season tended to be older ( $\bar{X} = 43.4$  years of age) than those who hunted only in the archery season ( $\bar{X} = 32.8$ ) or in both firearm and archery seasons ( $\bar{X} = 33.5$ ). Census categories were used to describe the age class of these hunter populations, even though the number of years encompassed by the <19, 19-24, and >64 year-old classes were not the same as remaining categories (Fig. 3).

Figure 3. Percentage of individuals within age classes among 3 groups of Michigan deer hunters in 1984.



The proportion of females among respondents was highest for archery-only hunters (9%), followed by firearm-only hunters (7%), and lowest (2%) for individuals that hunted in both firearm and archery seasons. Firearm-only hunters tended to have proportionately more Region I and out-of-state hunters, compared to other groups. The group of hunters that participated in both firearm and archery deer hunting seasons was comprised of proportionately more Region II and Region III hunters, compared to other groups (Table 3).

Table 3. Region of residence for Michigan deer hunters in 1984.

Groups	Estimated Number of Hunters			
	Region I	Region II	Region III	Out-of-State
Firearm Only	52,338	105,645	316,935	9,692
Archery Only	885	3,318	18,165	2,213
Firearm and Archery	11,684	40,518	135,502	754
Totals	64,907	149,481	470,602	12,659

The mean number of days hunted was highest for individuals with both firearm and archery deer hunting licenses and lowest for those who hunted only in the firearm deer hunting season (Table 4).

Table 4. Mean number of days hunted by 1984 deer hunters in each of 4 periods.

Group	Regular Firearm				Totals
	Early Archery (Oct 1-Nov 14)	Firearm (Nov 15-30)	Late Archery (Dec 1-Jan 1)	Muzzleloader (Dec 1-10)	
Firearm Only	0	7.35	0	0.23	7.58
Archery Only	12.23	0	2.61	0	14.84
Firearm and Archery	13.28	7.54	3.10	0.67	24.59

### License Buyers That Didn't Hunt

An estimated 35,343 individuals hunted 0 days for deer in 1984, even though they had purchased hunting licenses. These licensees averaged 41.3 years of age, which was older than individuals that hunted deer. About 12% of these licensees that didn't hunt were females, compared to 5% of hunters. They also had a much lower lifetime success rate for tagging deer, compared to licensees that hunted. License buyers that didn't hunt in 1984 tagged an average of 0.3 deer during 2.2 archery seasons and 2.5 deer during 11.8 firearm seasons.

### Hunting Pressure

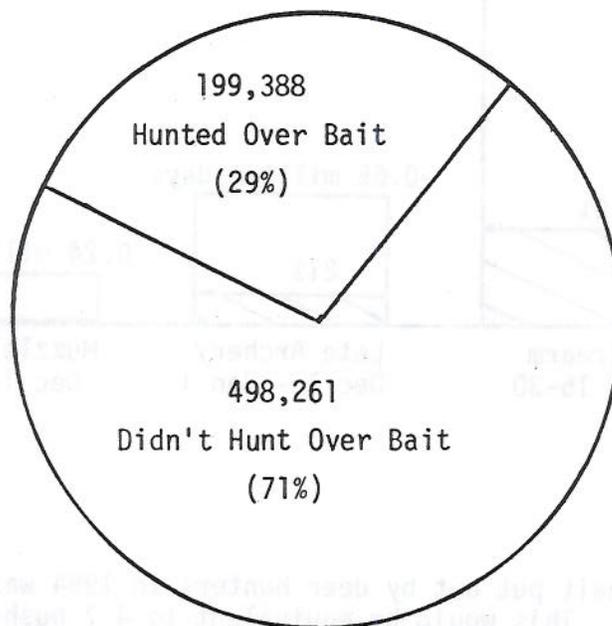
An estimated 8.67 million days of deer hunting occurred in Michigan during 1984. About 2.80 million days occurred during the early archery season, 4.98 million during the regular firearm season, 0.65 million during the late archery season, and 0.24 million days during the muzzleloader season.

### Baiting

Hunters were asked if they used bait while hunting for deer in 1984 and what their opinions were about the use of bait for hunting. Bait was defined as "materials placed in the areas for the purpose of attracting game - bait does not include natural food areas".

Participation in baiting.--About 20% of the respondents who hunted only in the firearm season said they hunted over bait, compared to 49% of those hunting only in the archery season, and 47% of those hunting in both seasons. Thus, an estimated 199,388 deer hunters used bait in 1984 (Fig. 4).

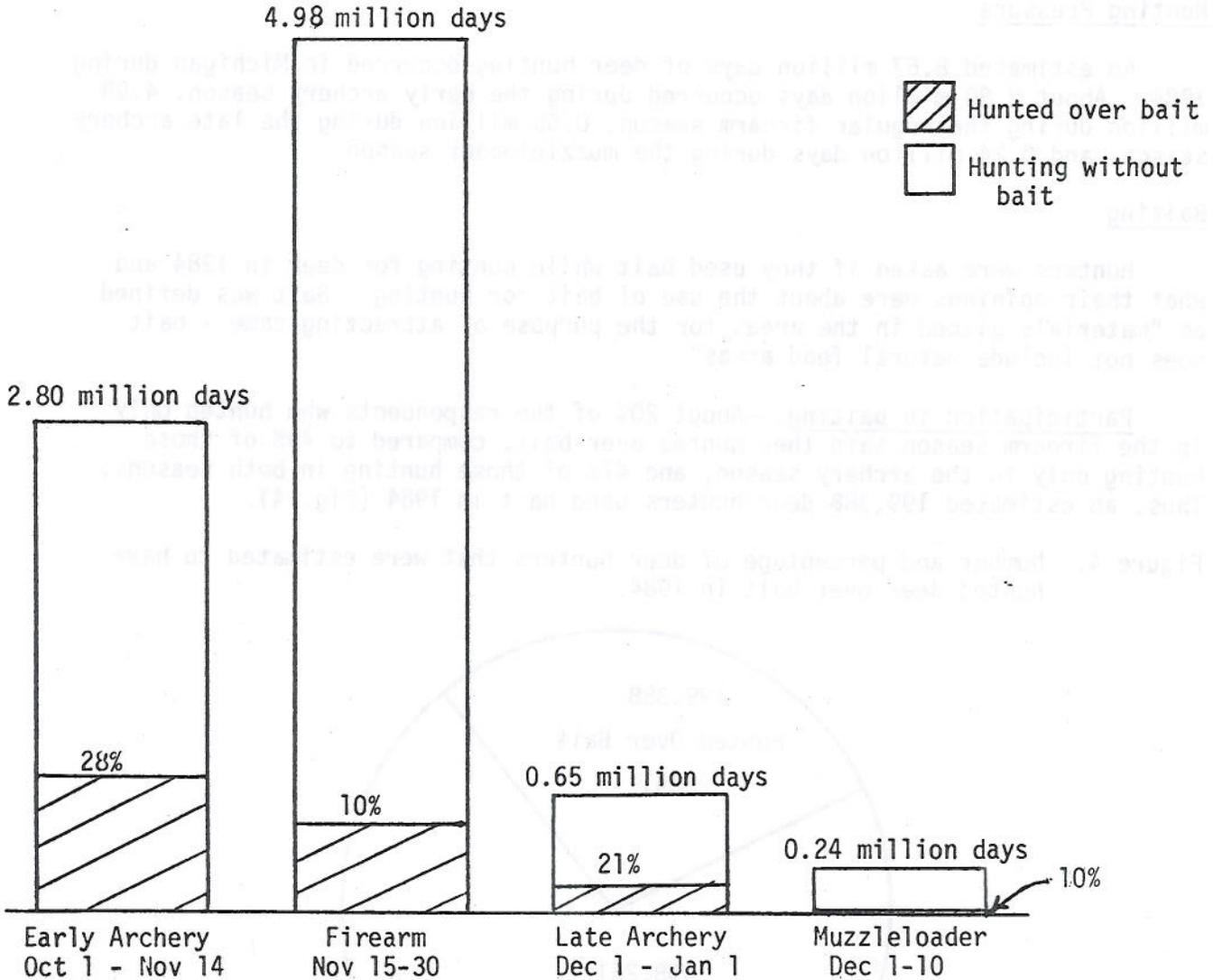
Figure 4. Number and percentage of deer hunters that were estimated to have hunted deer over bait in 1984.



About 24% of the hunters put out bait. Since 29% of the hunters used bait, the remaining 5% of the hunters used someone else's bait as a place to hunt deer.

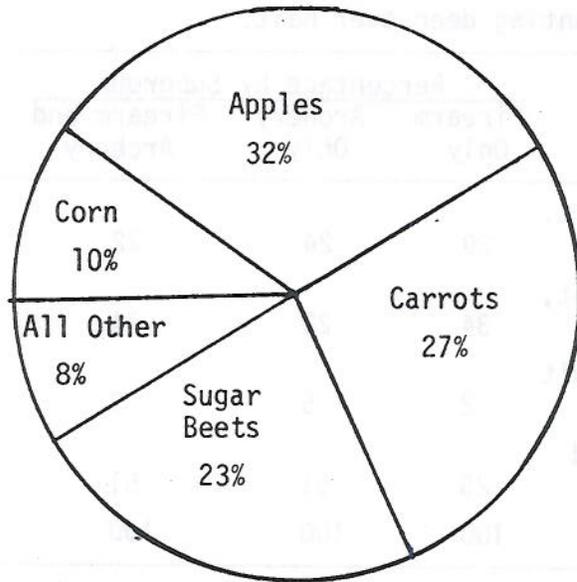
The percentage of hunting time spent using bait varied by season date (Fig. 5). The highest percentage of time spent hunting over bait occurred in the early archery season (Oct 1 - Nov 14, 1984), while the lowest percentage was found during the muzzleloading season (Dec 1-10, 1984). For all seasons, 16% of all deer hunting time (1.42 million days) was spent using bait.

Figure 5. Number of hunter-days and percentage of those hunter-days spent hunting over bait among deer hunters in 1984.



The total amount of bait put out by deer hunters in 1984 was estimated to include 3,253,835 bushels. This would be equivalent to 4.7 bushels of baiting material for every deer hunter -- including those that didn't use bait. The majority (75%) of bait was put out on private land. The baiting material was composed mostly of apples, carrots, and sugar beets (Fig. 6).

Figure 6. Composition of baiting material used by deer hunters in Michigan during 1984.



Total Bait Material =  
3,253,835 bushels  
worth an estimated  
\$13 million

Attitudes toward baiting deer.--We found that 54% of the hunters did not know it was legal to hunt deer over bait in Michigan. Only 46% responded "yes" to the question, "Under current Michigan laws, it is legal to shoot deer over bait during archery, firearm, and muzzleloader season. Before you read the above statement, did you know that it was legal to shoot deer over bait during all hunting seasons?"

Baiting has the potential to become a major issue; about 33% of the people buying deer licenses in 1984 thought that baiting for deer should be made illegal (Table 5).

Table 5. Responses of deer license holders to the question: "How much would you agree or disagree with a proposal to make it illegal to shoot deer over bait in Michigan?"

Group	Response			Totals
	Agree and Strongly Agree	Undecided	Disagree and Strongly Disagree	
Firearm Only	35%	27%	38%	100%
Archery Only	34%	19%	47%	100%
Firearm and Archery	29%	23%	48%	100%
Didn't Hunt	44%	23%	33%	100%
Weighted Average	33%	26%	41%	100%

The future interest in baiting was strong among hunters. About 31% of the hunters did not bait but said they might want to try it at some future time (Table 6). Thus, baiting will probably increase as hunters learn that it is legal to hunt deer over bait in Michigan. There is a potential for us to have an additional 216,271 deer hunters that will use bait.

Table 6. Responses among deer hunters to a question about current use and future interest in hunting deer over bait.

Response	Percentage by Subgroup			Weighted Average
	Firearm Only	Archery Only	Firearm and Archery	
Never have hunted deer over bait, never want to	39	24	22	34
Never have hunted deer over bait, may want to	34	20	24	31
Have hunted deer over bait, don't want to again	2	5	3	2
Have hunted deer over bait, and may want to again	25	51	51	33
Totals	100	100	100	100

Profile of baiters.--Comparison of the above 4 groups showed that baiters were much younger than respondents who had no interest in hunting deer over bait. Baiters had fewer years of firearm deer hunting experience but more bowhunting experience than hunters who had no interest in using bait (Table 7). About 54% of baiters lived in southern lower Michigan (Region III), compared to 75% of the respondents with no interest in baiting. Thus, baiters were more likely to live in northern Michigan (Regions I and II) than individuals who had no interest in using bait.

Table 7. Characteristics of Michigan deer hunters that said they used bait, never baited, had baited and quit, and had never baited but might like to try bait.

Item	Never Hunted Deer Over Bait		Have Hunted Deer Over Bait	
	Never Want To	Might Try It	Quit	Still Use Bait
Mean Age	45.6	39.8	34.8	35.7
Percentage of Females	5%	6%	5%	4%
Mean number of seasons hunted:				
firearm	20.6%	16.7	13.6	15.9
archery	2.2	2.3	4.3	4.3
Lifetime success rate (deer tagged/season hunted):				
firearm	0.3	0.4	0.4	0.4
archery	0.2	0.1	0.5	0.2

Hunters that had used bait but quit seemed to be a very special group. They hunted the most days of any group and were more likely than other groups to tag an antlerless deer. Success rate was highest for hunters that baited and quit, followed by current baiters and individuals that never want to bait. Hunters that might like to try baiting were the least successful of all groups (Table 8).

Table 8. Hunting experiences of Michigan deer hunters that said they used bait, never baited, had baited and quit, and had never baited but might like to try bait.

Item	Never Hunted Deer Over Bait		Have Hunted Deer Over Bait	
	Never Want To	Might Try It	Quit	Still Use Bait
Mean number of days hunted in 1984:				
firearm deer	7.1	7.4	8.9	8.0
archery deer	4.7	4.6	6.9	5.1
total deer	11.8	12.0	15.8	13.1
Success rate in 1984 (% of hunters tagging deer)	26	23	55	39
Percentage of antlered deer among deer tagged in 1984	85	71	69	83

Efficiency of bait.--Success rate was not an adequate measure for determining the impacts of baiting on harvest because baiters spent more days afield than hunters that did not use bait and because baiters did not spend all of their time hunting deer over bait. The number of deer reported to be taken with and without bait was compared with the amount of effort spent hunting with and without bait. In general, baiting had little impact on harvest efficiency. About 2.4 deer were taken over bait per 100 days of effort, compared to 2.2 deer taken without bait (Table 9). There were some differences in efficiency by season. Baiting was more efficient than not using bait in December, but there were too few deer taken to have much effect on the composite measures of efficiency. Experimental studies are needed to determine if efficiency differences in December were due to baiting per-se or due to the association between baiting and public land or baiting and the proportion of antlerless deer in the harvest.

Table 9. Number of deer reported to be harvested per 100 days of deer hunting effort.

Season	Bait Used	Bait Not Used
Early Archery	1.4	1.1
Regular Firearm	3.5	3.1
Late Archery	3.1	0.5
Muzzleloading	3.4	1.6
Totals	2.4	2.2

About 17% of all deer taken in Michigan during 1984 were reported to have been shot over bait. The percentage of deer taken over bait was highest in late archery season and lowest in the firearm deer hunting season (Table 10).

Table 10. Percentage of deer in Michigan that were reported to be shot over bait in 1984 by season hunted.

Season	Percentage Shot Over Bait	Percentage Taken Without Bait	Totals
Early Archery (Oct 1 - Nov 14)	33%	67%	100%
Firearm (Nov 15-30)	11%	89%	100%
Late Archery (Dec 1-Jan. 1)	65%	35%	100%
Muzzleloader (Dec 1-10)	18%	82%	100%

Literature Cited

Langenau, E. E., Jr. 1985. Evaluation of Michigan's 2-deer law. Mich. Dep. Nat. Resour. Wildl. Div. Unpublished Rep. East Lansing, MI. 13pp.

Ryel, L. A. 1983. Deer hunters' opinion survey, 1982. Mich. Dep. Nat. Resour. Wildl. Div. Rep. No. 2958. Lansing, MI. 9pp.

\_\_\_\_\_, G. C. Jansen, and L. J. Hawn. 1970. Some facts about Michigan hunters. Mich. Dep. Nat. Resour. Res. and Devel. Rep. No. 197. Lansing, MI. 25pp.

APPENDIX I.

DEER HUNTER OPINION SURVEY  
MICHIGAN - 1984 SEASON

1. Please indicate the number of days you hunted deer in Michigan last fall during each of the following deer hunting seasons (put 0 for none).
  - A. Early Archery (Oct. 1 - Nov. 14) . . . . . \_\_\_\_\_ days
  - B. Firearm (Nov. 15 - Nov. 30). . . . . \_\_\_\_\_ days
  - C. Late Archery (Dec. 1 - Jan. 1) . . . . . \_\_\_\_\_ days
  - D. Muzzleloader (Dec. 1 - Dec. 10). . . . . \_\_\_\_\_ days
  
2. Did you receive a permit to take an antlerless deer during the 1984 firearm deer hunting season?  
 Yes  
 No
  
3. Under current Michigan laws, it is legal to shoot deer over bait during archery, firearm, and muzzleloader season. (Throughout this survey the term "over bait" is used to include deer going to or from bait). Before you read the above statement, did you know that it was legal to shoot deer over bait during all hunting seasons?  
 Yes  
 No
  
4. What percentage of your deer hunting time in Michigan was spent hunting over bait during 1984? (Use 0 for none or didn't hunt and 100% for all of the time over bait).
  - A. Early Archery (Oct. 1 - Nov. 14) . . . . . \_\_\_\_\_ % of time over bait
  - B. Firearm (Nov. 15 - Nov. 30). . . . . \_\_\_\_\_ % of time over bait
  - C. Late Archery (Dec. 1 - Jan. 1) . . . . . \_\_\_\_\_ % of time over bait
  - D. Muzzleloader (Dec. 1 - Dec. 10). . . . . \_\_\_\_\_ % of time over bait
  
5. How much interest do you personally have in hunting deer over bait?  
 I have never hunted deer over bait and never want to.  
 I have never hunted deer over bait but may want to at some future time.  
 I have hunted deer over bait but never want to again.  
 I have hunted deer over bait and may want to at some future time.
  
6. How much do you approve or disapprove of other people hunting deer over bait in Michigan?  
 Strongly approve  
 Approve  
 Neither approve nor disapprove  
 Disapprove  
 Strongly disapprove
  
7. How much would you agree or disagree with a proposal to make it illegal to shoot deer over bait in Michigan?  
 Strongly agree  
 Agree  
 Neither agree nor disagree  
 Disagree  
 Strongly disagree

PLEASE COMPLETE THE BACK OF THIS PAGE

1. How often do you use the following services? (Check one)

- Daily
- Several times a week
- Once a week
- A few times a month
- Once a month
- Less than once a month
- Never

2. How often do you use the following services? (Check one)

- Daily
- Several times a week
- Once a week
- A few times a month
- Once a month
- Less than once a month
- Never

3. How often do you use the following services? (Check one)

- Daily
- Several times a week
- Once a week
- A few times a month
- Once a month
- Less than once a month
- Never

4. How often do you use the following services? (Check one)

- Daily
- Several times a week
- Once a week
- A few times a month
- Once a month
- Less than once a month
- Never

5. How often do you use the following services? (Check one)

- Daily
- Several times a week
- Once a week
- A few times a month
- Once a month
- Less than once a month
- Never

6. How often do you use the following services? (Check one)

- Daily
- Several times a week
- Once a week
- A few times a month
- Once a month
- Less than once a month
- Never

7. How often do you use the following services? (Check one)

- Daily
- Several times a week
- Once a week
- A few times a month
- Once a month
- Less than once a month
- Never

## APPENDIX II

Eight groups of license buyers were considered (Figure A).

The total number of firearm deer hunters was estimated by multiplying the sales figures times the percentage of licensees that actually hunted:

$$\text{Firearm Hunters} = N2 + N6 + N3 = (716,030)(0.94) = 673,068$$

Questionnaire responses showed that 69.23% of the firearm hunters did not bowhunt while 30.77% hunted in both firearm and archery seasons. Thus:

$$N2 + N6 = (.6923)(673,068) = 465,965$$

$$N3 = (.3077)(673,068) = 207,103$$

Similar calculations for archery deer hunters revealed the following:

$$N3 + N5 + N7 = (287,890)(0.74) = 213,039$$

$$N5 + N7 = (.2029)(213,039) = 43,226$$

$$N3 = (.7971)(213,039) = 169,813$$

Estimates of N3, the number of hunters participating in both firearm and archery deer hunting seasons, were averaged. For purposes of this analysis, we computed an average value for N3 and then re-computed N2 + N6 and N5 + N7.

$$N3 = (207,103 + 169,813)/2 = 188,458$$

$$N2 + N6 = 673,068 - 188,458 = 484,610$$

$$N5 + N7 = 213,039 - 188,458 = 24,581$$

For individuals that purchased both firearm and archery deer hunting licenses, the following sub-group proportions were estimated:

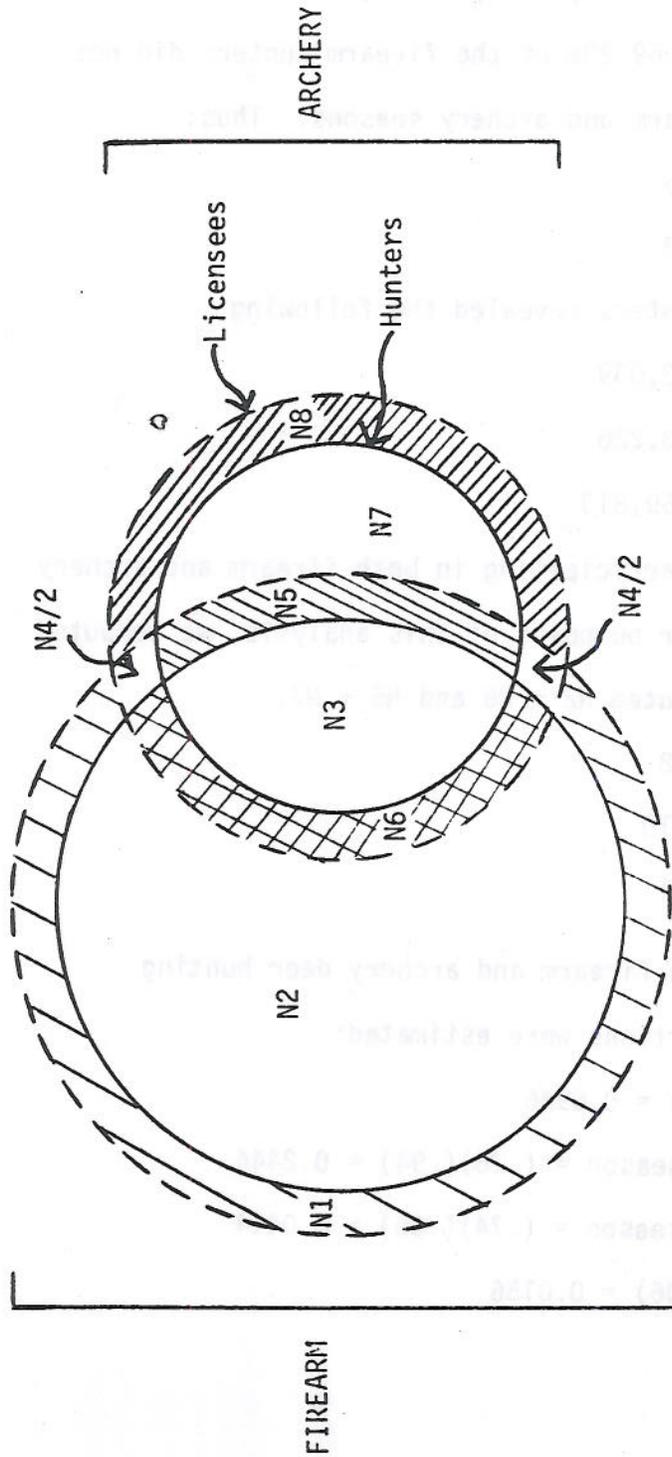
$$\text{hunted in both seasons} = (.74)(.94) = 0.6956$$

$$\text{hunted in firearm but not archery season} = (.26)(.94) = 0.2444$$

$$\text{hunted in archery but not firearm season} = (.74)(.06) = 0.0444$$

$$\text{hunted in neither season} = (.26)(.06) = 0.0156$$

Figure A. Groups of deer hunters derived from information on license purchasing and hunting behaviors.



Group	Licenses Bought		Seasons Hunted		Estimated Number of License Buyers in 1984
	Archery	Firearm	Archery	Firearm	
N1	No	Yes	No	No	26,707
N2	No	Yes	No	Yes	418,395
N3	Yes	Yes	Yes	Yes	188,458
N4	Yes	Yes	No	No	4,226
N5	Yes	Yes	Yes	No	12,029
N6	Yes	Yes	No	Yes	66,215
N7	Yes	No	Yes	No	12,552
N8	Yes	No	No	No	4,410

The number of licensees that purchased both firearm and archery deer hunting licenses was computed as follows:

$$N3 + N4 + N5 + N6 = N3/0.6956 = 188,458/.6956 = 270,929$$

The sizes of the 3 other groups purchasing both licenses could then be estimated:

$$N4 = 0.0156(270,929) = 4,226$$

$$N5 = 0.0444(270,929) = 12,029$$

$$N6 = 0.2444(270,929) = 66,215$$

The number of individuals that purchased one license and did not hunt was estimated as follows:

$$N1 = (.06)(716,030) - N4 - N5 = 26,707$$

$$N8 = (.26)(287,890) - N4 - N6 = 4,410$$

Finally, we separated individuals who hunted in only 1 season into 2 groups: (1) those that had only 1 license, and (2) those that had both licenses but used only 1:

$$N2 = (N2 + N6 + N3) - N6 - N3 = 418,395$$

$$N7 = (N3 + N5 + N7) - N5 - N3 = 12,552$$

These figures were used to estimate the number of separate hunters, separate license buyers, and the number of separate licensees that did not hunt:

$$\text{separate hunters} = N2 + N3 + N5 + N6 + N7 = 697,649$$

$$\text{separate license buyers} = N1 + N2 + N3 + N4 + N5 + N6 + N7 + N8 = 732,992^o$$

$$\text{separate licensees that didn't hunt} = \text{separate license buyers} - \text{separate hunters} = 35,343$$

