



## 2011 SMALL GAME HARVEST SURVEY

Brian J. Frawley

### Abstract

*A survey was completed to estimate the number of people hunting small game, their days afield, and harvest during the 2011 hunting seasons. The survey also was used to investigate hunter satisfaction, compliance with the Harvest Information Program (HIP), estimate the number of people hunting on Hunting Access Program (HAP) lands (private land leased for hunting), and estimate the number of hunters using the internet application Mi-Hunt to locate hunting areas. In 2011, 256,184 people purchased small game hunting licenses, a decrease of about 2% from 2010. An estimated 153,890 people actually hunted small game species in 2011, which declined significantly by 5% from 2010. Small game hunters most often sought ruffed grouse, squirrels, and cottontail rabbits. The number of hunters pursuing quail, woodcock, cottontail rabbit, squirrel, crow, and coyote did not change significantly between 2011 and 2010; however, fewer hunters sought pheasant (-15%), grouse (-9%), and snowshoe hare (-20%). Hunting effort did not change significantly for any species between 2010 and 2011, except for squirrel which increased 23%. Furthermore, harvest did not change significantly for any species between 2010 and 2011. Compared to 2010, a greater proportion of small game hunters in 2011 were satisfied with their overall small game hunting experience (63% in 2011 versus 58% satisfied in 2010). In addition, a greater proportion of small game hunters were satisfied with the amount of small game harvested (33% in 2011 versus 28% in 2010); however, a similar proportion of hunters were satisfied with the amount of small game seen. In 2011, 92% of migratory bird hunters had registered with HIP. In 2011, an estimated 2,698 hunters spent 9,663 days afield hunting small game on HAP lands. In 2011, an estimated 8,100 small game hunters used the internet application Mi-Hunt to assist with their small game hunting. Most of these hunters were satisfied with how easy the application was to use (73%), the quality of maps (74%), and the accuracy of information (71%) from Mi-Hunt.*



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## INTRODUCTION

The Natural Resources Commission and the Michigan Department of Natural Resources (DNR) have the authority and responsibility to protect and manage the wildlife resources of the state of Michigan. This responsibility is shared with the U.S. Fish and Wildlife Service (USFWS) for the management of migratory species such as woodcock (*Scolopax minor*), ducks (Anatinae), and geese (*Branta* and *Anser* spp.). Harvest surveys are one of the management tools used by the DNR to accomplish its statutory responsibility. Estimates derived from harvest surveys, as well as breeding bird counts, are used to monitor game populations and help establish harvest regulations.

Since the 1950s, the primary small game species harvested in Michigan have been ring-necked pheasant (*Phasianus colchicus*), ruffed grouse (*Bonasa umbellus*), American woodcock, cottontail rabbit (*Sylvilagus floridanus*), snowshoe hare (*Lepus americanus*), squirrels (*Sciurus* spp. and *Tamiasciurus hudsonicus*), and American crow (*Corvus brachyrhynchos*) (Frawley 2012). Most of these animals could be harvested during fall and early winter (Table 1) by a person possessing a small game hunting license (includes resident, nonresident, 3-day nonresident, resident junior, and senior small game hunting licenses). Coyotes (*Canis latrans*) could be harvested in Michigan by hunters possessing either a small game hunting (residents) or a fur harvesters license (residents and nonresidents). Woodcock and waterfowl hunters were required to register with the National Migratory Bird Harvest Information Program (HIP). Landowners and their families that hunted small game on their property where they resided could hunt without a hunting license, although they still needed to register with HIP if they hunted migratory game birds.

Waterfowl could be harvested by a person possessing both a waterfowl and a small game hunting license. Waterfowl hunters also had to obtain a federal waterfowl stamp and register with the HIP. Hunters younger than 16 years of age could hunt waterfowl without a waterfowl hunting license or a federal waterfowl stamp; however, they still were required to purchase a small game license and register with the HIP.

The HIP is a cooperative effort between state wildlife agencies and the USFWS. It was implemented to improve knowledge about harvest of migratory game birds. Beginning in 1995, any person who hunted migratory game birds in Michigan was required to register with HIP and answer several questions about their hunting experience during the previous year. The HIP provided the USFWS with a national registry of migratory bird hunters from which they can select participants for harvest surveys.

Estimating harvest, hunter numbers, and hunting effort were the primary objectives of the small game harvest survey. This survey also provided an opportunity to collect information about management issues. Questions were added to the questionnaire to investigate hunter satisfaction with the 2011 hunting season and small game numbers, to estimate the number of people hunting on Hunting Access Program (HAP) lands (private land leased for hunting), and to estimate the number of hunters using the internet application Mi-Hunt to locate hunting areas.

## METHODS

Following the 2011 small game hunting seasons, a questionnaire (Appendix A) was sent to 9,989 randomly selected people that were eligible to hunt small game. Hunters reported species hunted, county hunted, type of land on which hunt occurred (public or private lands), number of days spent afield, and number of animals harvested. In addition, hunters were asked whether they had hunted waterfowl and to rate their overall hunting experience and indicate their satisfaction with the amount of game seen and amount harvested, and number of days in the hunting season.

Estimates were calculated using a stratified random sampling design (Cochran 1977). Using stratification, hunters were placed into similar groups (strata) based on their county of residence. Residents of the Upper Peninsula (UP), northern Lower Peninsula (NLP), southern Lower Peninsula (SLP), and nonresidents and licensees with unknown residency were grouped into separate strata (Figure 1). The overall sample consisted of 1,185 people from the UP stratum (N= 30,796), 2,272 people from the NLP stratum (N= 59,908), 6,093 from the SLP stratum (N= 154,256), and 439 people from the nonresident and unknown residency stratum (N=11,224). Estimates were derived for each group separately. The statewide estimate was then derived by combining group estimates so the influence of each group matched the proportion its members contributed to the statewide population of hunters. The primary reason for using a stratified sampling design was to produce more precise estimates. Improved precision means similar estimates should be obtained if this survey were to be repeated.

Coyotes could be harvested in Michigan by hunters possessing either a small game hunting (residents) or a fur harvesters license (residents and nonresidents). The DNR sells hunting licenses using a statewide automated license sales system. This system allowed the DNR to maintain a central database containing license sales information (e.g., sales transactions) for each license buyer. Using the license sales database, small game hunting license buyers that also purchased a fur harvesters license were identified, and then coyote harvest was estimated separately for small game licensees with and without a fur harvesters license. The license sales database also was used to identify whether small game hunting licensees had registered with HIP. Using this information, estimates of compliance with HIP among small game hunting license buyers hunting migratory species (woodcock) was estimated.

Estimates were derived separately for the UP, NLP, and SLP (Figure 1). Hunting effort and animals harvested from unknown locations were allocated among areas in proportion to the known effort and harvest.

Estimates were subject to both sampling and nonsampling error. When a sample rather than the entire population has been surveyed, there is a chance that the sample estimates may differ from the true population values they represent. The difference, or sampling error, varies depending on the particular sample selected, and this variability was measured by the 95% confidence limit (CL). In theory, this CL can be added and subtracted from the estimate to calculate the 95% confidence interval. The confidence interval was a measure of the precision associated with the estimate and implies the true value would be within this interval 95 times out of 100.

Estimates also were affected by nonsampling error. Nonsampling error can occur for many reasons, including the failure to include a segment of the population, the inability to obtain data from all units in the sample, the inability or unwillingness of respondents to provide data, mistakes made by respondents, and errors made in the collection or processing of the data. It is very difficult to measure this error. Thus, estimates were not adjusted for nonsampling error. Furthermore, harvest estimates did not include animals taken legally outside the open season (e.g., nuisance animals) and by unlicensed landowners and their family that legally hunted on their own land.

Statistical tests are used routinely to determine the likelihood 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 the difference between the means was larger than would be expected 995 out of 1,000 times ( $P < 0.005$ ), if the study had been repeated (Payton et al. 2003).

Questionnaires were mailed initially in mid-April. Up to two follow-up questionnaires were sent to non-respondents. Questionnaires were undeliverable to 228 people, primarily because of changes in residence. Questionnaires were returned by 5,219 people, yielding a 53% adjusted response rate.

## **RESULTS AND DISCUSSION**

### **License sales and hunter participation**

In 2011, 256,184 people purchased small game hunting licenses, a decrease of about 2% from 2010 (Table 2). About  $60 \pm 1\%$  of the licensees actually hunted in 2011 (Tables 2 and 3), which was a smaller proportion than was reported in 2010 (60 versus 62%). An estimated 153,890 people actually hunted small game species in 2011 (excluded people hunting waterfowl only), which declined significantly by 5% from 2010 (Table 3). About 96% of the active small game hunters were males (Table 3). Hunters most often sought ruffed grouse, squirrels, and cottontail rabbits (Table 4). In 2011, the average age of small game license buyers was 43 years (Figure 2). Nearly 11% (29,255) of the license buyers were younger than 17 years old.

### **Harvest and hunting trends**

The number of people buying a small game hunting license in 2011 was about 40% less than the number of people who purchased a license ten years ago in 2001 (347,429 people purchased a license in 2001). There were fewer license buyers for most age classes between 12 and 54 years of age in 2011, compared to 2001 (Figure 3). However, there were increased hunter numbers among the youngest and oldest age classes in 2011. The increased hunter numbers in the oldest age classes likely represented the rising share of older people in the population as the baby-boom generation aged and life expectancies have increased. The increased participation among the youngest hunters likely reflected the lowering of the minimum age requirements. In 2011, it was legal for 10 and 11 year olds to hunt small game; while the hunters had to be at least 12 years old to participate in 2001.

The number of hunters pursuing quail, woodcock, cottontail rabbit, squirrel, crow, and coyote did not change significantly between 2011 and 2010; however, fewer hunters sought pheasant (-15%), grouse (-9%), and snowshoe hare (-20%, Table 4). Hunting effort did not change significantly for any species between 2010 and 2011, except for squirrel which increased 23% (Table 5). Furthermore, harvest did not change significantly for any species between 2010 and 2011 (Table 6).

Coyotes could be harvested in Michigan by hunters possessing either a small game hunting (residents) or a fur harvesters license (residents and nonresidents). In 2011, an estimated 34,547 small game hunters pursued coyotes (Tables 4 and 7). About 74% of these hunters possessed only a small game hunting license (Table 7), and they were responsible for 62% of the coyotes taken by all small game license holders.

The number of small game hunters in Michigan has declined about 77% since the mid-1950s and is currently at a record low (Figure 4). This trend has been previously reported in Michigan and nationally (Brown et al. 2000, Enck et al. 2000, Frawley 2006, U.S. Department of the Interior 2008). Hawn (1979) speculated declining ring-necked pheasant populations was the primary reason for declining small game hunter numbers in Michigan. The number of people hunting pheasants has declined by about 95% between the mid-1950s and recent years (Figure 5). Many other factors have contributed to the decline of small game hunting, including increased urbanization of the human population, increased competition between hunting and other leisure activities, and loss of wildlife habitat (Brown et al. 2000).

Declining small game hunting participation since the mid-1950s also has been noted among hunters pursuing cottontail rabbits (-85%), snowshoe hare (-84%), and squirrels (-66%, Figure 5). Changes in hunter participation and harvest were generally similar.

Hunter numbers in the 1970s through the early 1980s were likely affected by the initiation and subsequent elimination of the put-take pheasant program (Figure 6). This program was created for the purpose of providing additional pheasant hunting opportunities. Each year while the program existed, pen-raised pheasants were released on several state properties in southern Michigan (Janson 1975, Janson and Anderson 1976).

Changes in the harvest of game species and hunter participation usually track changes in game populations. The number of hunters that pursued pheasants, rabbits, snowshoe hares, and squirrels was at record low levels during recent years (Figure 5). Game population surveys have indicated pheasant, quail, and woodcock populations are currently among their lowest recorded levels since the 1960s (Frawley and Stewart 2008, Cooper and Rau 2013, Vander Wagen et al. 2013). The abundance of rabbit, hare, and squirrels was not monitored annually; thus, it was not possible to determine whether harvest and population trends were similar. Michigan's grouse population generally follows a cyclic pattern lasting about 10 years, and the grouse population in 2011 appeared to be approaching a peak after reaching the low in the present cycle during 2004-2005 (Vander Wagen et al. 2013).

Although many small game species are not as abundant today as during previous decades (e.g., pheasant, quail, woodcock), the mean number of animals taken per hunting effort has not paralleled changes in the population (Figure 7). For example, hunting efficiency has been high among hunters despite declining numbers of quail and woodcock.

About 31% of the small game hunters in Michigan hunted on private lands only, 24% hunted on public lands only, and 40% hunted on both private and public lands (Table 8). Private lands served as the primary area for hunters pursuing pheasants, quail, cottontail rabbits, squirrels, crows, and coyotes (Tables 8 and 9), while public lands were most popular among hunters pursuing grouse, woodcock, and snowshoe hares.

### **Hunter satisfaction**

Compared to 2010 (Frawley 2012), a greater proportion of small game hunters in 2011 were satisfied with their overall small game hunting experience (63% in 2011 versus 58% satisfied in 2010, Table 10). In addition, a greater proportion of small game hunters were satisfied with the amount of small game harvested 33% in 2011 versus 28% in 2010); however, a similar proportion of hunters were satisfied with the amount of small game seen.

### **Migratory bird hunters and Harvest Information Program (HIP) compliance**

An estimated  $74,736 \pm 3,099$  small game hunters hunted migratory birds (waterfowl and woodcock combined) in Michigan during 2011, compared to  $76,869 \pm 3,168$  in 2010. An estimated  $51,464 \pm 2,742$  hunters pursued waterfowl, and  $32,254 \pm 2,257$  hunters pursued woodcock in 2011. The number of waterfowl and woodcock hunters in 2011 was not statistically significant from 2010.

In 2011,  $92 \pm 1\%$  of migratory bird hunters had registered with HIP. About  $96 \pm 1\%$  of the waterfowl hunters and  $88 \pm 2\%$  of the woodcock hunters had registered with HIP. Compliance among hunters was unchanged from the rate of compliance in 2010 (Frawley 2012). Hunters registered with HIP were responsible for about 92% of the woodcock taken and 86% of the woodcock hunting trips done in 2011 (Table 11). Waterfowl hunters were not asked to report their harvest and hunting effort; thus, it was not possible to estimate harvest and effort for waterfowl among HIP registrants.

Cooper and Parker (2012) reported estimates of harvest, hunter numbers, and hunting effort of Michigan woodcock hunters in 2011 from an independent survey done by the USFWS. These estimates were based on responses received from a random sample of HIP registrants. Cooper and Parker estimated  $28,400 \pm 4,260$  hunters went afield  $144,000 \pm 25,920$  days and harvested  $106,900 \pm 29,932$  woodcock. Estimates of hunting effort were less than estimates from the present survey (Tables 4-6). Because nearly 15% of Michigan woodcock hunters failed to register with HIP, the estimates derived from the USFWS survey would be expected to be lower than estimates from the present survey. Estimates derived from a subset of Michigan hunters that had registered with HIP (Table 11) were not significantly different from estimates from the USFWS survey.

Frawley (2013) estimated  $45,786 \pm 1,029$  waterfowl hunters in Michigan during 2011 from the waterfowl harvest survey. In contrast, this current survey estimated  $51,464 \pm 2,742$  people hunted waterfowl. The previous estimate was obtained from a separate survey sent to a random sample of waterfowl license buyers and HIP registrants younger than 17 years old. The estimate from this small game harvest survey included a larger population of hunters, including many hunters that were not licensed to hunt waterfowl.

An estimated  $3,237 \pm 768$  youth hunters (10-15 years old) participated during the 2-day youth waterfowl hunting season (September 17-18), which was not significantly different from the number of participants in 2010 ( $2,902 \pm 728$ ). About  $16 \pm 4\%$  of the youth hunters eligible to hunt during the youth season actually participated.

### **Hunting access program**

The Michigan Hunting Access Program (HAP) was created in 1977 to lease private lands to provide access for hunting (Oliver 2005). About 10,000 acres on 75 farms were enrolled in HAP in 2011. An estimated 2,698 hunters spent 9,663 days afield hunting small game on HAP land (Table 12).

### **Mi-Hunt internet application**

The Michigan DNR developed an internet-based application called Mi-Hunt that could be used to locate hunting sites. In 2011, an estimated  $8,100 \pm 1,204$  small game hunters used Mi-Hunt to assist with their small game hunting. Most of these hunters were satisfied (combined very satisfied and somewhat satisfied responses) with how easy the application was to use ( $73 \pm 7\%$ ), the quality of maps ( $74 \pm 7\%$ ), and the accuracy of information ( $71 \pm 7\%$ ) from Mi-Hunt (Tables 13 and 14). Although most hunters that used Mi-Hunt were satisfied with it, most ( $62 \pm 7\%$ ) of these hunters also were uncertain whether Mi-Hunt had affected the quality of their small game hunting experience. In contrast,  $33 \pm 7\%$  of the hunters using Mi-Hunt reported it had improved the quality of their hunt and  $3 \pm 3\%$  reported it had decreased the quality of their hunt. In addition, about 1% of hunters did not provide an answer.

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Table 1. Small game hunting seasons in Michigan, 2011-2012.

Species, season, and area <sup>a</sup>	Season dates
Ring-necked pheasant	
Upper Peninsula (Zone 1)	Oct. 10 – 31
Lower Peninsula (Zone 2)	Oct. 20 – Nov. 14
Lower Peninsula (Zone 3)	Oct. 20 – Nov. 14 and Dec. 1 – Jan. 1
Northern bobwhite quail	
Southern Lower Peninsula	Oct. 20 – Nov. 14
Ruffed grouse	
Statewide	Sept. 15 – Nov. 14 and Dec. 1 – Jan. 1
American woodcock	
Statewide	Sept. 24 – Nov. 7
Cottontail rabbit	
Statewide	Sept. 15 – March 31
Snowshoe hare	
Statewide	Sept. 15 – March 31
Squirrels	
Statewide	Sept. 15 – March 1
American crow	
Statewide	Aug. 1 – Sept. 30 and Feb. 1 – March 31
Coyote	
Statewide	July 15 – April 15

<sup>a</sup>See Figure 1 for boundaries of hunt areas.

Table 2. Number of small game hunting licenses sold in Michigan, 2007-2011.

Item	Year					2010-2011 % Change
	2007	2008	2009	2010	2011	
Number of licenses sold <sup>a</sup>	298,685	277,215	270,594	265,060	260,544	-2
Number of people buying a hunting license <sup>b</sup>	293,662	273,243	266,549	261,050	256,184	-2

<sup>a</sup>The number of licenses sold is higher than the number of people buying licenses because some people purchased multiple licenses.

<sup>b</sup>A person was counted only once, regardless of how many licenses they purchased.

Table 3. Estimated sex and age of active small game hunters in Michigan, 2007-2011.<sup>a</sup>

Variable	2007	2008	2009	2010	2011	
					Estimate	95% CL
Hunters <sup>b</sup>	188,297	184,474	166,068	161,800	153,890*	3,343
Males (%)	95.9	96.4	96.6	96.9	96.6	0.6
Females (%)	3.7	3.6	3.4	3.1	3.4	0.6
Age (Years) <sup>c</sup>	43.8	44.7	44.9	46.1	46.2	0.6

<sup>a</sup>Analyses included only those people that hunted.

<sup>b</sup>People that hunted American crow, American woodcock, cottontail rabbit, coyote, northern bobwhite quail, ring-necked pheasant, ruffed grouse, snowshoe hare, or squirrels.

<sup>c</sup>Mean age of active hunters on October 1.

\*Non-overlapping 95% confidence intervals indicated estimates differed significantly between the last two years ( $P < 0.005$ ).

Table 4. Estimated number of small game hunters by species and region in Michigan, 2008-2011.<sup>a</sup>

Species and region	2008	2009	2010	2011		2010-11 % Change
				No.	95% CL	
Ring-necked pheasant <sup>b</sup>						
UP	2,378	2,226	1,670	1,229	463	-26
NLP	15,290	11,762	9,975	7,907	1,155	-21
SLP	27,795	22,057	17,483	15,294	1,581	-13
Statewide	43,144	34,014	27,450	23,351	1,973	-15*
Northern bobwhite quail						
NLP	4	166	0	49	95	
SLP	1,052	1,352	838	393	269	-53
Statewide	1,056	1,373	838	442	285	-47
Ruffed grouse						
UP	39,356	36,518	39,291	36,041	1,847	-8
NLP	46,730	43,561	43,536	39,714	2,382	-9
SLP	11,200	9,578	9,137	6,680	1,069	-27*
Statewide	91,417	82,818	85,327	77,283	2,908	-9*
American woodcock						
UP	11,068	11,371	9,980	9,410	1,244	-6
NLP	26,154	23,969	23,559	21,100	1,839	-10
SLP	7,271	5,748	6,110	3,952	832	-35*
Statewide	41,052	37,693	36,451	32,254	2,257	-12
Cottontail rabbit						
UP	3,976	3,875	3,477	2,860	698	-18
NLP	23,309	19,187	18,876	17,452	1,633	-8
SLP	52,642	49,098	41,328	38,303	2,301	-7
Statewide	75,455	67,883	60,031	56,065	2,803	-7
Snowshoe hare						
UP	7,726	8,780	7,972	6,090	997	-24
NLP	7,678	7,172	6,093	5,688	989	-7
SLP	1,599	1,198	1,445	757	368	-48
Statewide	16,507	16,387	15,214	12,143	1,437	-20*
Squirrels						
UP	5,596	4,563	4,782	4,219	825	-12
NLP	33,009	29,341	29,602	27,448	1,968	-7
SLP	47,771	43,698	40,336	44,065	2,406	9
Statewide	81,736	73,016	69,784	72,102	3,047	3
American crows						
UP	1,177	1,653	1,099	917	403	-17
NLP	4,336	4,334	4,500	4,489	875	0
SLP	6,746	7,486	7,348	7,640	1,143	4
Statewide	11,812	12,944	12,453	12,506	1,479	0
Coyote						
UP	3,875	4,310	5,689	4,987	907	-12
NLP	12,783	13,930	14,857	13,264	1,458	-11
SLP	16,718	18,164	16,260	18,355	1,714	13
Statewide	31,289	34,656	34,732	34,547	2,344	-1

<sup>a</sup>The number of hunters does not add up to the statewide total because hunters can hunt in more than one region.<sup>b</sup>Included both regular and late pheasant hunting seasons.\*Non-overlapping 95% confidence intervals indicated estimates differed significantly ( $P < 0.005$ ).

Table 5. Estimated amount of small game hunter effort (days afield) by species and region, 2008-2011.

Species and region	2008	2009	2010	2011		2010-11 % Change
				No.	95% CL	
Ring-necked pheasant <sup>a</sup>						
UP	13,411	10,658	9,699	6,370	3,561	-34
NLP	58,064	45,250	33,238	31,093	8,328	-6
SLP	108,718	92,285	63,892	63,159	10,760	-1
Statewide	180,193	148,194	106,829	100,622	14,613	-6
Northern bobwhite quail						
NLP	7	698	0	245	476	
SLP	3,422	5,084	3,034	589	555	-81
Statewide	3,428	5,781	3,034	835	731	-72
Ruffed grouse						
UP	325,116	299,237	311,693	305,132	30,815	-2
NLP	244,730	238,137	255,379	237,091	27,270	-7
SLP	54,329	45,508	48,557	36,949	9,829	-24
Statewide	624,175	582,881	615,628	579,171	42,876	-6
American woodcock						
UP	58,633	76,358	49,045	59,664	14,098	22
NLP	144,577	125,296	136,178	128,445	19,028	-6
SLP	36,142	26,085	27,601	19,187	6,723	-30
Statewide	239,352	227,738	212,824	207,295	25,474	-3
Cottontail rabbit						
UP	22,994	22,782	19,718	18,923	11,435	-4
NLP	122,123	107,926	112,693	102,822	22,443	-9
SLP	306,463	283,916	232,450	240,626	35,510	4
Statewide	451,580	414,624	364,861	362,371	43,877	-1
Snowshoe hare						
UP	49,280	55,671	50,493	48,331	17,529	-4
NLP	41,400	41,325	47,881	42,628	16,825	-11
SLP	9,881	6,847	4,316	1,981	2,041	-54
Statewide	100,561	103,843	102,690	92,940	24,421	-9
Squirrels						
UP	39,009	36,782	36,539	49,522	18,562	36
NLP	168,707	158,726	151,028	164,935	33,048	9
SLP	297,621	236,550	207,814	271,127	34,045	30*
Statewide	505,337	432,058	395,380	485,583	51,671	23*
American crow						
UP	5,938	7,506	2,379	6,321	5,896	166
NLP	20,098	16,187	14,605	15,734	5,040	8
SLP	32,444	27,893	25,582	30,705	8,252	20
Statewide	58,480	51,586	42,566	52,760	11,575	24
Coyote						
UP	19,053	32,567	37,743	42,408	23,229	12
NLP	90,332	96,224	88,133	89,784	30,434	2
SLP	112,024	99,300	91,344	124,502	41,435	36
Statewide	221,409	228,092	217,220	256,694	56,540	18

<sup>a</sup>Included both regular and late pheasant hunting seasons.

\*Non-overlapping 95% confidence intervals indicated estimates differed significantly ( $P < 0.005$ ).

Table 6. Estimated small game harvest by species and region in Michigan, 2008-2011.

Species and region	2008	2009	2010	2011		2010-11 % Change
				No.	95% CL	
Ring-necked pheasant <sup>a</sup>						
UP	4,796	2,991	2,059	2,047	1,398	-1
NLP	25,528	12,602	10,268	7,539	2,671	-27
SLP	32,598	20,492	14,898	13,034	3,209	-13
Statewide	62,922	36,085	27,224	22,620	4,567	-17
Northern bobwhite quail						
NLP	2	357	0	0	0	
SLP	853	1,116	1,435	441	547	-69
Statewide	854	1,473	1,435	441	547	-69
Ruffed grouse						
UP	183,804	144,682	161,171	159,427	18,549	-1
NLP	106,329	88,936	89,884	95,095	15,371	6
SLP	10,858	7,157	9,151	6,218	2,401	-32
Statewide	300,990	240,775	260,207	260,741	24,790	0
American woodcock						
UP	28,699	27,059	18,447	22,290	6,460	21
NLP	79,190	53,098	68,920	66,936	12,550	-3
SLP	13,801	11,087	9,526	5,431	2,022	-43
Statewide	121,690	91,244	96,892	94,657	14,709	-2
Cottontail rabbit						
UP	7,818	9,935	4,210	4,048	1,620	-4
NLP	79,068	52,058	56,606	38,757	7,570	-32
SLP	269,207	214,118	169,783	151,105	21,621	-11
Statewide	356,093	276,112	230,598	193,910	23,481	-16
Snowshoe hare						
UP	30,892	25,820	22,001	13,884	962	-37*
NLP	10,419	9,890	11,766	10,157	746	-14
SLP	4,491	2,171	1,506	602	16,922	-60
Statewide	45,802	37,881	35,273	24,643	6,800	-30
Squirrels						
UP	39,965	34,840	24,505	39,500	16,922	61
NLP	196,157	172,735	150,067	142,573	18,028	-5
SLP	304,433	232,756	195,734	254,845	30,242	30*
Statewide	540,555	440,330	370,306	436,918	40,905	18
American crow						
UP	9,178	20,615	3,978	3,132	1,930	-21
NLP	30,032	23,606	15,987	17,137	6,442	7
SLP	22,471	28,219	32,248	40,072	14,563	24
Statewide	61,681	72,440	52,213	60,341	17,272	16
Coyote						
UP	2,888	4,386	6,001	7,096	3,794	18
NLP	19,531	16,278	24,209	10,372	3,994	-57*
SLP	17,035	18,692	18,002	18,532	5,911	3
Statewide	39,454	39,356	48,212	36,001	8,116	-25

<sup>a</sup>Included both regular and late pheasant hunting seasons.\*Non-overlapping 95% confidence intervals indicated estimates differed significantly ( $P < 0.005$ ).

Table 7. Estimated number of coyote hunters, coyotes harvested, and hunting effort (days afield) by small game hunters with and without a fur harvesters license in Michigan, 2011.<sup>a</sup>

Small game hunter group	Hunters		Days afield		Harvest	
	No.	95% CL	No.	95% CL	No.	95% CL
Without fur harvesters license	25,616	2,060	156,898	41,546	22,344	6,040
With fur harvesters license	8,932	1,260	99,796	38,646	13,657	5,465
Combined	34,547	2,344	256,694	56,540	36,001	8,116

<sup>a</sup>Coyotes can also be taken by hunters possessing either a small game hunting or a fur harvesters license. These estimates do not include people with only a fur harvesters license that hunted coyotes.

Table 8. Estimated number and proportion of hunters hunting on private and public lands during the 2011 small game hunting season, summarized by species.

Species	Land type															
	Private land only				Public land only				Both private and public lands				Unknown land			
	Total	95% CL	%	95% CL	Total	95% CL	%	95% CL	Total	95% CL	%	95% CL	Total	95% CL	%	95% CL
Ring-necked pheasant	13,345	1,525	57	4	4,659	918	20	4	4,071	860	17	3	1,275	484	5	2
Northern bobwhite quail	196	191	44	32	147	165	33	30	49	95	11	20	49	95	11	20
Ruffed grouse	12,677	1,483	16	2	31,833	2,230	41	2	30,710	2,102	40	2	2,063	615	3	1
American woodcock	4,366	890	14	3	14,869	1,593	46	4	10,762	1,374	33	4	2,257	642	7	2
Cottontail rabbit	29,331	2,169	52	3	10,153	1,339	18	2	14,765	1,601	26	3	1,816	577	3	1
Snowshoe hare	2,363	654	19	5	4,615	913	38	6	4,477	893	37	6	688	356	6	3
Squirrels	32,280	2,269	45	3	18,044	1,750	25	2	18,198	1,763	25	2	3,580	807	5	1
American crow	7,112	1,129	57	6	1,912	592	15	4	2,354	656	19	5	1,128	455	9	3
Coyote	21,786	1,913	63	4	3,878	840	11	2	8,100	1,199	23	3	784	380	2	1
Combined	47,992	2,667	31	2	37,277	2,406	24	1	61,308	2,887	40	2	7,314	1,145	5	1

Table 9. Estimated number of days of hunting effort on private and public lands during the 2011 small game hunting season in Michigan, summarized by species.<sup>a</sup>

Species	Land type							
	Private lands		Public lands		Both private and public lands		Unknown	
	Total	95% CL	Total	95% CL	Total	95% CL	Total	95% CL
Ring-necked pheasant	46,515	8,151	27,121	9,066	21,150	6,310	5,836	3,665
Northern bobwhite quail	687	700	49	95	0	0	98	190
Ruffed grouse	76,646	12,591	249,208	30,790	236,418	27,661	16,899	6,961
American woodcock	21,733	5,974	94,897	16,733	73,450	16,222	17,215	6,777
Cottontail rabbit	156,436	21,557	88,515	27,659	105,942	24,715	11,477	6,908
Snowshoe hare	13,323	9,243	25,732	9,785	48,533	19,933	5,352	3,677
Squirrels	179,078	22,316	141,573	25,861	145,055	37,952	19,877	7,272
American crow	26,839	7,369	12,677	6,891	9,564	4,649	3,679	2,625
Coyote	157,477	47,152	27,430	9,994	65,366	29,284	6,420	4,446

<sup>a</sup>People that hunted small game on both private and public lands were not asked to record the amount of effort separately for each land type; thus, it was not possible to estimate the total amount or proportion of effort devoted to either private or public lands separately.



Table 10. Level of satisfaction among active small game hunters (% of hunters) with the 2011 small game hunting season in Michigan.<sup>a</sup>

Index used to measure season satisfaction	Level of satisfaction									
	Very satisfied		Somewhat satisfied		Neutral		Somewhat dissatisfied		Very dissatisfied	
	%	95% CL	%	95% CL	%	95% CL	%	95% CL	%	95% CL
Small game seen	13	1	29	2	20	1	22	1	16	1
Small game harvested	10	1	23	2	25	2	21	1	21	1
Length of season	35	2	26	2	28	2	6	1	4	1
Overall experience	28	2	35	2	19	1	11	1	6	1

<sup>a</sup>Analyses limited to small game license buyers that actually hunted in 2011 and indicated a level of satisfaction.

Table 11. Estimated number of Michigan woodcock hunters, woodcock harvested, and hunting effort (days afield) among people that registered with the Harvest Information Program, 2011.<sup>a</sup>

Variable	No.	95% CL
Hunters	28,323	2,136
Days afield (effort)	178,847	23,338
Harvest	86,946	14,041

<sup>a</sup>Analyses limited to people that registered with HIP and hunted woodcock.

Table 12. Estimated number of Michigan hunters and hunting effort (days afield) among people that hunted on Habitat Access Program lands, 2011.

Variable	No.	95% CL
Hunters	2,698	701
Days afield (effort)	9,663	3,449
Mean days afield per hunter	3.6	0.9

Table 13. Level of satisfaction among active small game hunters (% of hunters) with the Mi-Hunt internet application.<sup>a</sup>

Index used to measure satisfaction	Level of satisfaction													
	Very satisfied		Somewhat satisfied		Neutral		Somewhat dissatisfied		Strongly dissatisfied		Not applicable		No answer	
	95%		95%		95%		95%		95%		95%		95%	
	%	CL	%	CL	%	CL	%	CL	%	CL	%	CL	%	CL
Ease of use	31	7	42	7	16	6	7	4	2	2	1	2	1	1
Quality of maps	35	7	39	7	16	6	6	4	1	2	2	2	1	1
Accuracy of information	36	7	35	7	21	6	4	3	2	2	1	1	1	2

<sup>a</sup>Analyses limited to small game license buyers that had used the Mi-Hunt internet application and had hunted in 2011 (8,100 ± 1,204 small game hunters).

Table 14. Level of satisfaction among active small game hunters (total number of hunters) with the Mi-Hunt internet application.<sup>a</sup>

Index used to measure satisfaction	Level of satisfaction													
	Very satisfied		Somewhat satisfied		Neutral		Somewhat dissatisfied		Strongly dissatisfied		Not applicable		No answer	
	95%		95%		95%		95%		95%		95%		95%	
	Total	CL	Total	CL	Total	CL	Total	CL	Total	CL	Total	CL	Total	CL
Ease of use	2,503	677	3,436	791	1,277	485	589	329	147	165	98	135	49	95
Quality of maps	2,846	721	3,144	758	1,325	493	490	300	98	135	147	165	49	95
Accuracy of information	2,895	727	2,849	722	1,718	561	343	251	147	165	49	95	98	135

<sup>a</sup>Analyses limited to small game license buyers that had used the Mi-Hunt internet application and had hunted in 2011 (8,100 ± 1,204 small game hunters).

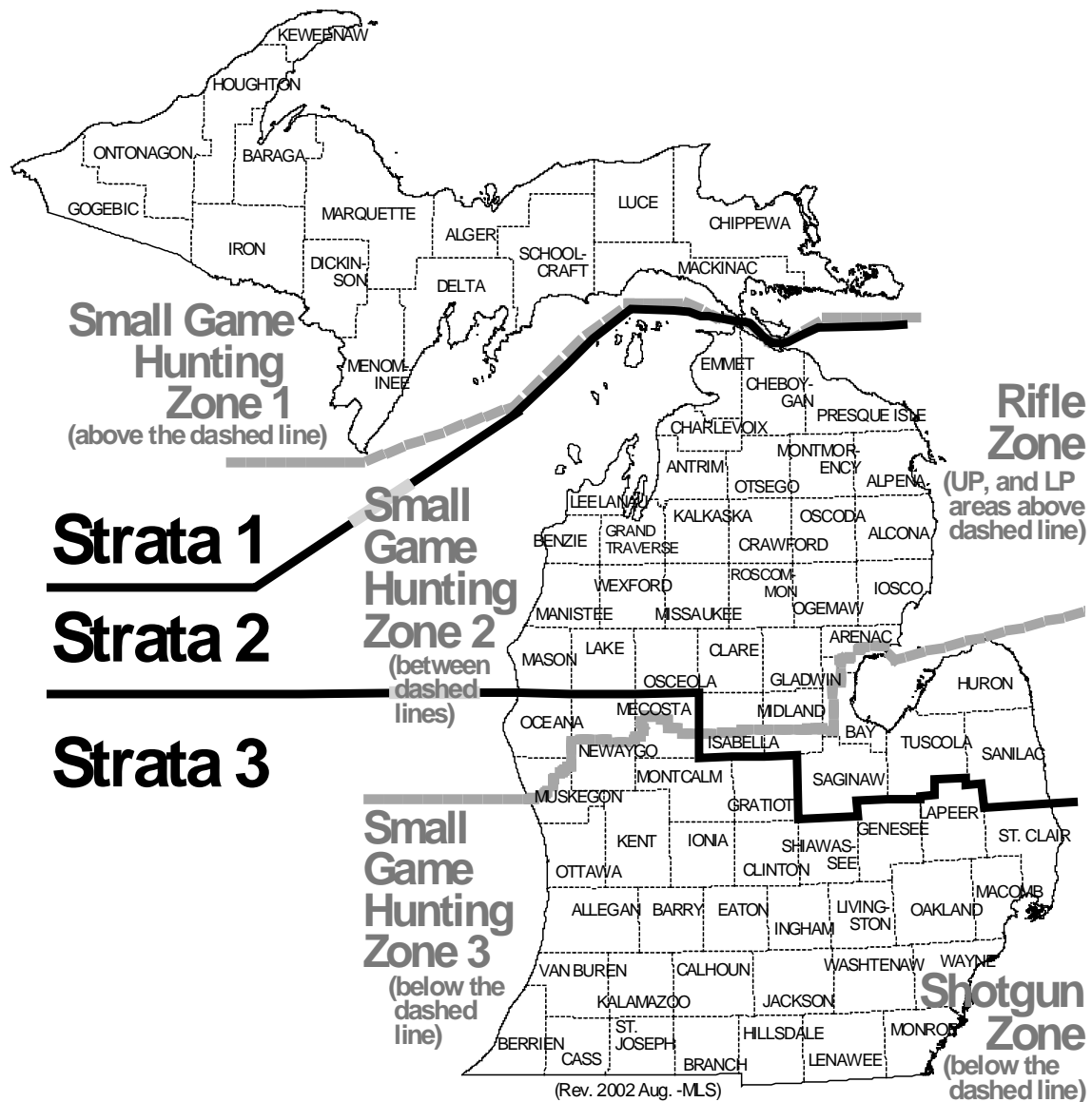


Figure 1. Areas (strata) used to summarize the survey data (top). Stratum boundaries did not match the small game management hunting zones.

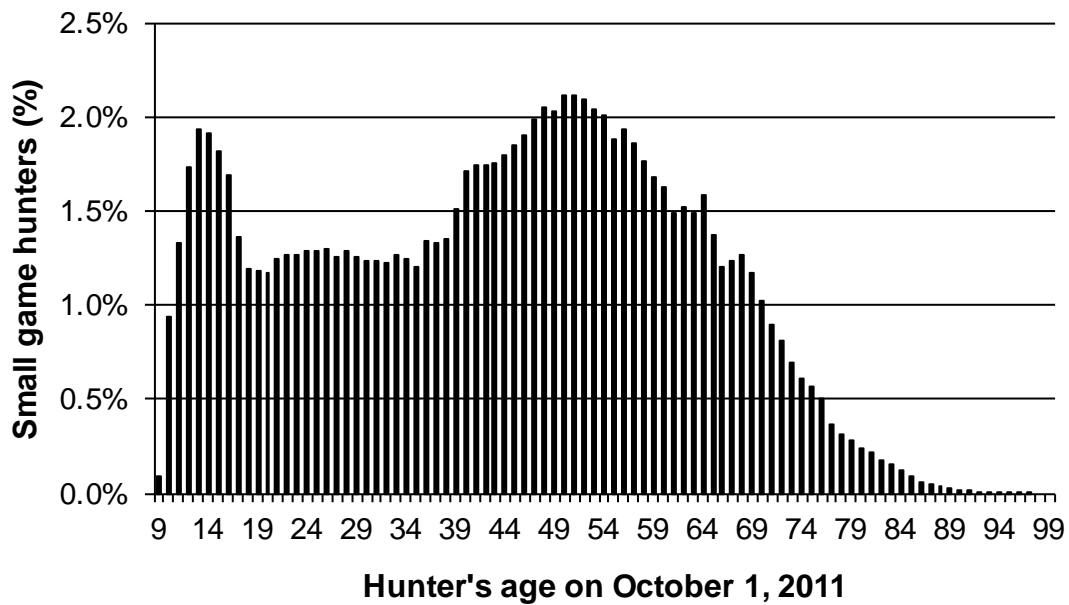


Figure 2. Age of people that purchased a small game hunting license in Michigan for the 2011 hunting seasons ( $\bar{x}$  = 43 years).

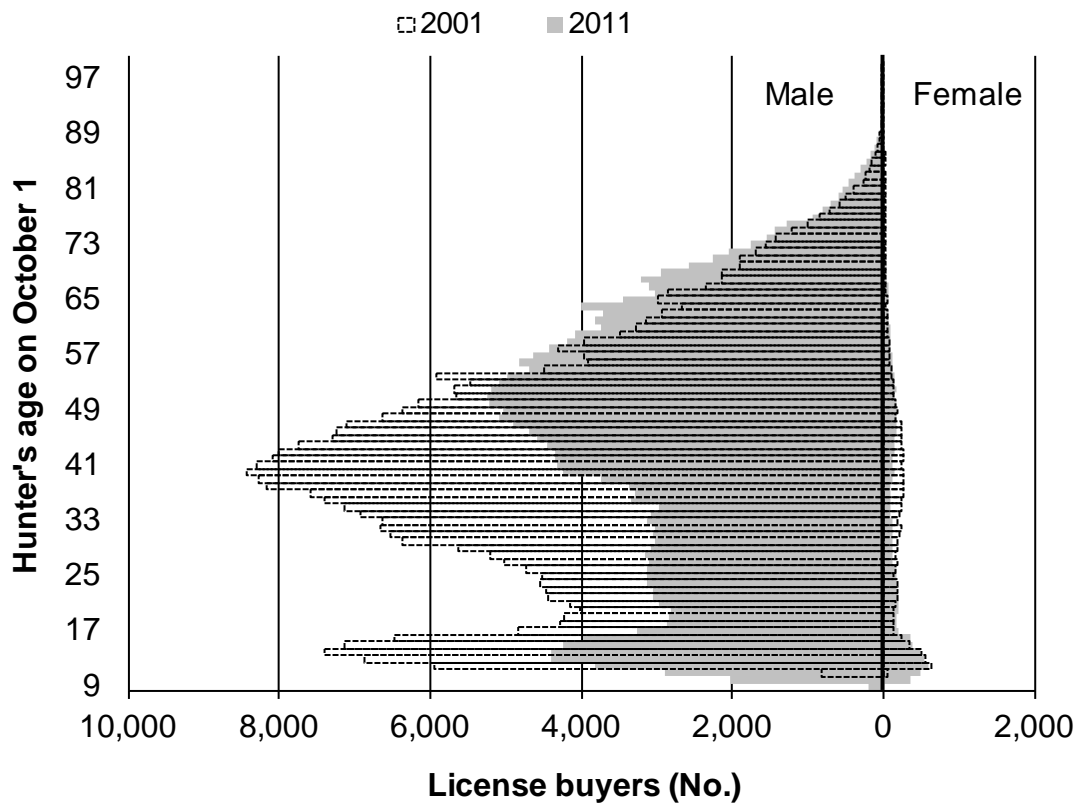


Figure 3. Number of small game hunting license buyers in Michigan by age and sex during 2001 and 2011 hunting seasons. The number of people buying a license was 347,429 in 2001 and 256,184 in 2011.

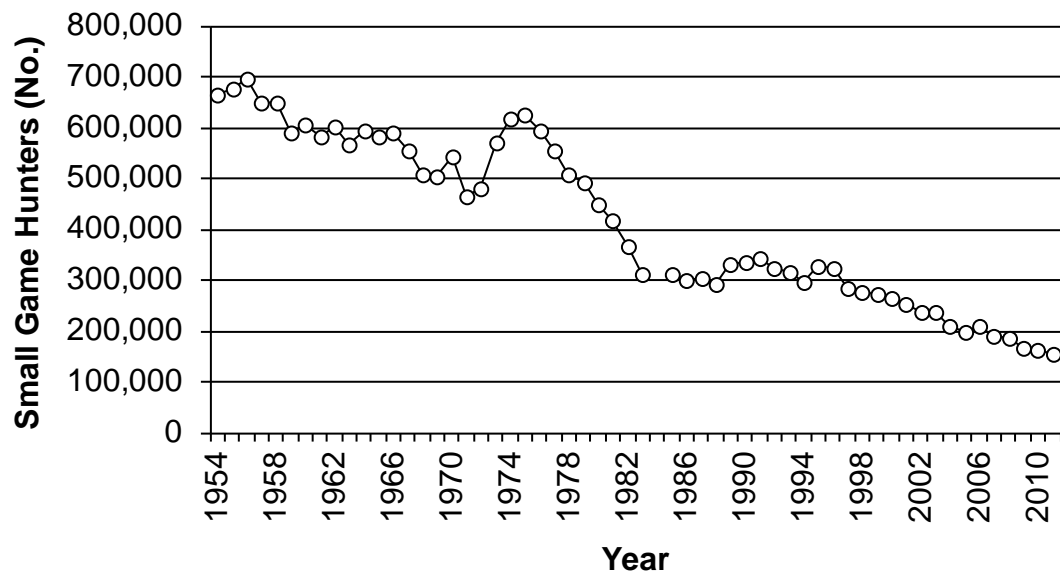


Figure 4. Estimated number of small game hunters in Michigan, 1954-2011 (estimate of the number of people that went afield). No estimate was available for 1984.

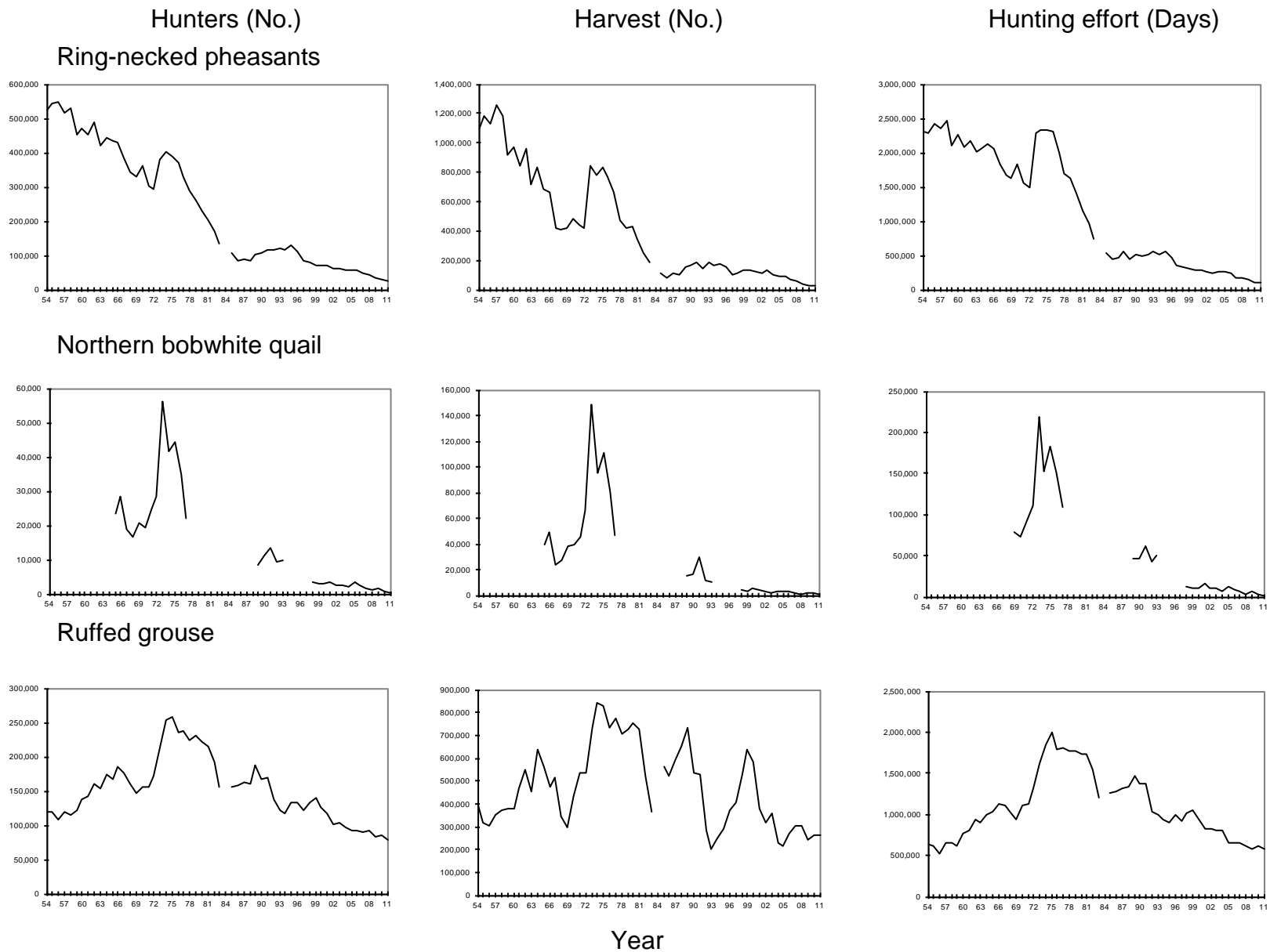


Figure 5. Estimated number of hunters, harvest, and hunting effort in Michigan during the small game hunting seasons, 1954-2011. No estimates were available or no seasons existed during years when no data are plotted.

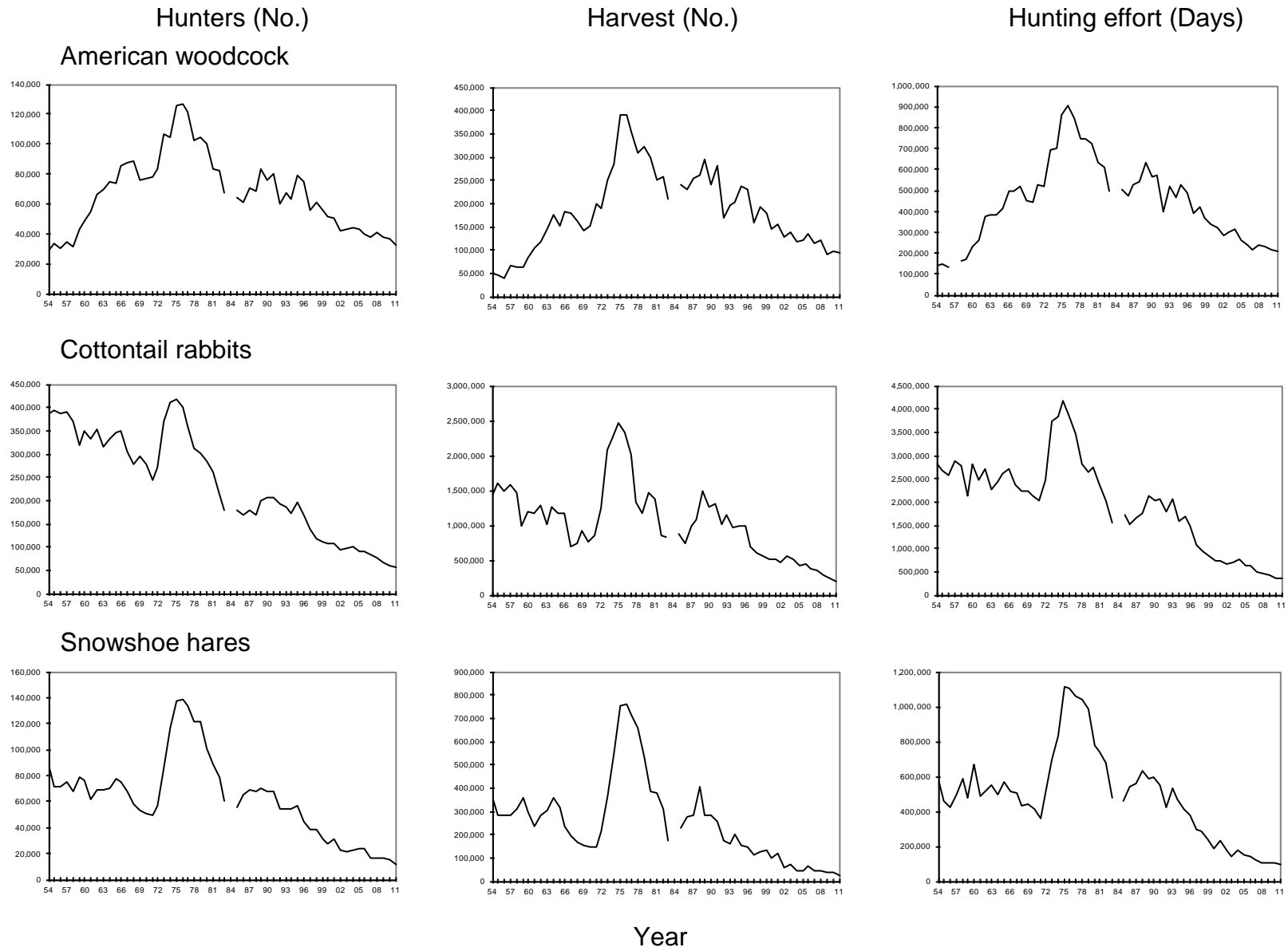


Figure 5 (continued). Estimated number of hunters, harvest, and hunting effort in Michigan during the small game hunting seasons, 1954-2011. No estimates were available or no seasons existed during years when no data are plotted.



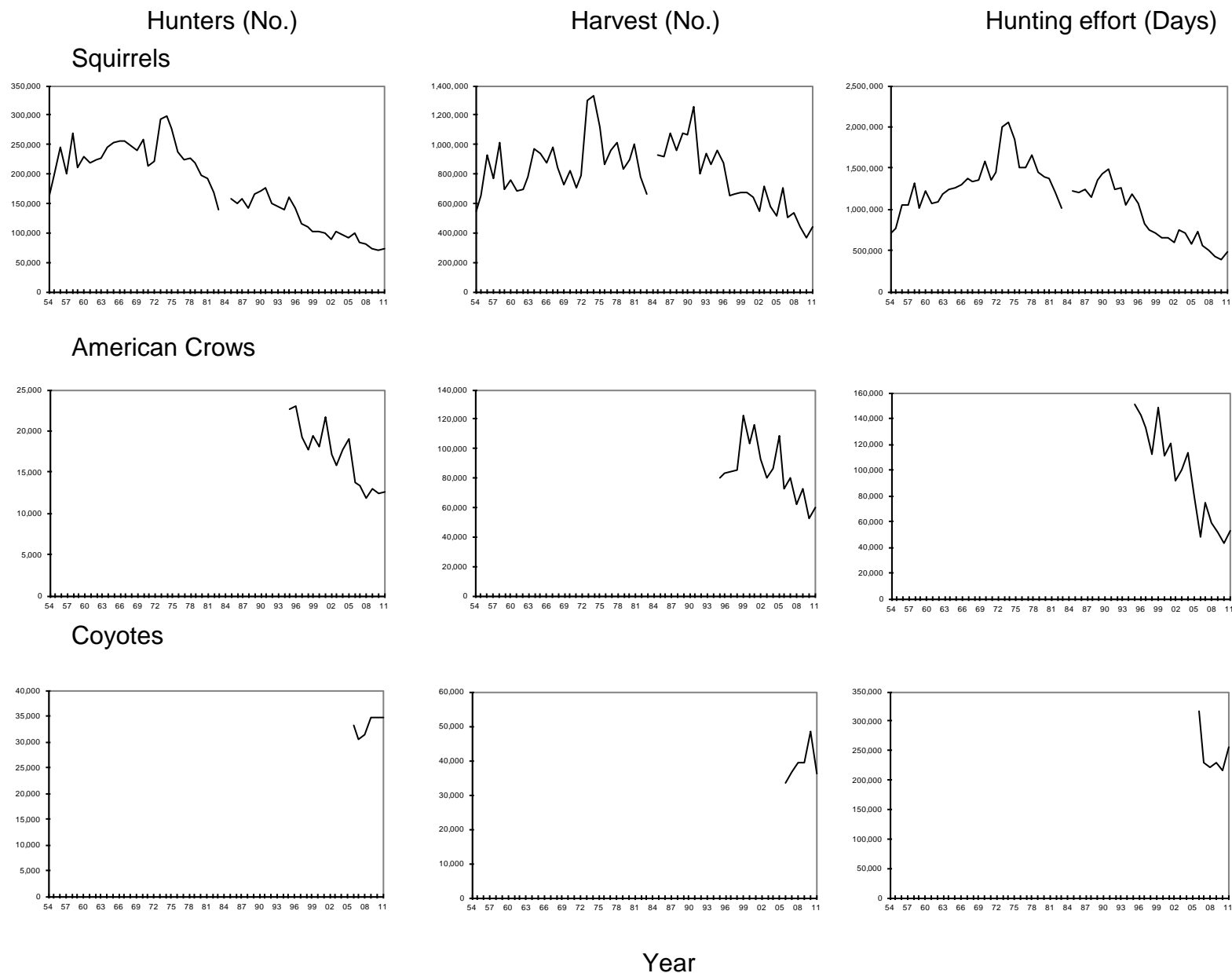


Figure 5. (continued) Estimated number of hunters, harvest, and hunting effort in Michigan during the small game hunting seasons, 1954-2011. No estimates were available or no seasons existed during years when no data are plotted.

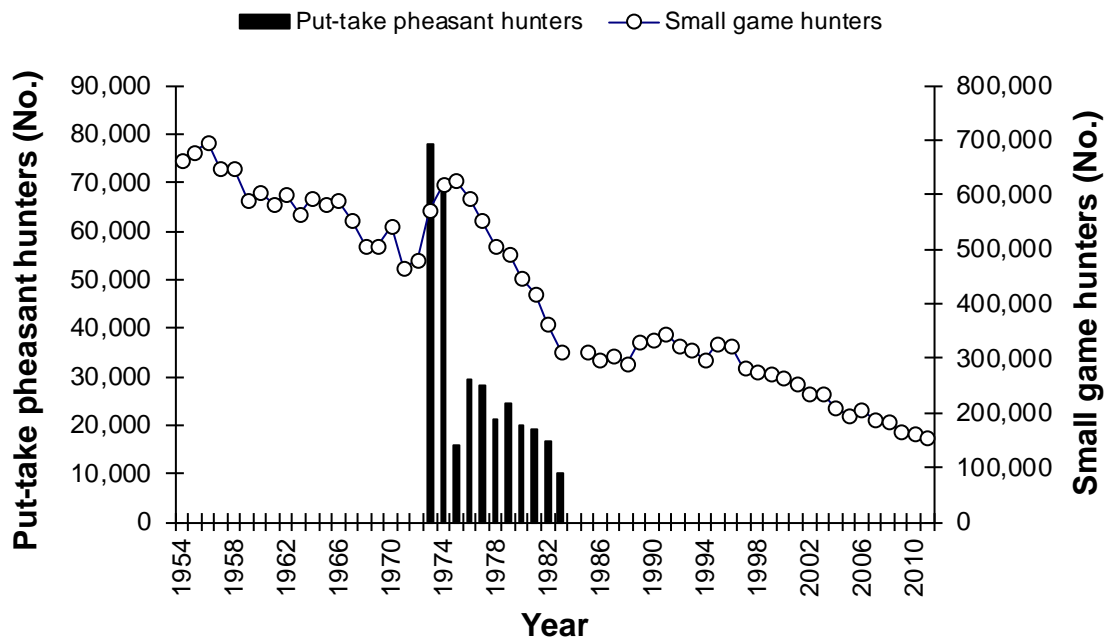


Figure 6. Estimated number of small game hunters in Michigan, 1954-2011 (estimate of the number of people that went afield) and number of people participating in put-take pheasant hunts (1973-1983). The numbers of put-take pheasant hunters were estimated for 1973-1974 (Janson 1975, Janson and Anderson 1976), while numbers of hunters during 1975-1983 were tallies of annual put-take permits sold (DNR, unpublished data). Thus, the estimates of put-take hunters during 1973-1975 and 1976-1983 periods are not directly comparable. No estimates of small game hunters or put-take pheasant hunters were available for 1984.

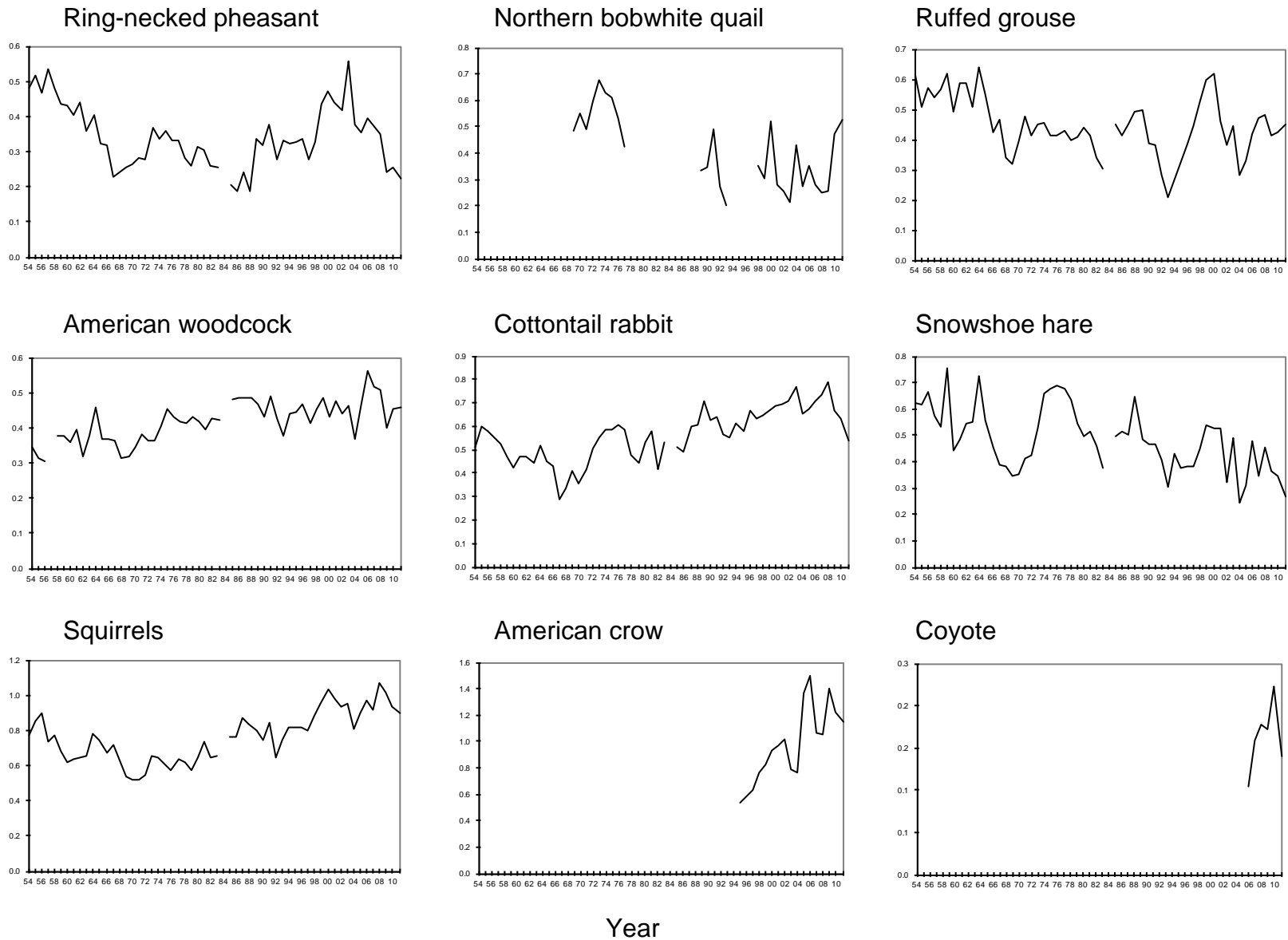


Figure 7. Estimated harvest per effort in Michigan during the small game hunting seasons, 1954-2011. No estimates were available or no seasons existed during years when no data are plotted.

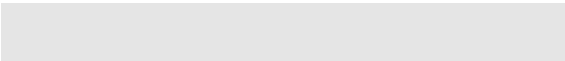
## Appendix A

### 2011-2012 Small Game Harvest Questionnaire



2011-2012 UPLAND GAME HARVEST REPORT

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



*It is important that you complete and return this questionnaire even if you did not hunt or harvest any animals. Report only **your** hunting activities and the animals that **you** harvested. Do not report any game taken on a licensed shooting preserve.*

1. Did you attempt to hunt upland small game species in Michigan during 2011-12?

- <sup>1</sup> ☐ Yes. Please complete the table below.  
<sup>2</sup> ☐ No. Skip to Question #3.

SPECIES (Check box if you hunted during the season.)	COUNTY HUNTED (List the counties hunted on separate lines.)	NUMBER OF DAYS HUNTED (Include all days hunted, even if you did not harvest anything.)	TYPE OF LAND	NUMBER OF ANIMALS TAKEN
<sup>0</sup> <input checked="" type="checkbox"/> Example	1 Jackson	5	<sup>1</sup> <input checked="" type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	12
<sup>1</sup> <input type="checkbox"/> Pheasant (Do not count birds taken on a licensed shooting preserve)	1		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	2		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	3		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	4		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
<sup>2</sup> <input type="checkbox"/> Ruffed Grouse	1		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	2		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	3		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	4		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
<sup>3</sup> <input type="checkbox"/> Woodcock	1		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	2		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	3		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	4		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
<sup>4</sup> <input type="checkbox"/> Cottontail Rabbit	1		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	2		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	3		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	4		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
<sup>5</sup> <input type="checkbox"/> Snowshoe Hare	1		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	2		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	3		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	4		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
<sup>6</sup> <input type="checkbox"/> Squirrel	1		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	2		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	3		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	4		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
<sup>7</sup> <input type="checkbox"/> Crow	1		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	2		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	3		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	4		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
<sup>8</sup> <input type="checkbox"/> Quail (Portions of the Southern Lower Peninsula)	1		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	2		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	3		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	4		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
<sup>9</sup> <input type="checkbox"/> Coyote	1		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	2		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	3		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	
	4		<sup>1</sup> <input type="checkbox"/> Private <sup>2</sup> <input type="checkbox"/> Public <sup>3</sup> <input type="checkbox"/> Both	

Questions continued on back

2. During the last upland small game hunting season, how satisfied or dissatisfied were you with:

Very Satisfied

Somewhat Satisfied

Neutral

Somewhat Dissatisfied

Very Dissatisfied

a. The amount of small game seen.

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

b. Number of small game harvested.

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

c. Number of days in the hunting season.

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

d. Your overall hunting experience.

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

3. Did you attempt to hunt ducks or geese in Michigan during 2011-12?

1 ☐ Yes

2 ☐ No

4. If you are a youth (*adults skip to question 5*), did you hunt during Michigan's Youth Waterfowl Hunting weekend (September 17-18, 2011)? Eligible youth were 10-15 years old during the youth season.

1 ☐ Yes

2 ☐ No

5. The Michigan Department of Natural Resources leases private lands throughout southern Michigan for public hunting through the Hunting Access Program (HAP). In 2011, the DNR leased about 50 properties totaling about 7,800 acres. Did you hunt small game on any HAP property in 2011-12?

1 ☐ Yes

2 ☐ No. Skip to Question #6.

5a. If you hunted small game on a HAP property in 2011-12, how many days did you hunt on HAP properties?

DAYS HUNTED

5b. If you hunted small game on a HAP property in 2011-12, which county was each HAP property located?

COUNTIES HUNTED

6. The Michigan Department of Natural Resources developed an internet-based application called Mi-HUNT that can be used to locate hunting, trapping, boating or camping sites. Did you use Mi-HUNT to help locate a hunting area in 2011-12?

1 ☐ Yes

2 ☐ No. Skip the remaining questions.

7. If you used Mi-HUNT to select an area for your 2011-12 small game hunts, please indicate how satisfied or dissatisfied you were with the following features of Mi-HUNT:  
(Select one choice per item.)

Very Satisfied

Somewhat Satisfied

Neutral

Somewhat Dissatisfied

Strongly Dissatisfied

Not Applicable

a. Ease of use.

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

6 ☐

b. Quality of maps.

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

6 ☐

c. Accuracy of information.

1 ☐

2 ☐

3 ☐

4 ☐

5 ☐

6 ☐

8. How did Mi-HUNT affect the quality of your small game hunting experience in 2011-12?

1 ☐ Greatly improved quality of hunt

2 ☐ Improved quality of hunt

3 ☐ Not Sure

4 ☐ Decreased quality of hunt

5 ☐ Greatly decreased quality of hunt

Please return questionnaire in the enclosed postage-paid envelope.  
Thank you for your help!

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