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2010 SMALL GAME HARVEST SURVEY

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Abstract

A survey was completed to estimate the number of people hunting small game, their days afield, and harvest during the 2010-2011 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 potential hunting areas. In 2010, 261,050 people purchased small game hunting licenses, a decrease of about 2% from 2009. An estimated 161,800 people actually hunted small game species in 2010, which was not significantly different from 2009. Small game hunters most often sought ruffed grouse, squirrels, and cottontail rabbits. The number of hunters pursuing quail, ruffed grouse, woodcock, snowshoe hare, squirrel, crow, and coyote did not change significantly between 2010 and 2009; however, fewer hunters sought pheasant (-19%) and rabbit (-12%). Hunting effort and harvest did not change significantly for any species between 2009 and 2010, except for hunting effort for pheasants which declined 28%. Compared to 2009, a similar proportion of small game hunters in 2010 were satisfied with their overall small game hunting experience, small game seen, and small game harvested. In 2010, 92% of migratory bird hunters registered with HIP. In 2010, an estimated 3,543 hunters spent 14,375 days afield hunting small game on HAP lands. In 2010, an estimated 7,581 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 (74%), the quality of maps (69%), and the accuracy of information (69%) 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 managing 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 other indices of abundance, 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 2011a). 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). Coyotes also may be taken without a license on private property by a property owner or their designee if they are doing or about to do damage on their property. 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 2010 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 potential hunting areas.

METHODS

Following the 2010 small game hunting seasons, a questionnaire (Appendix A) was sent to 9,996 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 1,233 people from the UP stratum (N= 31,659), 2,337 people from the NLP stratum (N= 61,671), 6,011 from the SLP stratum (N= 156,537), and 415 people from the nonresident and unknown residency stratum (N=11,183). 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 effort and harvest estimated from known locations.

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 236 people, primarily because of changes in residence. Questionnaires were returned by 5,315 people, yielding a 54% adjusted response rate.

RESULTS AND DISCUSSION

License sales and hunter participation

In 2010, 261,050 people purchased small game hunting licenses, a decrease of about 2% from 2009 (Table 2). About $62 \pm 1\%$ of the licensees actually hunted in 2010 (Tables 2 and 3), which was the same proportion reported in 2009. An estimated 161,800 people actually hunted small game species in 2010 (excluded people hunting waterfowl only), which was not significantly different from 2009 (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 2010, the average age of small game license buyers was 43 years (Figure 2). Nearly 11% (29,708) of the license buyers were younger than 17 years old.

Harvest and hunting trends

The number of hunters pursuing quail, ruffed grouse, woodcock, snowshoe hare, squirrel, crow, and coyote did not change significantly between 2010 and 2009; however, fewer hunters sought pheasant (-19%) and rabbit (-12%, Table 4). Hunting effort did not change significantly for any species between 2009 and 2010, except for pheasant which declined

28% (Table 5). Furthermore, harvest did not change significantly for any species between 2009 and 2010 (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 2010, an estimated 34,732 small game hunters pursued coyotes (Tables 4 and 7). About 78% of these hunters possessed only a small game hunting license (Table 7), and they were responsible for 74% of the coyotes taken by all small game license holders.

The number of small game hunters in Michigan has declined about 75% since the mid-1950s and is currently at a record low (Figure 3). 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 4). 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 (-80%), and squirrels (-65%, Figure 4). 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 5). 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 often 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 4). 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 Parker 2011). 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 2010 appeared to be increasing after reaching the low in the present cycle during 2004-2005 (Frawley and Stewart 2010). Hunter numbers and the number of grouse harvested have generally followed a similar cyclic pattern.

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 6). For example, hunting efficiency has been high among hunters despite declining numbers of quail and woodcock. Currently, hunters

pursuing grouse, woodcock, rabbit, and squirrels have been expending less effort per animal harvested than in the previous years.

About 31% of the small game hunters in Michigan hunted on private lands only, 25% hunted on public lands only, and 39% hunted on both private and public lands (Table 8). Private lands served as the primary area for hunters pursuing pheasants, quail, cottontail rabbits, 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 2009 (Frawley 2011a), a similar proportion of small game hunters in 2010 were satisfied with their overall small game hunting experience (58% in 2010 versus 59% satisfied in 2009, Table 10). Moreover, similar proportions of small game hunters were satisfied with the amount of small game seen (40% versus 37%) and small game harvested (28% versus 29%).

Migratory bird hunters and Harvest Information Program (HIP) compliance

An estimated $76,869 \pm 3,168$ small game hunters hunted migratory birds (waterfowl and woodcock combined) in Michigan during 2010, compared to $81,573 \pm 3,168$ in 2009. An estimated $49,205 \pm 2,709$ hunters pursued waterfowl, and $36,451 \pm 2,379$ hunters pursued woodcock in 2010. The number of waterfowl and woodcock hunters combined in 2010 was not statistically different from the estimate in 2009.

In 2010, $92 \pm 1\%$ of migratory bird hunters had registered with HIP. About $97 \pm 1\%$ of the waterfowl hunters and $85 \pm 3\%$ of the woodcock hunters had registered with HIP. Compliance among hunters was unchanged from the rate of compliance in 2009 (Frawley 2011a). Hunters registered with HIP were responsible for about 95% of the woodcock taken and 89% of the woodcock hunting trips done in 2010 (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 (2011) reported estimates of harvest, hunter numbers, and hunting effort of Michigan woodcock hunters in 2010 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 $31,100 \pm 4,400$ hunters went afield $159,200 \pm 30,200$ days and harvested $93,200 \pm 19,600$ woodcock. Estimates reported by Cooper and Parker of hunter number and 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.

The USFWS conducted a survey of HIP registrants and estimated $43,200 \pm 3,900$ people hunted waterfowl in Michigan in 2010 (Raftovich et. al. 2011). The estimated number of waterfowl hunters derived from the current survey (47,788) was not significantly different from the USFWS estimate.

Frawley (2011b) estimated $47,788 \pm 1,084$ waterfowl hunters in Michigan during 2010 from the waterfowl harvest survey. In contrast, this current survey estimated $49,205 \pm 2,709$ 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. Despite the differences in survey populations, the estimates of waterfowl hunters from the two surveys were not significantly different.

An estimated $2,902 \pm 728$ youth hunters (10-15 years old) participated during the 2-day youth waterfowl hunting season (September 18-19), which was not significantly different from the number of participants in 2009 ($2,659 \pm 693$). About $14 \pm 3\%$ 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). In 2010, an estimated 3,543 hunters spent 14,375 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 2010, an estimated $7,581 \pm 1,167$ 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 ($74 \pm 7\%$), the quality of maps ($69 \pm 7\%$), and the accuracy of information ($69 \pm 7\%$) from Mi-Hunt (Tables 13 and 14). Although most hunters that used Mi-Hunt were satisfied with it, most ($64 \pm 8\%$) of these hunters also were uncertain whether Mi-Hunt had affected the quality of their small game hunting experience. In contrast, $30 \pm 7\%$ 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 3% of hunters did not provide an answer.

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Table 1. Small game hunting seasons in Michigan, 2010-2011.

Species, season, and area ^a	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. 25 – Nov. 8
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

^aSee Figure 1 for boundaries of hunt areas.

Table 2. Number of small game hunting licenses sold in Michigan, 2006-2010.

Item	Year					2009-2010 % Change
	2006	2007	2008	2009	2010	
Number of licenses sold ^a	300,099	298,685	277,215	270,594	265,060	-2
Number of people buying a hunting license ^b	295,369	293,662	273,243	266,549	261,050	-2

^aThe number of licenses sold is higher than the number of people buying licenses because some people purchased multiple licenses.

^bA 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, 2006-2010.^a

Variable	2006	2007	2008	2009	2010	
					Estimate	95% CL
Hunters ^b	207,981	188,297	184,474	166,068	161,800	3,339
Males (%)	97.1	95.9	96.4	96.6	96.9	0.6
Females (%)	2.9	3.7	3.6	3.4	3.1	0.6
Age (Years) ^c	43.2	43.8	44.7	44.9	46.1	0.6

^aAnalyses included only those people that hunted.

^bPeople that hunted American crow, American woodcock, cottontail rabbit, coyote, northern bobwhite quail, ring-necked pheasant, ruffed grouse, snowshoe hare, or squirrels.

^cMean 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, 2007-2010.^a

Species and region	2007	2008	2009	2010		2009-10 % Change
				No.	95% CL	
Ring-necked pheasant ^b						
UP	2,019	2,378	2,226	1,670	537	-25
NLP	16,331	15,290	11,762	9,975	1,296	-15
SLP	30,218	27,795	22,057	17,483	1,681	-21*
Statewide	45,669	43,144	34,014	27,450	2,121	-19*
Northern bobwhite quail						
NLP	279	4	166	0	0	-100*
SLP	1,455	1,052	1,352	838	344	-38
Statewide	1,578	1,056	1,373	838	394	-39
Ruffed grouse						
UP	38,677	39,356	36,518	39,291	1,930	8
NLP	45,127	46,730	43,561	43,536	2,474	0
SLP	11,138	11,200	9,578	9,137	1,248	-5
Statewide	88,727	91,417	82,818	85,327	2,998	3
American woodcock						
UP	9,695	11,068	11,371	9,980	1,266	-12
NLP	24,418	26,154	23,969	23,559	1,923	-2
SLP	6,875	7,271	5,748	6,110	1,024	6
Statewide	37,875	41,052	37,693	36,451	2,379	-3
Cottontail rabbit						
UP	4,158	3,976	3,875	3,477	759	-10
NLP	22,682	23,309	19,187	18,876	1,701	-2
SLP	59,602	52,642	49,098	41,328	2,378	-16*
Statewide	82,647	75,455	67,883	60,031	2,881	-12*
Snowshoe hare						
UP	8,911	7,726	8,780	7,972	1,133	-9
NLP	6,739	7,678	7,172	6,093	1,018	-15
SLP	1,412	1,599	1,198	1,445	506	21
Statewide	16,593	16,507	16,387	15,214	1,606	-7
Squirrels						
UP	6,329	5,596	4,563	4,782	879	5
NLP	32,967	33,009	29,341	29,602	2,071	1
SLP	48,435	47,771	43,698	40,336	2,347	-8
Statewide	83,487	81,736	73,016	69,784	3,040	-4
American crows						
UP	1,079	1,177	1,653	1,099	436	-33
NLP	4,859	4,336	4,334	4,500	879	4
SLP	7,924	6,746	7,486	7,348	1,127	-2
Statewide	13,379	11,812	12,944	12,453	1,480	-4
Coyote						
UP	3,168	3,875	4,310	5,689	951	32
NLP	12,563	12,783	13,930	14,857	1,541	7
SLP	16,627	16,718	18,164	16,260	1,620	-10
Statewide	30,369	31,289	34,656	34,732	2,354	0

^aThe number of hunters does not add up to the statewide total because hunters can hunt in more than one region.^bIncluded 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, 2007-2010.

Species and region	2007	2008	2009	2010		2009-10 % Change
				No.	95% CL	
Ring-necked pheasant ^a						
UP	11,024	13,411	10,658	9,699	6,223	-9
NLP	57,056	58,064	45,250	33,238	6,767	-27
SLP	109,096	108,718	92,285	63,892	9,693	-31*
Statewide	177,176	180,193	148,194	106,829	14,148	-28*
Northern bobwhite quail						
NLP	2,048	7	698	0	0	-100
SLP	3,663	3,422	5,084	3,034	2,466	-40
Statewide	5,711	3,428	5,781	3,034	2,468	-48
Ruffed grouse						
UP	335,400	325,116	299,237	311,693	27,989	4
NLP	238,393	244,730	238,137	255,379	26,802	7
SLP	72,843	54,329	45,508	48,557	11,460	7
Statewide	646,636	624,175	582,881	615,628	41,513	6
American woodcock						
UP	70,993	58,633	76,358	49,045	10,759	-36*
NLP	121,955	144,577	125,296	136,178	21,070	9
SLP	26,290	36,142	26,085	27,601	8,797	6
Statewide	219,238	239,352	227,738	212,824	26,144	-7
Cottontail rabbit						
UP	31,356	22,994	22,782	19,718	7,546	-13
NLP	103,912	122,123	107,926	112,693	19,765	4
SLP	364,908	306,463	283,916	232,450	32,094	-18
Statewide	500,176	451,580	414,624	364,861	39,407	-12
Snowshoe hare						
UP	77,972	49,280	55,671	50,493	13,643	-9
NLP	37,577	41,400	41,325	47,881	16,449	16
SLP	6,861	9,881	6,847	4,316	2,657	-37
Statewide	122,409	100,561	103,843	102,690	22,122	-1
Squirrels						
UP	56,052	39,009	36,782	36,539	13,845	-1
NLP	171,061	168,707	158,726	151,028	20,606	-5
SLP	323,983	297,621	236,550	207,814	25,559	-12
Statewide	551,097	505,337	432,058	395,380	36,244	-8
American crow						
UP	6,477	5,938	7,506	2,379	1,575	-68
NLP	31,143	20,098	16,187	14,605	5,060	-10
SLP	37,229	32,444	27,893	25,582	6,820	-8
Statewide	74,850	58,480	51,586	42,566	8,932	-17
Coyote						
UP	20,885	19,053	32,567	37,743	14,464	16
NLP	86,395	90,332	96,224	88,133	22,474	-8
SLP	121,267	112,024	99,300	91,344	18,751	-8
Statewide	228,547	221,409	228,092	217,220	33,728	-5

^aIncluded 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, 2007-2010.

Species and region	2007	2008	2009	2010		2009-10 % Change
				No.	95% CL	
Ring-necked pheasant ^a						
UP	3,765	4,796	2,991	2,059	1,346	-31
NLP	22,317	25,528	12,602	10,268	2,972	-19
SLP	39,736	32,598	20,492	14,898	3,650	-27
Statewide	65,817	62,922	36,085	27,224	5,112	-25
Northern bobwhite quail						
NLP	74	2	357	0	0	-100
SLP	1,511	853	1,116	1,435	1,583	29
Statewide	1,585	854	1,473	1,435	1,609	-3
Ruffed grouse						
UP	193,227	183,804	144,682	161,171	17,732	11
NLP	100,163	106,329	88,936	89,884	14,178	1
SLP	9,667	10,858	7,157	9,151	3,515	28
Statewide	303,057	300,990	240,775	260,207	23,328	8
American woodcock						
UP	31,623	28,699	27,059	18,447	5,421	-32
NLP	72,233	79,190	53,098	68,920	15,080	30
SLP	8,983	13,801	11,087	9,526	5,039	-14
Statewide	112,838	121,690	91,244	96,892	17,161	6
Cottontail rabbit						
UP	8,248	7,818	9,935	4,210	1,832	-58
NLP	58,268	79,068	52,058	56,606	11,392	9
SLP	299,430	269,207	214,118	169,783	22,912	-21
Statewide	365,946	356,093	276,112	230,598	26,859	-16
Snowshoe hare						
UP	29,937	30,892	25,820	22,001	1,106	-15*
NLP	9,530	10,419	9,890	11,766	1,643	19
SLP	2,892	4,491	2,171	1,506	7,728	-31
Statewide	42,360	45,802	37,881	35,273	9,915	-7
Squirrels						
UP	65,161	39,965	34,840	24,505	7,728	-30
NLP	176,428	196,157	172,735	150,067	25,447	-13
SLP	265,225	304,433	232,756	195,734	22,655	-16
Statewide	506,814	540,555	440,330	370,306	35,574	-16
American crow						
UP	7,038	9,178	20,615	3,978	2,733	-81
NLP	37,688	30,032	23,606	15,987	6,163	-32
SLP	35,350	22,471	28,219	32,248	11,661	14
Statewide	80,076	61,681	72,440	52,213	14,317	-28
Coyote						
UP	4,530	2,888	4,386	6,001	2,126	37
NLP	17,567	19,531	16,278	24,209	8,529	49
SLP	14,387	17,035	18,692	18,002	5,438	-4
Statewide	36,485	39,454	39,356	48,212	10,514	23

^aIncluded 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, 2010.^a

Small game hunter group	Hunters		Days afield		Harvest	
	No.	95% CL	No.	95% CL	No.	95% CL
Without fur harvesters license	27,167	2,119	159,991	28,712	35,917	9,625
With fur harvesters license	7,564	1,164	57,229	18,092	12,294	4,326
Combined	34,732	2,354	217,220	33,728	48,212	10,514

^aCoyotes 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 2010 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	15,388	1,632	56	4	4,576	912	17	3	6,107	1,051	0	0	1,379	504	5	2
Northern bobwhite quail	344	252	41	23	198	192	24	20	99	136	12	15	197	191	24	20
Ruffed grouse	15,076	1,611	18	2	35,894	2,339	42	2	30,978	2,102	0	0	3,379	784	4	1
American woodcock	5,398	988	15	3	16,767	1,684	46	4	10,906	1,383	0	0	3,379	784	9	2
Cottontail rabbit	32,016	2,257	53	3	10,233	1,348	17	2	15,318	1,632	26	2	2,463	673	4	1
Snowshoe hare	3,082	745	20	4	5,629	1,006	37	5	5,131	955	34	5	1,372	502	9	3
Squirrels	30,107	2,211	43	3	18,417	1,774	26	2	16,928	1,710	24	2	4,332	888	6	1
American crow	7,731	1,178	62	6	1,525	530	12	4	2,361	658	19	5	837	393	7	3
Coyote	20,736	1,877	60	4	4,036	858	12	2	8,730	1,244	25	3	1,230	476	4	1
Combined	49,433	2,709	31	2	39,904	2,456	25	1	63,619	2,929	39	2	8,844	1,257	5	1

Table 9. Estimated number of days of hunting effort on private and public lands during the 2010 small game hunting season in Michigan, summarized by species.^a

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	57,082	9,900	22,129	5,737	25,301	7,012	2,318	1,221
Northern bobwhite quail	1,549	1,726	1,237	1,731	148	288	99	192
Ruffed grouse	79,968	12,422	262,049	27,718	244,832	27,500	28,779	9,702
American woodcock	20,788	5,165	106,689	19,451	62,134	12,899	23,213	10,185
Cottontail rabbit	179,781	25,623	70,573	15,272	102,899	25,160	11,608	5,376
Snowshoe hare	15,144	6,261	35,489	11,959	40,371	15,141	11,686	8,582
Squirrels	150,272	18,962	119,344	20,396	100,490	21,278	25,274	9,725
American crow	25,776	6,910	5,814	3,354	8,614	4,325	2,362	1,473
Coyote	113,486	21,947	27,692	13,771	70,911	20,625	5,131	3,817

^aPeople 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 2010 small game hunting season in Michigan.^a

Index used to measure season satisfaction	Level of satisfaction									
	Very satisfied		Somewhat satisfied		Neutral		Somewhat dissatisfied		Very dissatisfied	
	95%		95%		95%		95%		95%	
	%	CL	%	CL	%	CL	%	CL	%	CL
Small game seen	12	1	27	2	19	1	23	1	17	1
Small game harvested	9	1	20	1	26	2	22	1	24	1
Length of season	34	2	26	2	30	2	7	1	3	1
Overall experience	26	2	33	2	22	1	12	1	7	1

^aAnalyses limited to small game license buyers that actually hunted in 2010 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, 2010.^a

Variable	No.	95% CL
Hunters	31,157	2,225
Days afield (effort)	190,178	25,339
Harvest	92,120	17,062

^aAnalyses 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, 2010.

Variable	No.	95% CL
Hunters	3,543	804
Days afield (effort)	14,375	4,787
Mean days afield per hunter	4.1	1.0

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

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	34	7	40	8	12	5	6	4	5	3	1	2	3	2
Quality of maps	34	7	35	7	15	6	6	4	4	3	1	2	5	3
Accuracy of information	31	7	38	8	16	6	6	4	3	2	2	2	4	3

^aAnalyses limited to small game license buyers that had used the Mi-Hunt internet application and had hunted in 2010 (7,581 ± 1,167 small game hunters).

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

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	2,613	693	2,998	740	887	405	443	286	345	253	98	135	198	192
Quality of maps	2,560	685	2,657	698	1,133	457	492	302	295	234	98	135	346	254
Accuracy of information	2,362	659	2,906	730	1,228	475	444	287	197	191	148	166	297	235

^aAnalyses limited to small game license buyers that had used the Mi-Hunt internet application and had hunted in 2010 (7,581 ± 1,167 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.

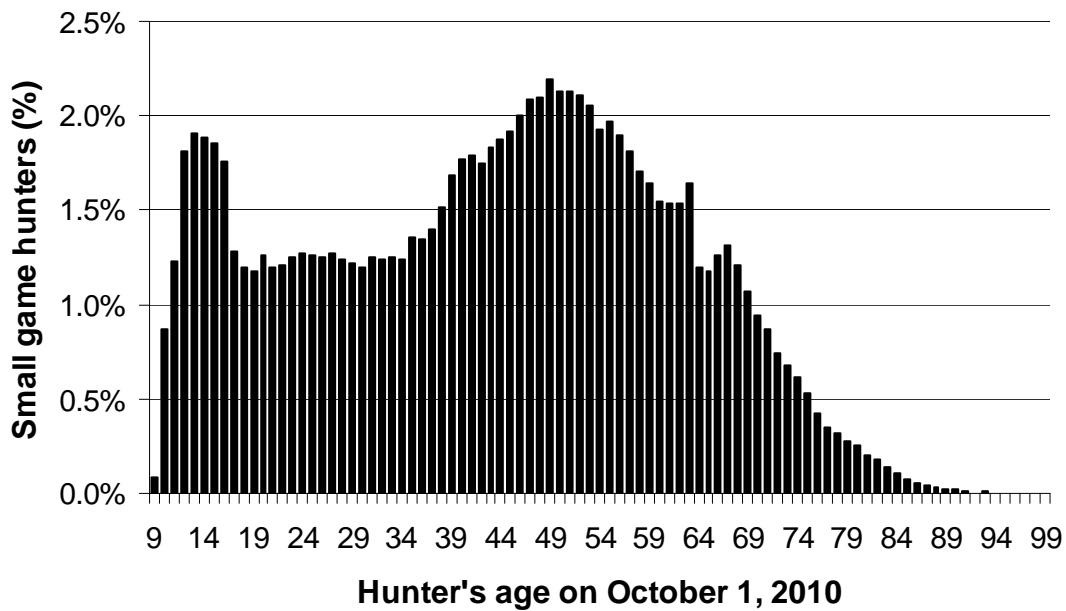


Figure 2. Age of people that purchased a small game hunting license in Michigan for the 2010 hunting seasons ($\bar{x} = 43$ years).



Figure 3. Estimated number of small game hunters in Michigan, 1954-2010 (estimate of the number of people that went afield). No estimate was available for 1984.

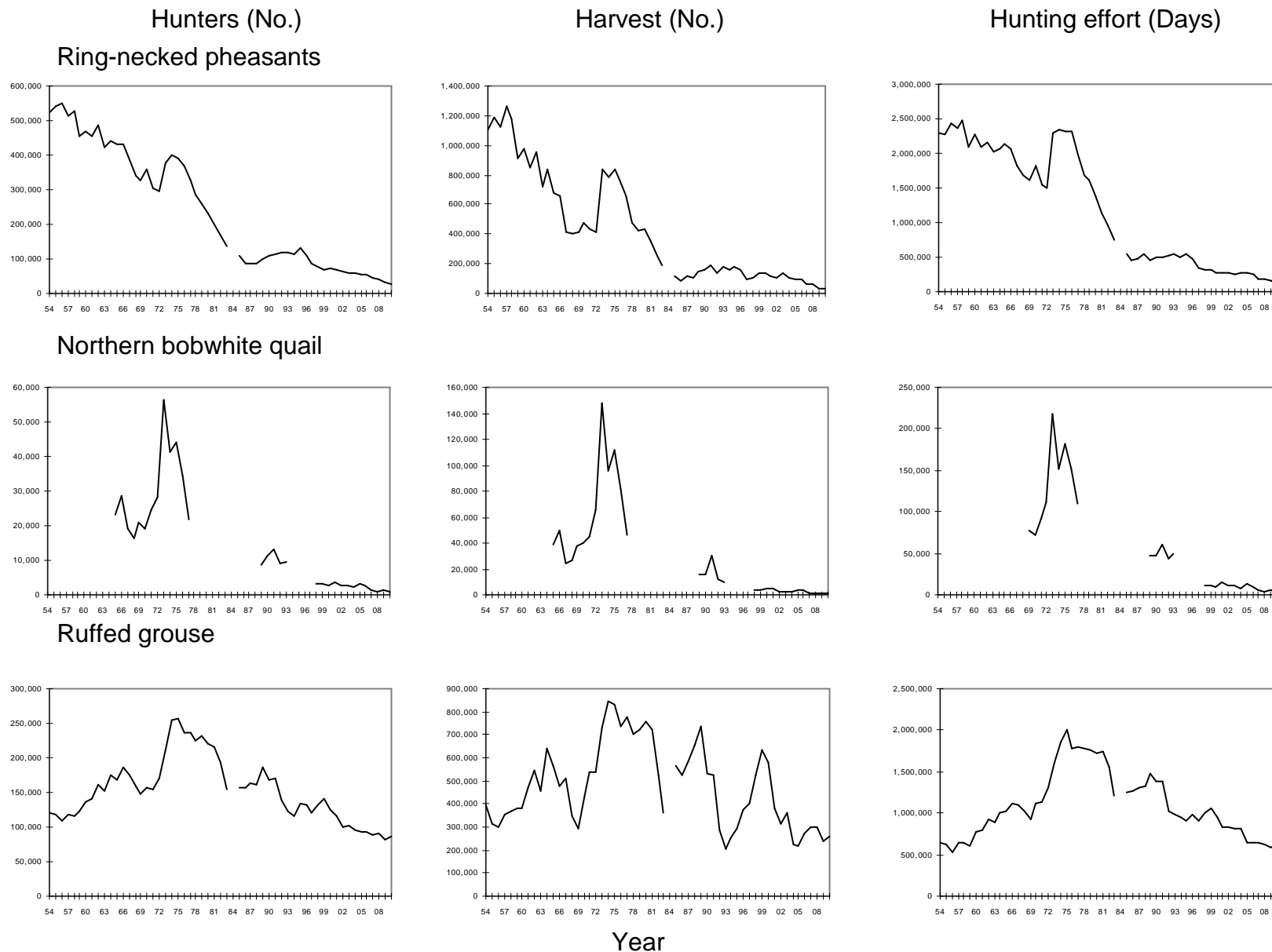


Figure 4. Estimated number of hunters, harvest, and hunting effort in Michigan during the small game hunting seasons, 1954-2010. No estimates were available or no seasons existed during years when no data are plotted.

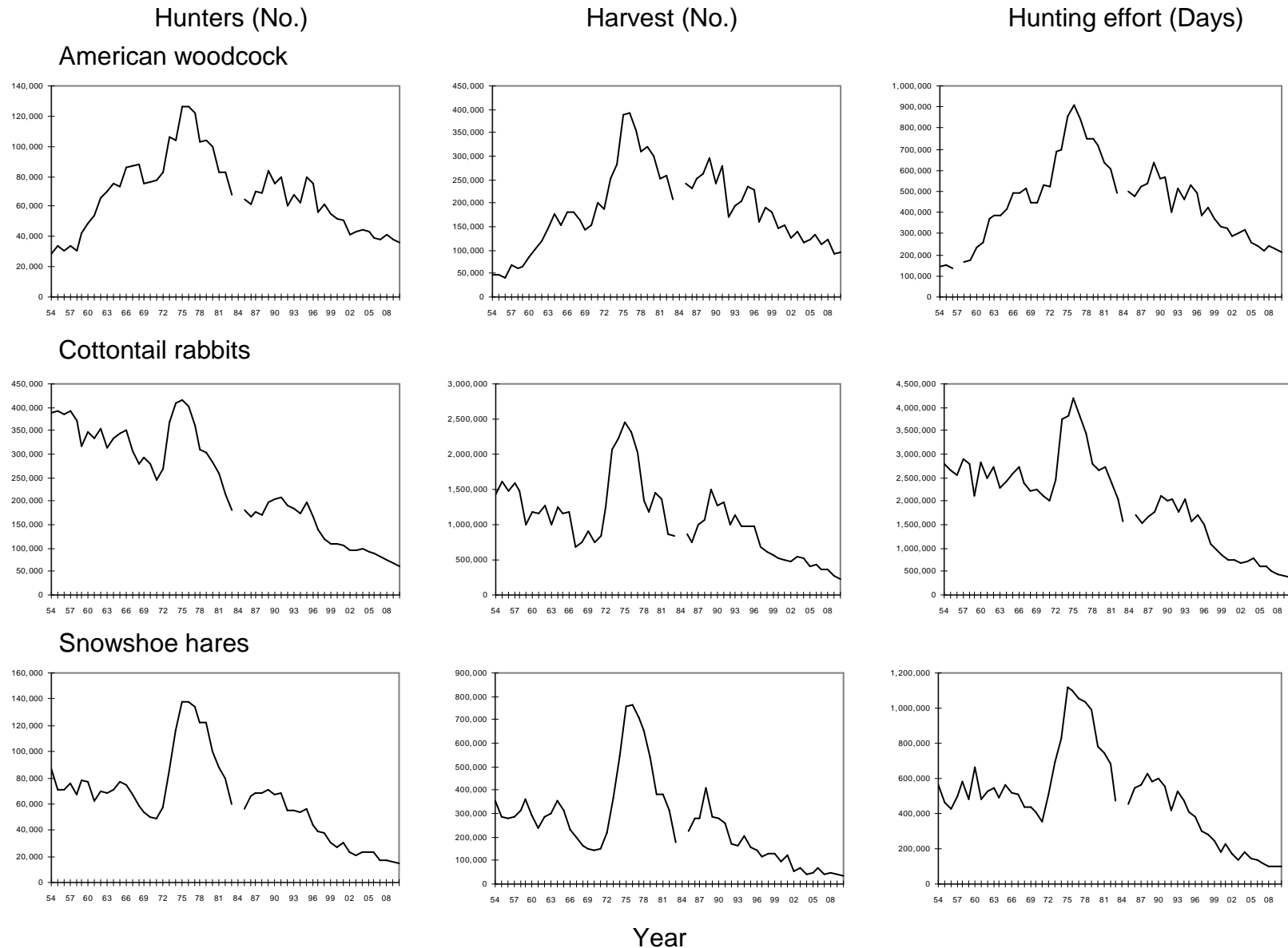


Figure 4 (continued). Estimated number of hunters, harvest, and hunting effort in Michigan during the small game hunting seasons, 1954-2010. No estimates were available or no seasons existed during years when no data are plotted.

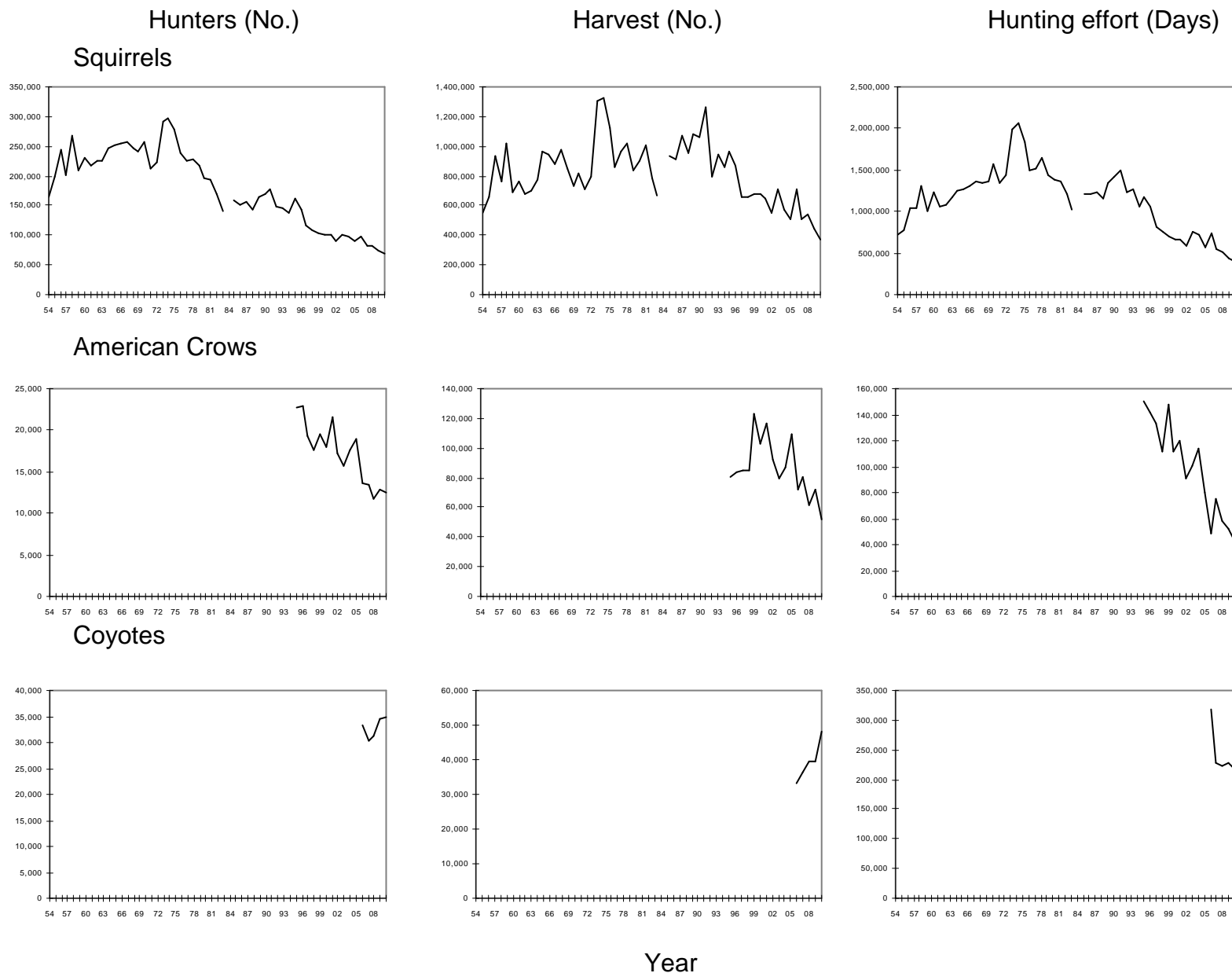


Figure 4. (continued) Estimated number of hunters, harvest, and hunting effort in Michigan during the small game hunting seasons, 1954-2010. No estimates were available or no seasons existed during years when no data are plotted.

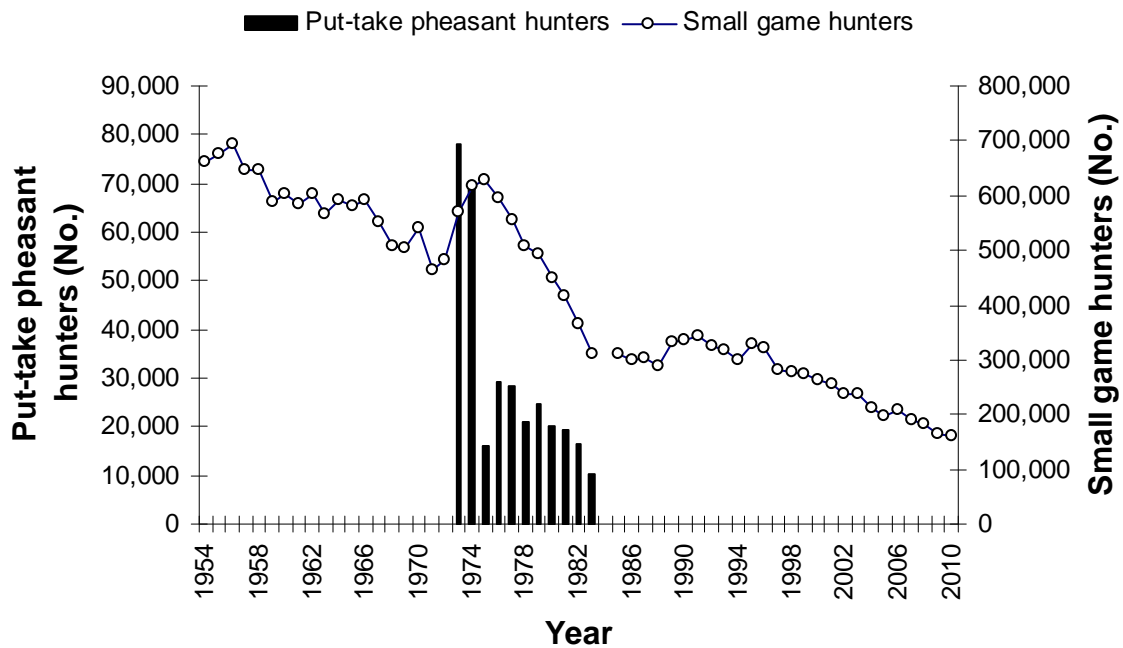


Figure 5. Estimated number of small game hunters in Michigan, 1954-2010 (estimate of the number of people that went afield) and number of people participating in put-take pheasant hunts (1973-1983). The numbers of put-take pheasant hunters were estimated for 1973-1974 (Janson 1975, Janson and Anderson 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.

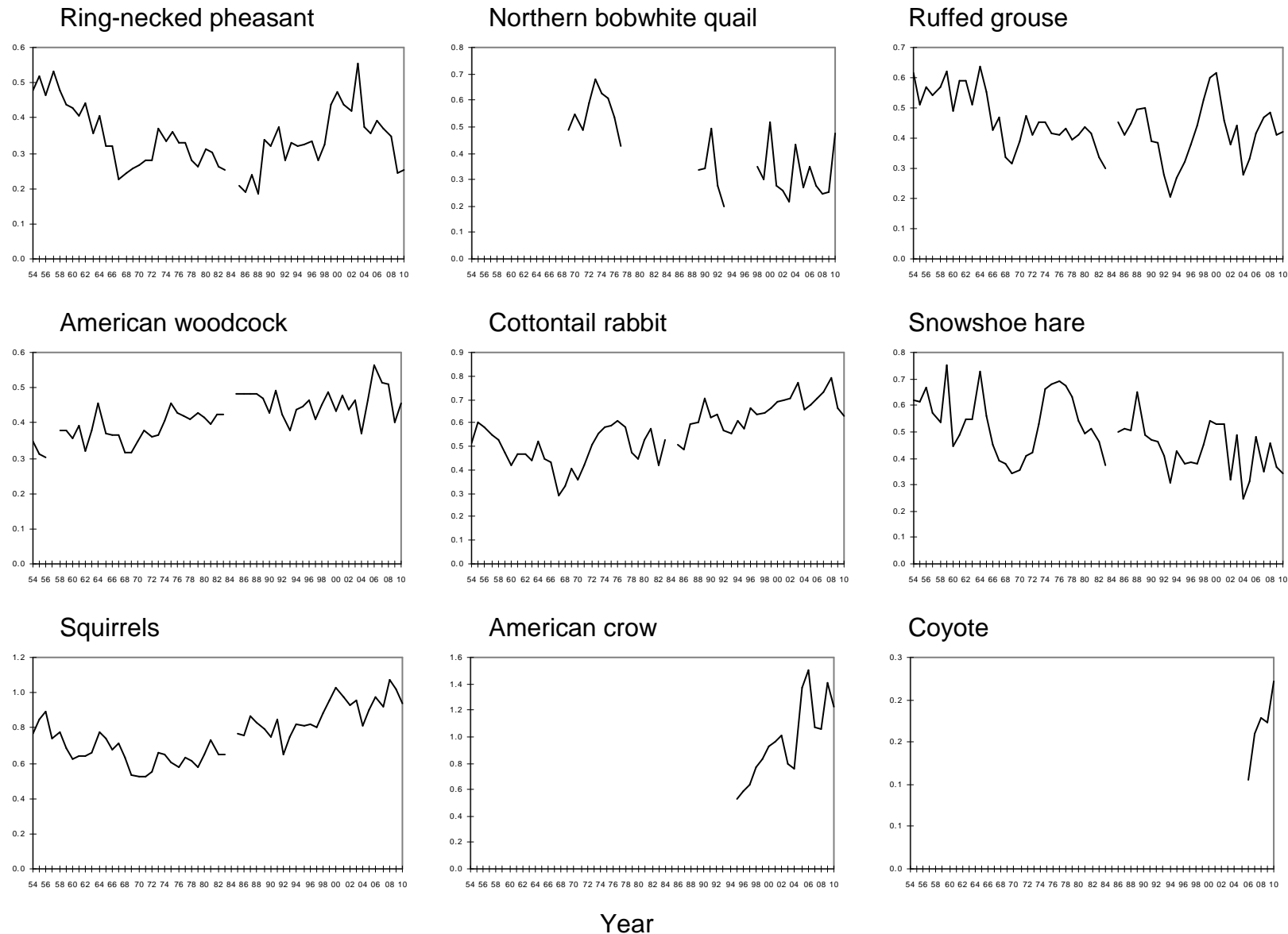


Figure 6. Estimated harvest per effort in Michigan during the small game hunting seasons, 1954-2010. No estimates were available or no seasons existed during years when no data are plotted.

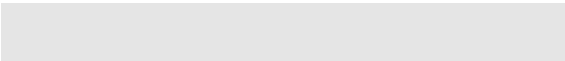
Appendix A

2010-2011 Small Game Harvest Questionnaire



2010-2011 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 2010-11?

- ¹ ☐ Yes. Please complete the table below.
² ☐ 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
⁰ <input checked="" type="checkbox"/> Example	1 Jackson	5	¹ <input checked="" type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	1 2
¹ <input type="checkbox"/> Pheasant (Do not count birds taken on a licensed shooting preserve)	1		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	2		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	3		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	4		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
² <input type="checkbox"/> Ruffed Grouse	1		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	2		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	3		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	4		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
³ <input type="checkbox"/> Woodcock	1		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	2		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	3		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	4		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
⁴ <input type="checkbox"/> Cottontail Rabbit	1		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	2		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	3		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	4		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
⁵ <input type="checkbox"/> Snowshoe Hare	1		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	2		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	3		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	4		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
⁶ <input type="checkbox"/> Squirrel	1		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	2		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	3		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	4		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
⁷ <input type="checkbox"/> Crow	1		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	2		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	3		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	4		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
⁸ <input type="checkbox"/> Quail (Portions of the Southern Lower Peninsula)	1		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	2		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	3		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	4		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
⁹ <input type="checkbox"/> Coyote	1		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	2		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	3		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <input type="checkbox"/> Both	
	4		¹ <input type="checkbox"/> Private ² <input type="checkbox"/> Public ³ <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 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
b. Number of small game harvested.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
c. Number of days in the hunting season.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
d. Your overall hunting experience.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

3. Did you attempt to hunt ducks or geese in Michigan during 2010-11?
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 18-19, 2010)? 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 2010, the DNR leased about 50 properties totaling about 7,800 acres. Did you hunt small game on any HAP property in 2010-11?
1 ☐ Yes 2 ☐ No. Skip to Question #6.

5a. If you hunted small game on a HAP property in 2010-11, how many days did you hunt on HAP properties? _____ DAYS HUNTED

5b. If you hunted small game on a HAP property in 2010-11, 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 2010-11?
1 ☐ Yes 2 ☐ No. Skip the remaining questions.

7. If you used Mi-HUNT to select an area for your 2010-11 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 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
b. Quality of maps.	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. Accuracy of information.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>

8. How did Mi-HUNT affect the quality of your small game hunting experience in 2010-11?
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!