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## **2010 MICHIGAN FURBEARER HARVEST SURVEY**

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### **ABSTRACT**

*A sample of furtakers was contacted after the 2010 hunting and trapping seasons to estimate the number of participants, days afield (effort), and furbearer harvests. In 2010, 24,288 people purchased a fur harvester license, which was 4% greater than in 2009. In 2010, about 14,106 license buyers either hunted or trapped furbearers. About 32% of the license buyers trapped (7,812 trappers), 40% hunted (9,783 hunters), and 14% (3,489) both trapped and hunted. Overall trapper and hunter numbers were nearly unchanged between 2009 and 2010. Significantly more trappers pursued fisher and bobcat in 2010, compared to 2009. Changes for hunting and trapping effort and harvest between 2009 and 2010 generally followed changes in the number of furtakers. Hunters most commonly sought coyotes, raccoons, and red fox, while trappers most frequently sought raccoons, muskrats, and coyotes. Trends in harvest can be affected by both changes in furtaker and furbearer numbers; thus, harvest per furtaker was examined for trends. The mean number of raccoon and opossum taken per furtaker has increased since the 1980s. The mean harvest of red fox by both hunters and trappers has declined since the mid-1980s. These trends suggest raccoon and opossum may have been increasing in abundance during the last 20 years, while red fox numbers may have been declining. An estimated 178 trappers caught and released 343 bobcats that were caught in traps set for another species in 2010.*



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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. Harvest surveys are one of the management tools used by the DNR to accomplish this statutory responsibility. Estimating harvests and hunter participation are primary objectives of these surveys. Information from harvest surveys, mandatory registration, and other indices are used to monitor furbearer populations and help establish harvest regulations.

The primary furbearing animals harvested for their pelts in Michigan during recent years have been badger (*Taxidea taxus*), beaver (*Castor canadensis*), bobcat (*Felis rufus*), coyote (*Canis latrans*), fisher (*Martes pennanti*), gray fox (*Urocyon cinereoargenteus*), marten (*Martes americana*), mink (*Mustela vison*), muskrat (*Ondatra zibethica*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), river otter (*Lontra canadensis*), striped skunk (*Mephitis mephitis*), and weasels (*Mustela* spp.) (Frawley 2008a). Opossum, weasels, and skunks could be taken year-round with any hunting or fur harvester license. The remaining furbearers could be harvested in 2010 during late fall through winter by a person possessing a fur harvesters license (included Fur Harvester, Junior Fur Harvester, Senior Fur Harvester, Non-resident Fur Harvester, Military Fur Harvester, Resident Fur [trap only], and Junior Fur [trap only]) (Table 1). Landowners or their designees could take raccoons and coyotes throughout the year on their property without a license if these animals were doing or about to do damage. Coyotes could also be taken by hunters possessing a small game hunting license. Thus, harvest estimates of coyotes, raccoons, opossum, skunks, and weasels from this survey do not represent all possible forms of harvest, but only those taken by people with a fur harvester's license.

## METHODS

Following the 2010 hunting and trapping seasons, a questionnaire was sent to a random sample of people (4,200) who had purchased a fur harvester license (Table 2). All licensees had an equal chance of being included in the random sample. After the sample was selected, licensees were grouped into one of four strata on the basis of their residence. These strata included residents of the Upper Peninsula (UP), Northern Lower Peninsula (NLP), Southern Lower Peninsula (SLP), and nonresidents (Figure 1). People receiving the questionnaire were asked to report whether they pursued furbearers, number of days spent afield, and whether they harvested any furbearing animals.

Estimates were calculated using a stratified random sampling design (Cochran 1977). Using stratification, furtakers were placed into similar groups (strata) based on their county of residence. Residents of the UP, NLP, SLP, and nonresidents and licensees with unknown residency were grouped into separate strata (Figure 1). The overall sample consisted of 581 people from the UP stratum (N= 3,443), 850 people from the NLP stratum (N= 4,961), 2,748 from the SLP stratum (N= 15,692), and 21 people from the nonresident and unknown residency stratum (N=192). 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 occurred in the statewide population of furtakers. 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 was repeated.

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 survey 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).

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).

Estimates of events that occur infrequently are difficult to estimate precisely using common sampling designs (Cochran 1977). Relatively few furtakers harvest river otter, bobcat, badger, fisher, and marten; thus, some estimates associated with these species should be viewed cautiously. More precise harvest estimates were probably obtained for these species through tallying registration reports. All furtakers harvesting a river otter, bobcat, fisher, or marten were required to present these animals at a DNR office for registration. Prior to 2003, furtakers were also required to register badger; however, this requirement was eliminated in 2003. In this report, marten harvest was determined only by registration.

During recent years, all licensed furtakers attempting to harvest bobcat, fisher, marten, and otter in Michigan were required to obtain a free harvest tag from the DNR. The list of furtakers obtaining these harvest tags formed a complete list of trappers statewide pursuing these species. Using these lists, the DNR was able to design separate harvest surveys that provided more precise estimates (i.e., narrower confidence intervals) than previous harvest from surveys of all furtakers. Separate surveys were conducted to estimate furtaker participation, harvest, and effort for bobcat (Frawley 2011c), fisher and marten (Frawley 2011a), and otter (Frawley 2011b) seasons during recent years.

Although furtakers that purchased a small game hunting license could harvest coyotes without a fur harvester's license; these license buyers were not included in this survey. Rather, a separate survey was conducted to estimate the harvest of coyotes taken by small game hunting license buyers (e.g., Frawley 2008b).

While the primary objectives of the fur harvester's survey were estimating harvest, number of participants, and trapping and hunting effort, this survey also provided an opportunity to collect information about management issues. Questions were added to the questionnaire to determine whether trappers had used cable restraints (snare) while attempting to capture coyote or fox during 2010 seasons. Trappers also were asked whether they caught any bobcats incidentally in traps set for another species.

Questionnaires were mailed initially in late May 2010. Up to two follow-up questionnaires were sent to non-respondents. Questionnaires were undeliverable to 57 people, primarily because of changes in residence. Questionnaires were returned by 2,661 people, yielding a 64% adjusted response rate.

## **RESULTS AND DISCUSSION**

In 2010, 24,582 fur harvester licenses were purchased by 24,288 people (Figure 2, Table 2). The number of license buyers in 2010 was 4% greater than in 2009. Most license buyers were men (97%), with an average age of 46 years (Figure 3). About 6% of the license buyers (1,569) were younger than 17 years of age.

### **Mail Harvest Survey**

Overall, approximately 58% of license buyers either hunted or trapped furbearers during 2010 (Table 3). The number of active furtakers increased 6% from 2009, although the change was not statistically significant. About 32% of the license buyers trapped and 40% hunted furbearers during 2010. Trappers most often pursued raccoons, muskrat, and coyote (Table 4). Hunters most commonly sought coyotes, raccoon, and red fox. Coyotes and raccoons ranked as the most frequently sought furbearers when trappers and hunters were combined.

Although the estimated trapper numbers were similar during 2009 and 2010 (Table 3), the number of trappers during recent years is well below the record highs of nearly 16,000 in the early 1980s (Figure 4). The peaks in furtaker numbers corresponded closely to periods when pelt values peaked for many species such as muskrat, raccoon, and red fox (Iowa Department of Natural Resources 2002). The number of trappers during recent years has been comparable to the numbers active during the 1960s, prior to the peak in fur prices. The estimated number of people hunting furbearers was not significantly different between 2009 and 2010 (Table 3). Since 1999, the number of people hunting furbearers has been consistently greater than the number of people trapping (Figure 4).

Collectively, about the same number of people trapped furbearers in 2010 compared to 2009. Moreover, similar numbers of trappers pursued most species, except for bobcat and fisher (Table 4). Bobcat and fisher had greater numbers of trappers seeking them in 2010 than 2009. Overall, similar numbers of people hunted furbearers in 2010 than 2009. Changes for hunting and trapping effort and harvest between 2009 and 2010 generally followed changes in the number of furtakers.

Harvest of mink, red fox, beaver, bobcat, and fisher in 2010 were near the low end of their historical ranges (Figures 5-7). In contrast, harvest of coyote and weasel were near the high end of their historical ranges. Many factors influence harvest trends such as furtaker numbers, wildlife population size, hunting regulations, habitat conditions, and fur prices; thus, any interpretations of trends should be viewed cautiously. Trends in harvest per furtaker (Figures 8 and 9) were examined because this measure may eliminate some of the effects of changing furtaker and furbearer numbers over time, although many other factors may still complicate interpretations of these trends (Poole and Mowat 2001).

The mean number of raccoon and opossum taken per furtaker has generally increased since the early 1980s (Figures 8 and 9). The mean harvest of red fox by both hunters and trappers has declined since the mid-1980s. These trends suggest raccoon and opossum may have been increasing in abundance during the last 20 years, while red fox numbers may have been declining.

These trends in furbearer numbers are not unique to Michigan. Increasing raccoon numbers have also been reported in Illinois since the 1980s (Gehrt et al. 2002). Furthermore, declining red fox numbers have been reported in portions of the northern Great Plains since the 1980s (Sovada et al. 1995). The decline in red fox numbers in the northern Great Plains during recent years has been attributed largely to competition from increased coyote numbers (Sovada et al. 1995).

The mean harvest of fisher per trapper has declined during the last ten years (Figure 8). Frawley (2011a) reported increasing effort expended by trappers for each fisher registered during the last ten years. Both the declining mean harvest of fisher per trapper and the increasing effort per registered fisher suggest fisher numbers may have declined over the last ten years.

The mean number of bobcats taken per trapper declined from 2003 to 2010 (Figure 8). The seasonal harvest limit for bobcats was lowered from three to two bobcats in 2004, and this reduction probably contributed to the decline of bobcats taken per trapper since 2003 (Frawley 2011c).

### Registration Data

Compared to 2009, more fisher (31%), bobcat (15%), and marten (7%) were registered in 2010; however, fewer otter (8% decline) were registered (Figure 10, Table 5). Registration totals included only animals legally harvested by furtakers during hunting and trapping

seasons. Also, registration totals only included animals that were registered and returned to the furtaker.

### Supplemental Questions

An estimated 3,145 coyote trappers caught 8,743 coyotes with foothold traps, while 2,585 fox trappers caught 5,447 fox with foothold traps (Table 6). These trappers also reported 2,203 coyotes and 957 fox escaping from foothold traps. Among trappers using cable restraints, 910 trappers caught 2,909 coyotes, and 434 trappers caught 281 fox. In addition, trappers reported 2,938 coyotes and 1,066 fox escaping from cable restraints.

An estimated 178 trappers caught a bobcat incidentally in traps set for another species (Table 7). These trappers caught 343 incidental bobcats that were released alive from their traps. In addition, 20 incidental bobcats were registered because they could not be released alive. Because incidental bobcats could be captured more than once, the estimate of incidental bobcats caught by trappers probably does not represent unique bobcats.

### Beaver Trapping Activity by Otter Trappers

In order to trap otter, trappers were required to obtain a free otter harvest tag in addition to a fur harvesters license. A separate survey was sent to these trappers obtaining an otter harvest tag to estimate their trapping activity (Frawley 2011b). Because otter trappers frequently sought beaver, these trappers also were asked to report information about their beaver trapping activity. However, these estimates associated with beaver trapping only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag. In order to put these estimates into a broader perspective, it is important to know what proportion of beaver trapping activity was attributed to trappers having an otter harvest tag.

An estimated 34,732 furtakers sought beavers (Tables 4 and 8). About 46% of these trappers possessed an otter harvest tag (Table 8), and they were responsible for 59% of the beaver taken.

### **ACKNOWLEDGEMENTS**

I thank all the furtakers that provided information. Autumn Feldpausch, Sheree Kershaw, Anna Mitterling, and Theresa Riebow completed data entry. Marshall Strong prepared Figure 1. Adam Bump, Russ Mason, Cheryl Nelson, and Doug Reeves reviewed a draft version of this report.

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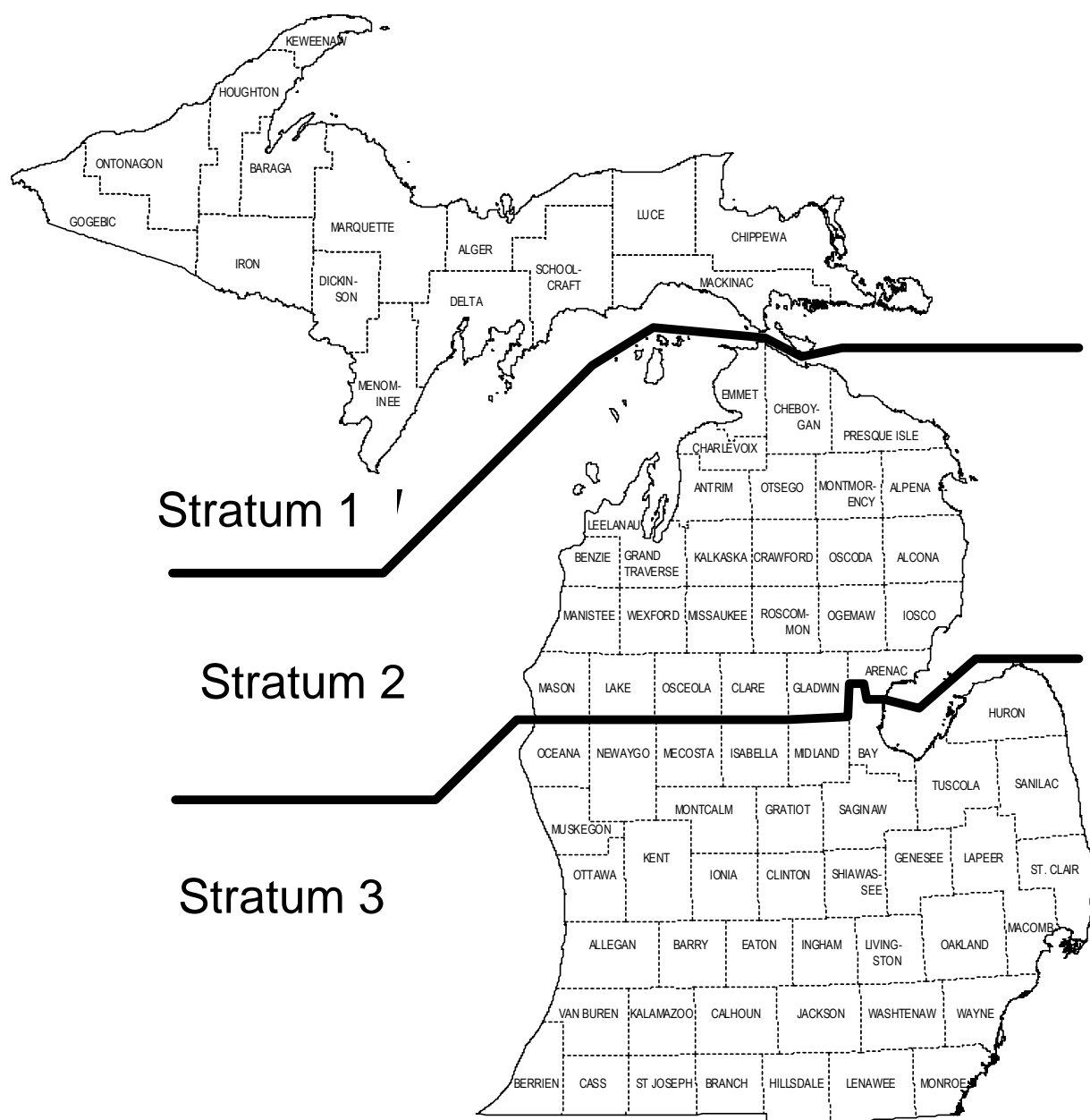


Figure 1. Stratum boundaries used for the analysis of the Michigan furbearer harvest survey. Nonresidents were included as a fourth stratum.



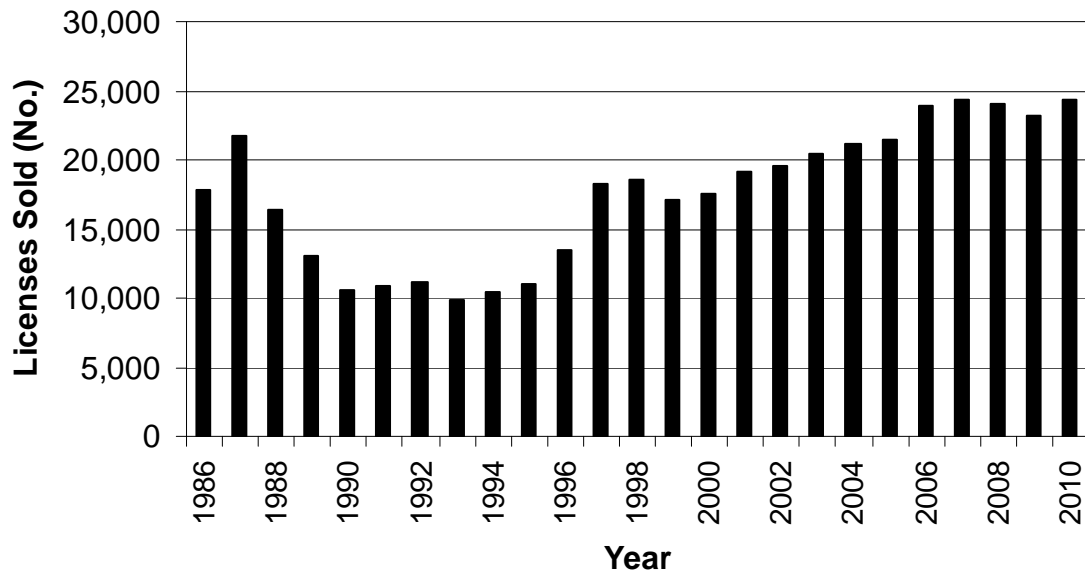


Figure 2. Number of fur harvester licenses sold in Michigan, 1986-2010. Fur harvester licenses included Resident Fur Harvester, Senior Fur Harvester, Junior Fur Harvester, Military Fur Harvester, and Nonresident Fur Harvester licenses. During 1996-2010, totals also included Resident Fur Harvester (trap only) and Junior Fur Harvester (trap only) licenses.

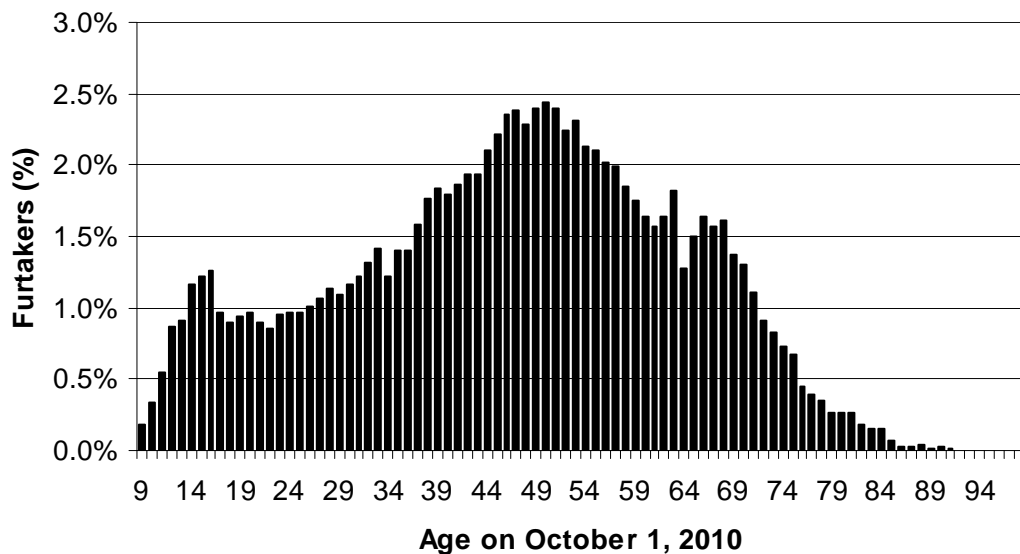


Figure 3. Ages of people that purchased a license to hunt or trap furbearers in Michigan for the 2010 hunting and trapping seasons ( $\bar{x}$  = 46 years).

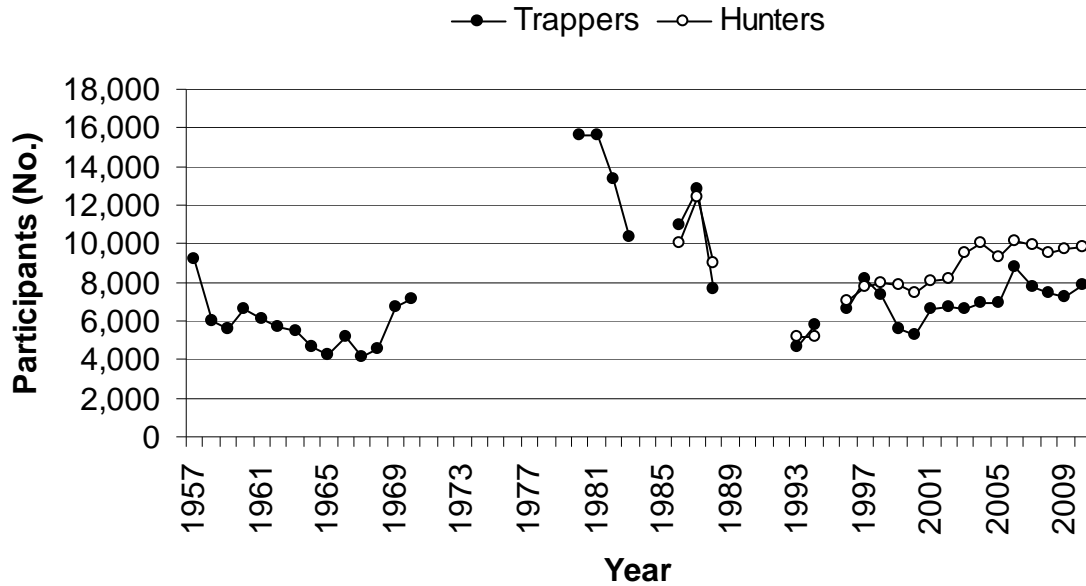


Figure 4. Estimated number of trappers and hunters in Michigan, 1957-2010. Estimates included only license buyers that actually trapped or hunted furbearers (any species). Data were not available for all years.

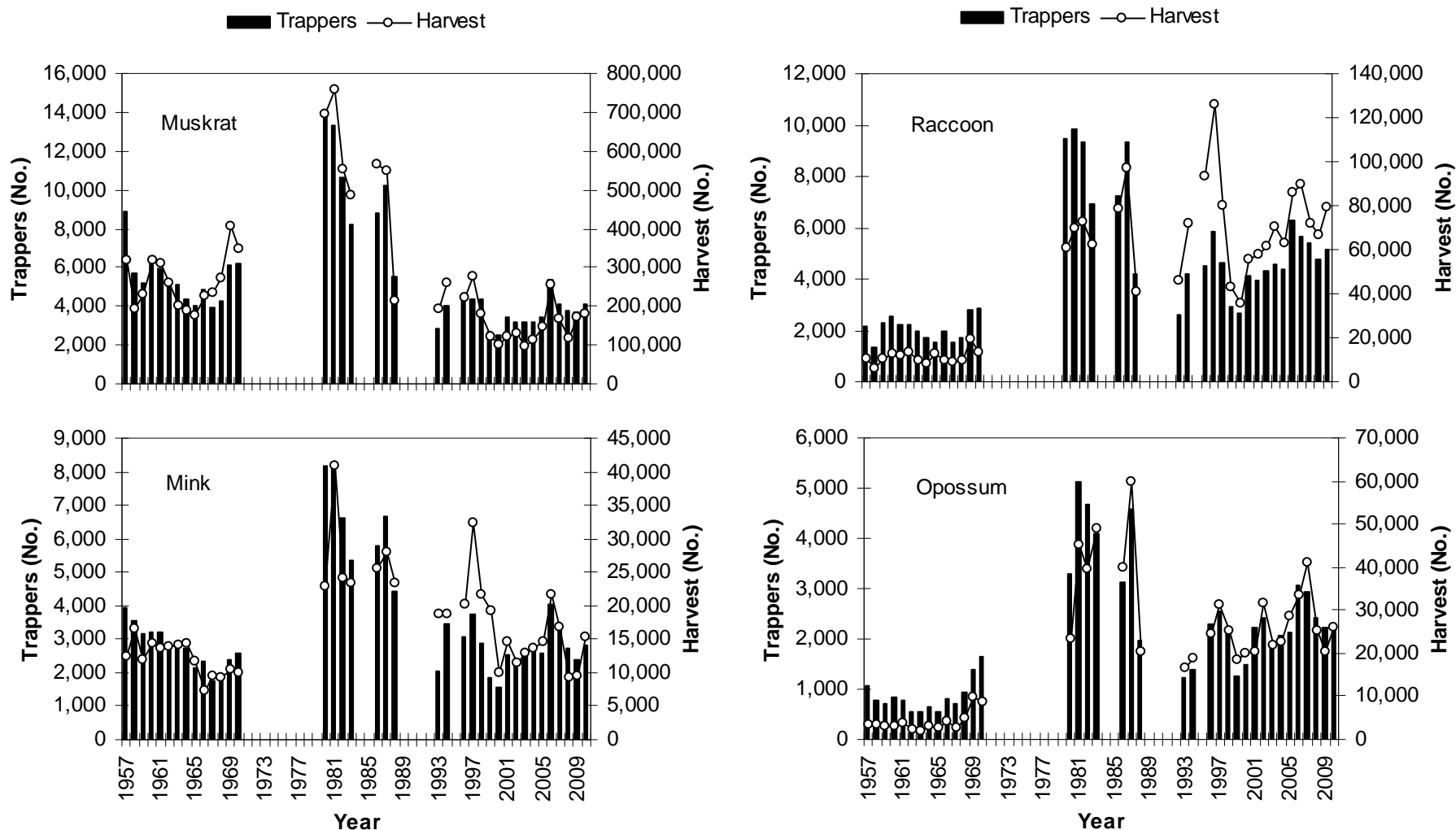


Figure 5. Estimated furbearer harvest by trappers and the number of trappers in Michigan estimated from mail harvest surveys, 1957-2010. Mail survey questionnaires were sent to a random sample of Trapping license buyers during 1957-1969. The sample also included Sportsman's license buyers in 1970-1972. During 1980-1983, the sample included Trapping and Senior Hunting license buyers. During 1986-2010, the sample was selected from people buying either Resident Fur Harvester, Senior Fur Harvester, Junior Fur Harvester, Military Fur Harvester, or Nonresident Fur Harvester licenses. The sample also included Senior Hunting license buyers during 1986-1988. Starting in 1996, samples also included people buying Resident Fur Harvester (trap only) and Junior Fur Harvester (trap only) licenses. Data were not available for all years.

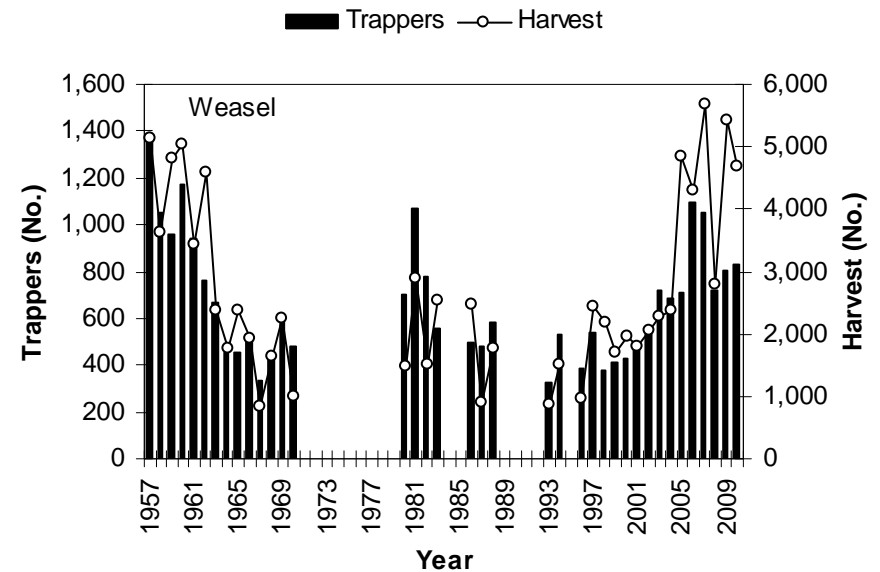
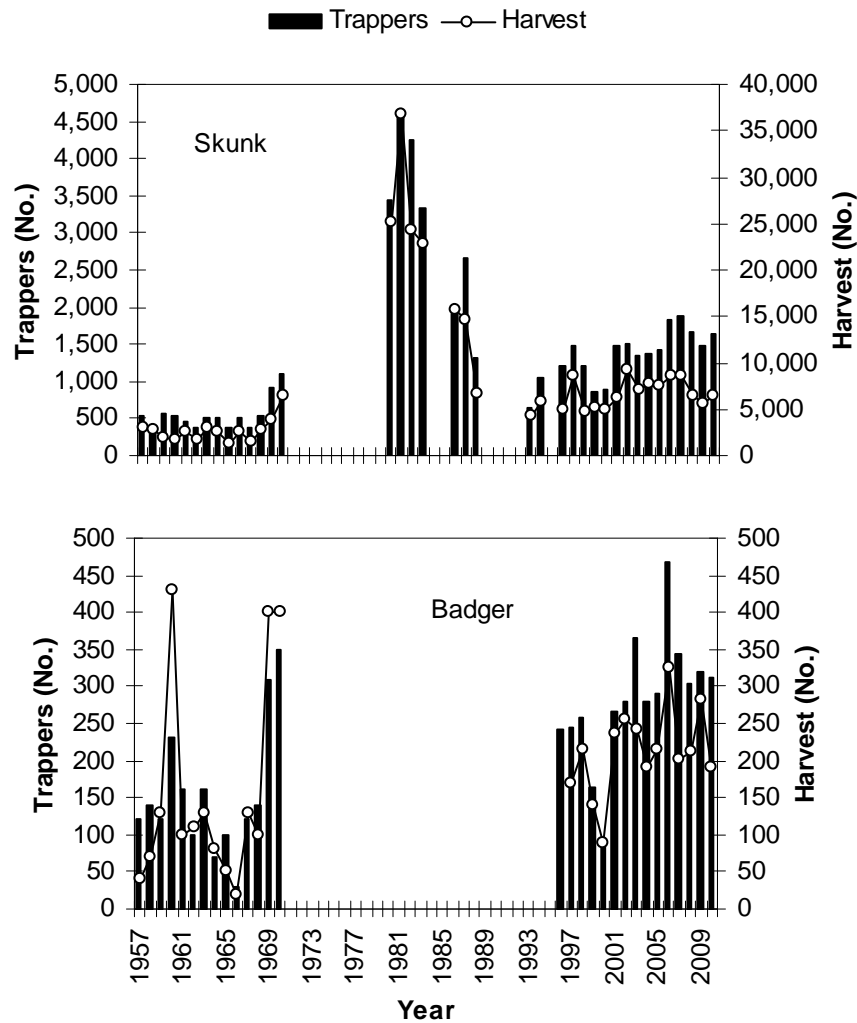


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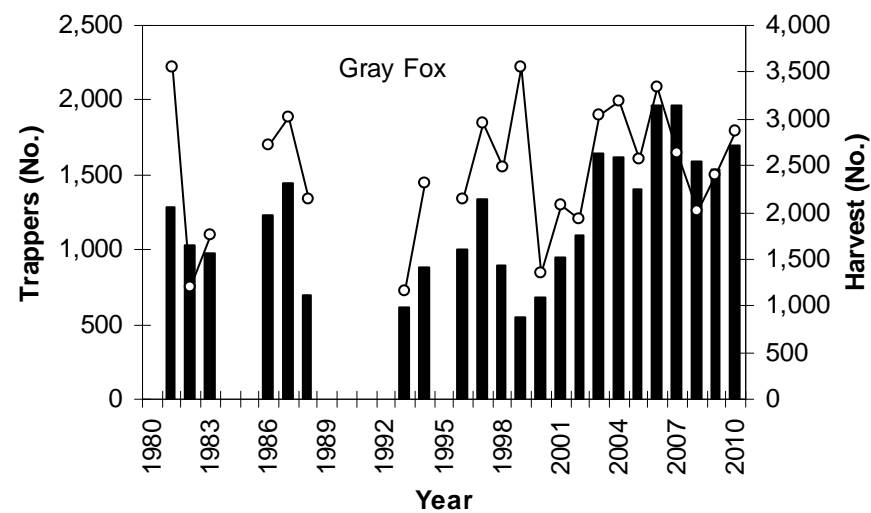
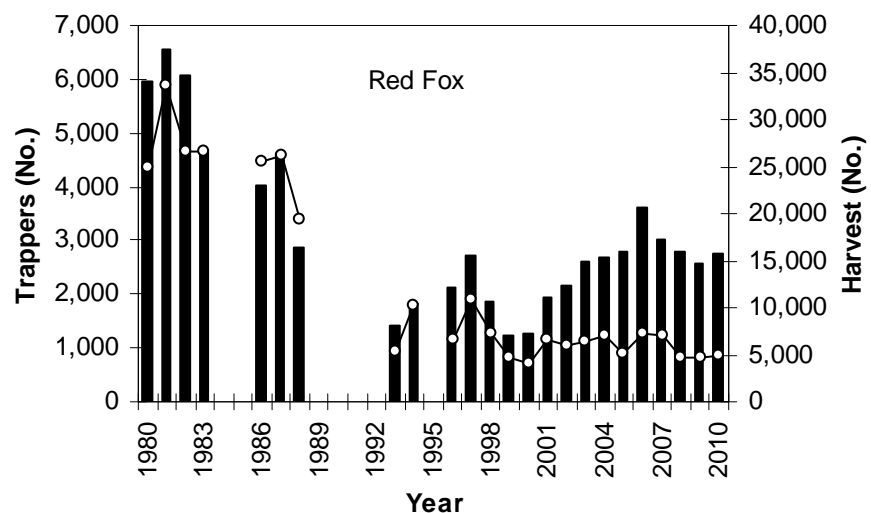
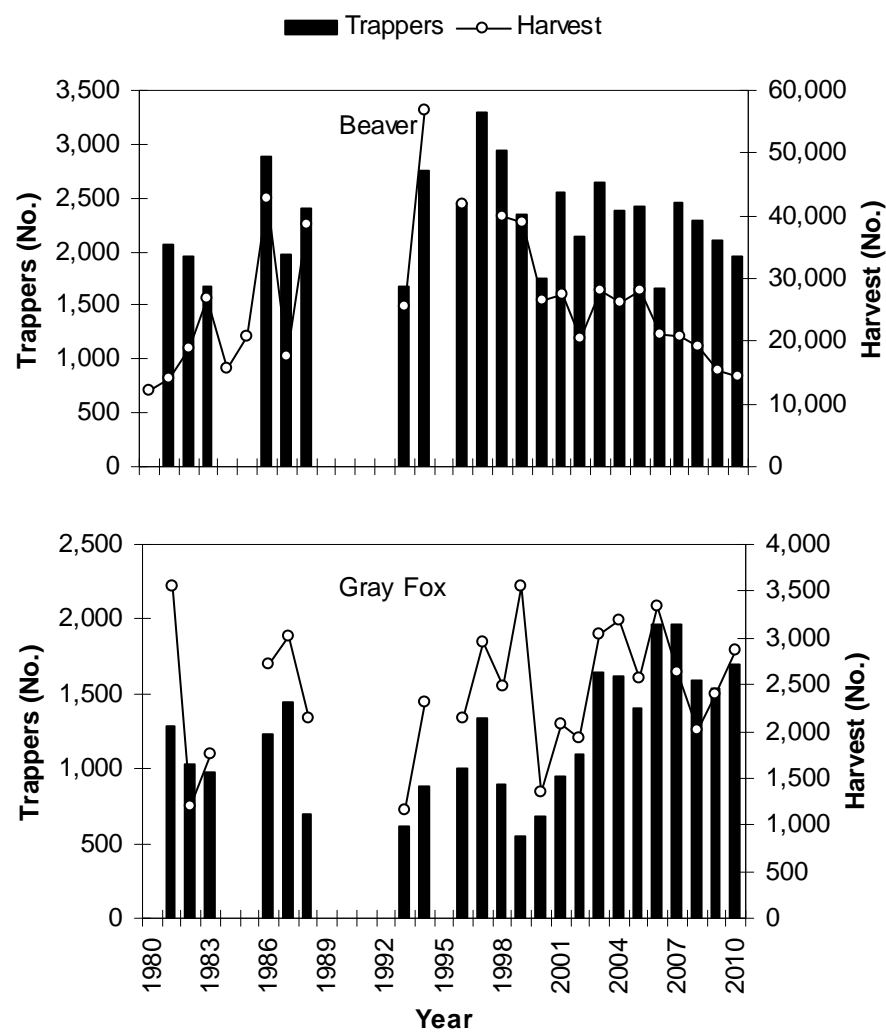
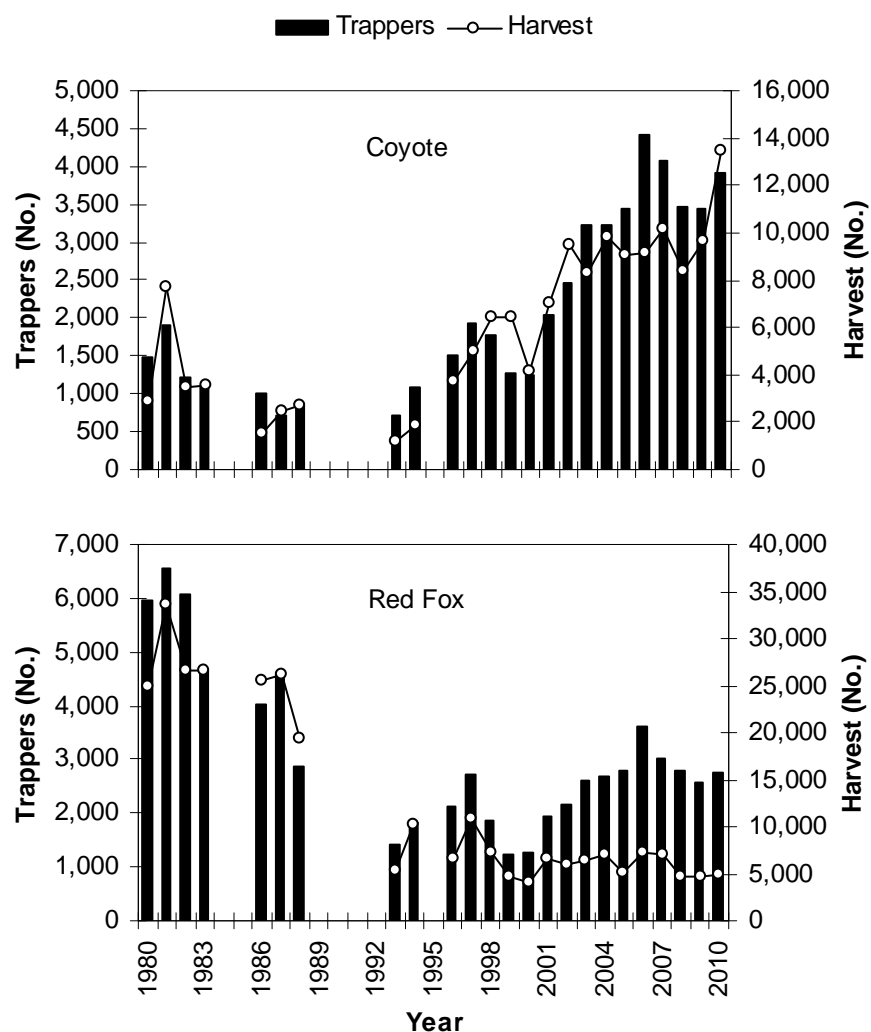


Figure 6. Estimated furbearer harvest by trappers and the number of trappers in Michigan estimated from mail harvest surveys, 1980-2010. The mail survey was sent to a random sample of Trapping and Senior Hunting license buyers during 1980-1983. During 1986-2010, the sample was selected from people buying either Resident Fur Harvester, Senior Fur Harvester, Junior Fur Harvester, Military Fur Harvester, or Nonresident Fur Harvester licenses. The sample also included Senior Hunting license buyers during 1986-1988. Starting in 1996, samples also included people buying Resident Fur Harvester (trap only) and Junior Fur Harvester (trap only) licenses. Data were not available for all years.

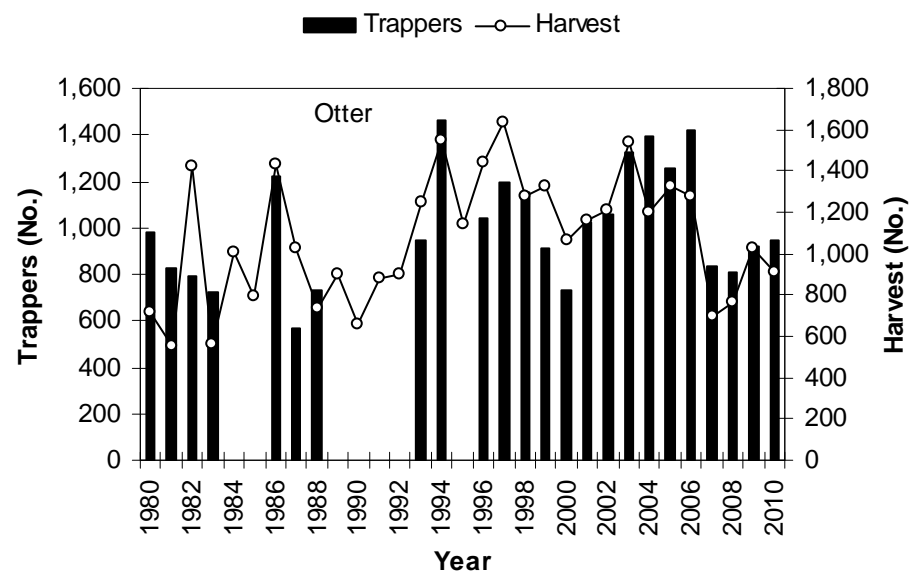
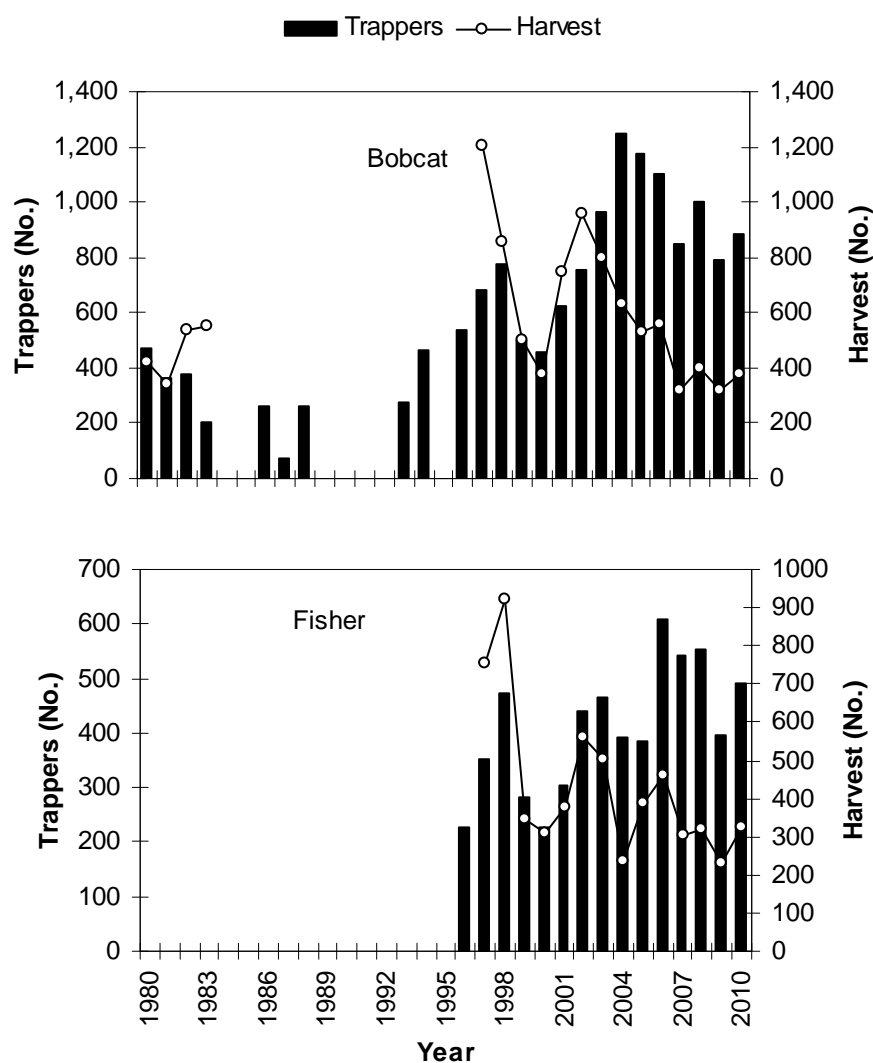


Figure 6 (Continued). Estimated furbearer harvest by trappers and the number of trappers in Michigan estimated from mail harvest surveys, 1980-2010. The mail survey was sent to a random sample of Trapping and Senior Hunting license buyers during 1980-1983. During 1986-2010, the sample was selected from people buying either Resident Fur Harvester, Senior Fur Harvester, Junior Fur Harvester, Military Fur Harvester, or Nonresident Fur Harvester licenses. The sample also included Senior Hunting license buyers during 1986-1988. Starting in 1996, samples also included people buying Resident Fur Harvester (trap only) and Junior Fur Harvester (trap only) licenses. Data were not available for all years.

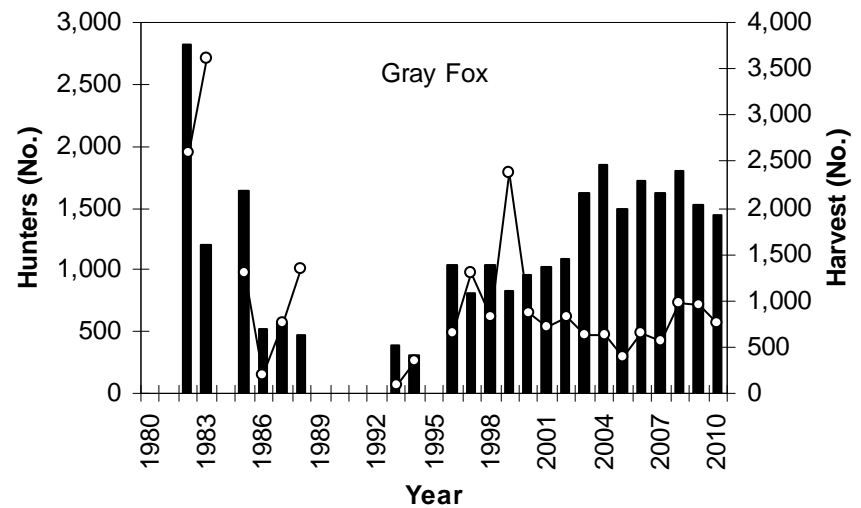
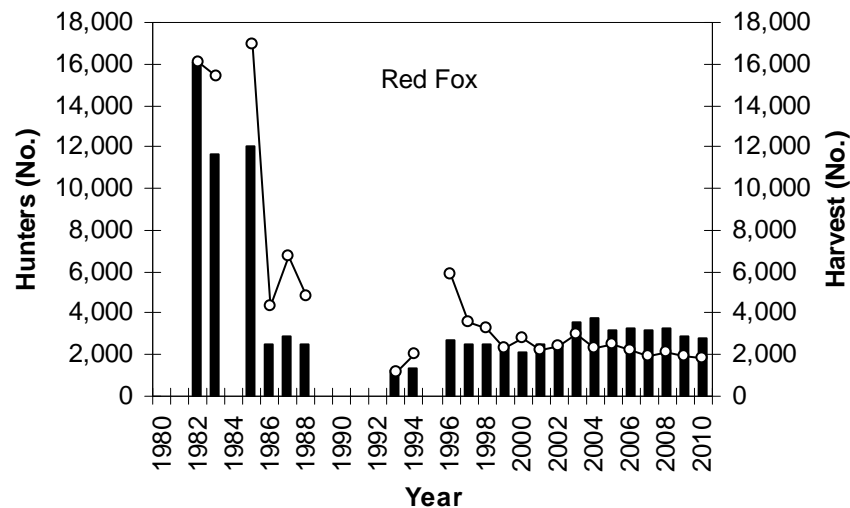
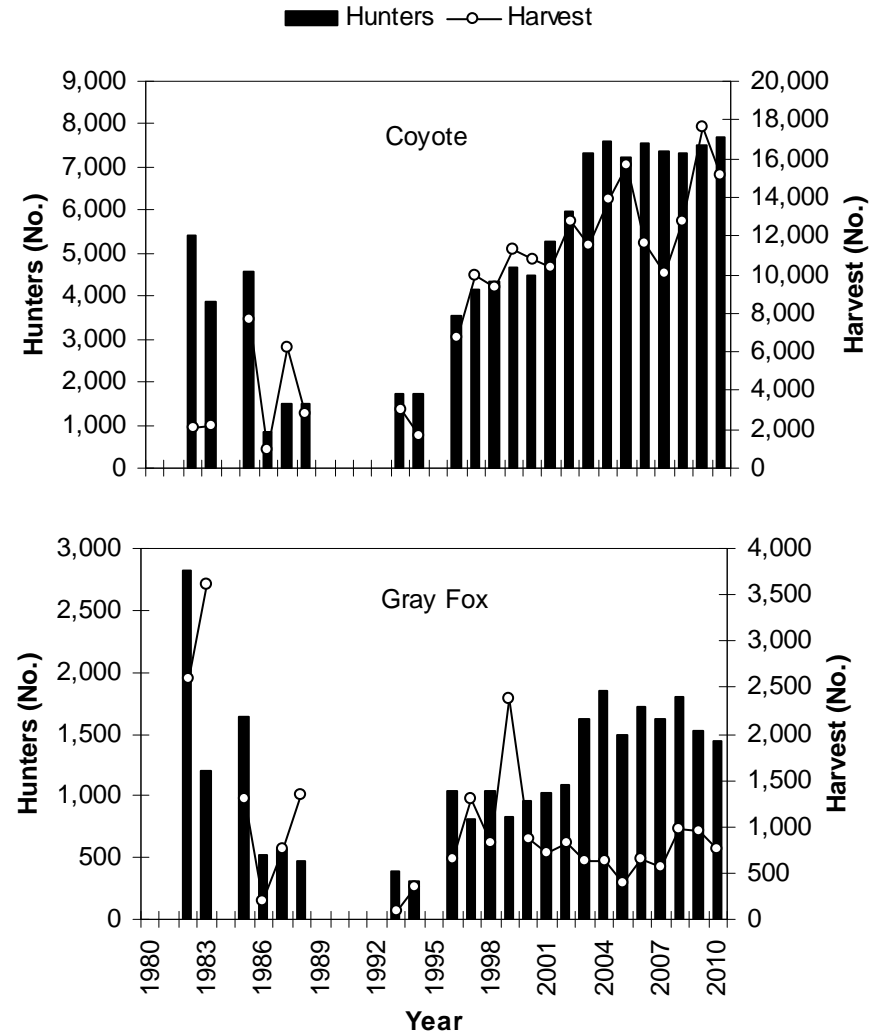
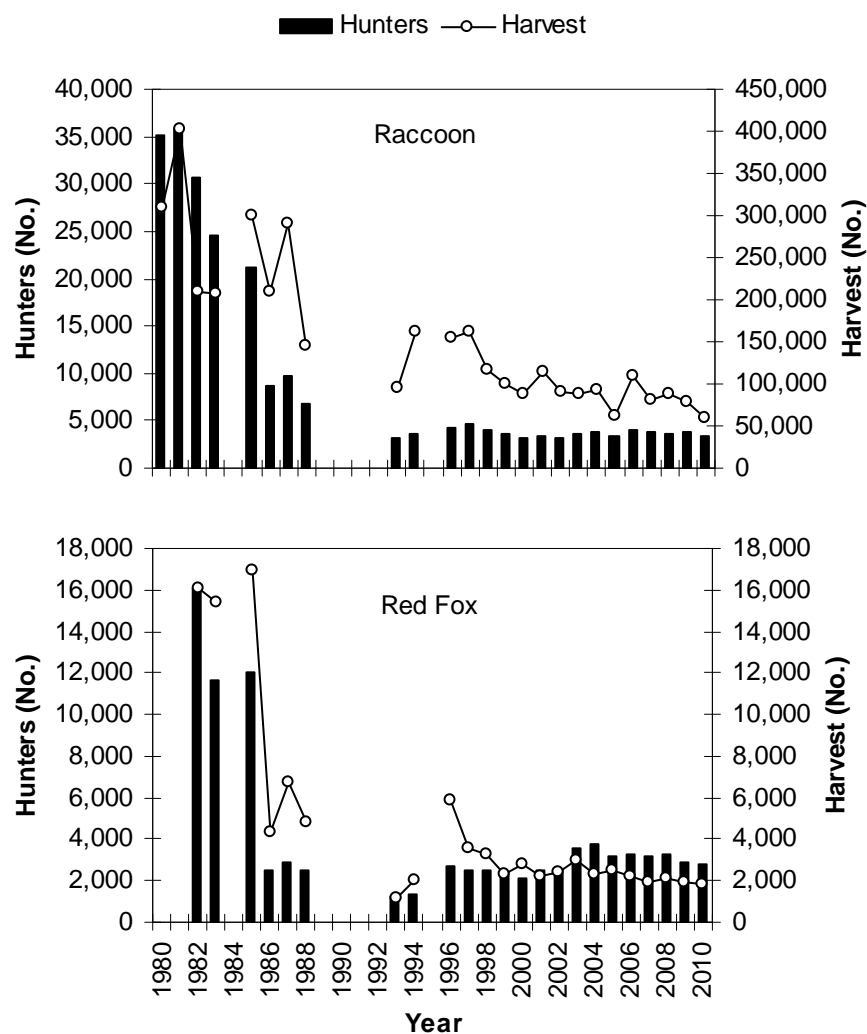


Figure 7. Estimated furbearer harvest by hunters and the number of hunters in Michigan estimated from mail harvest surveys, 1980-2010. The mail survey was sent to a random sample of people buying either small game licenses, Senior Hunting licenses, or Sportsman's licenses during 1980-1985. During 1986-2010, the sample was selected from people buying either Resident Fur Harvester, Senior Fur Harvester, Junior Fur Harvester, Military Fur Harvester, or Nonresident Fur Harvester licenses. The sample also included Senior Hunting license buyers during 1986-1988. Starting in 1996, samples also included people buying Resident Fur Harvester (trap only) and Junior Fur Harvester (trap only) licenses. Data were not available for all years.

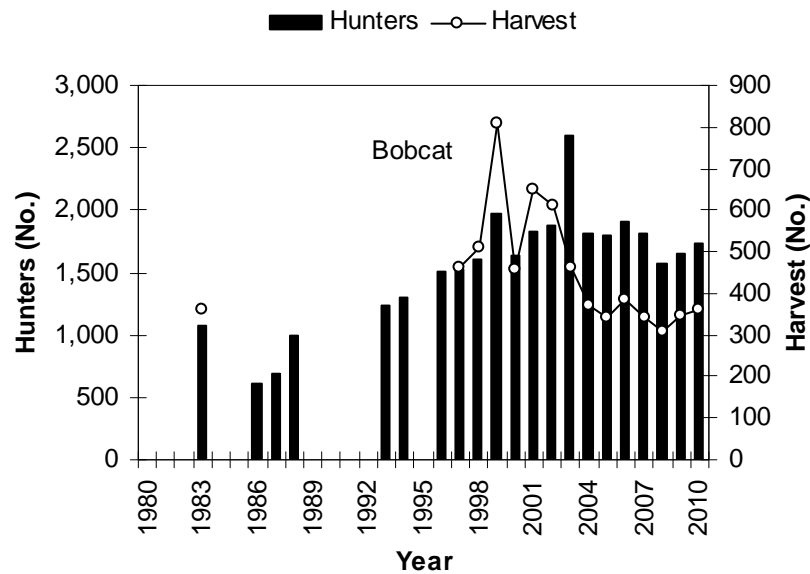


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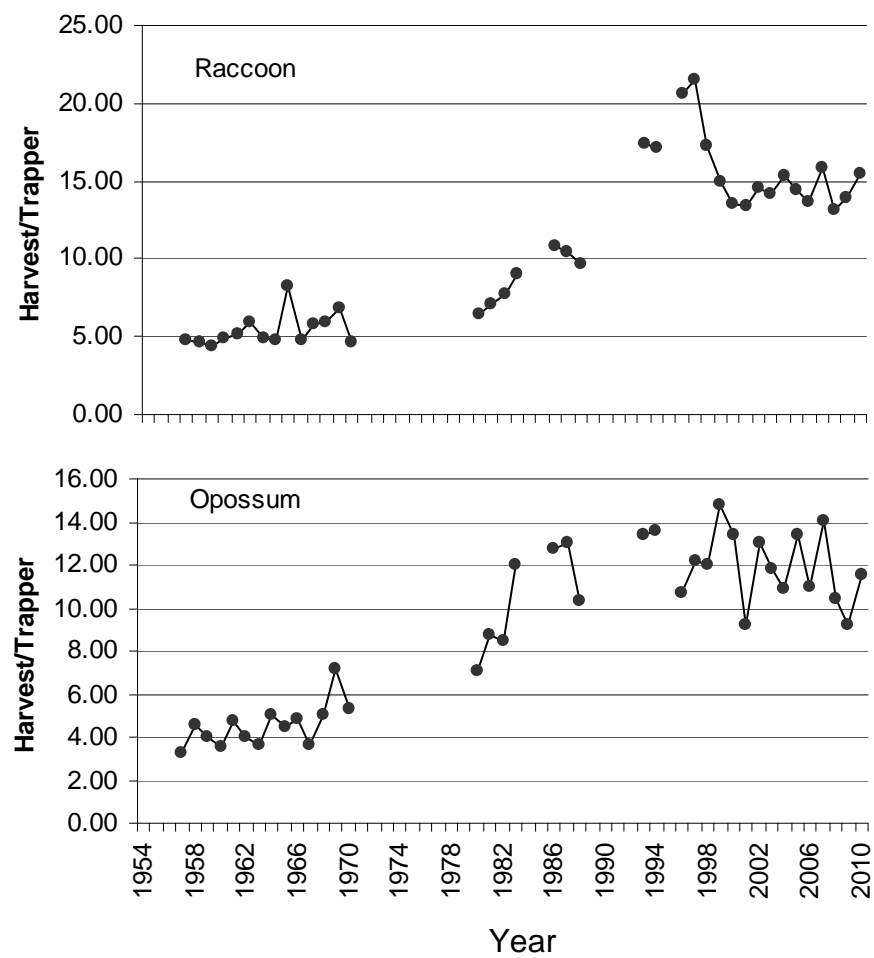
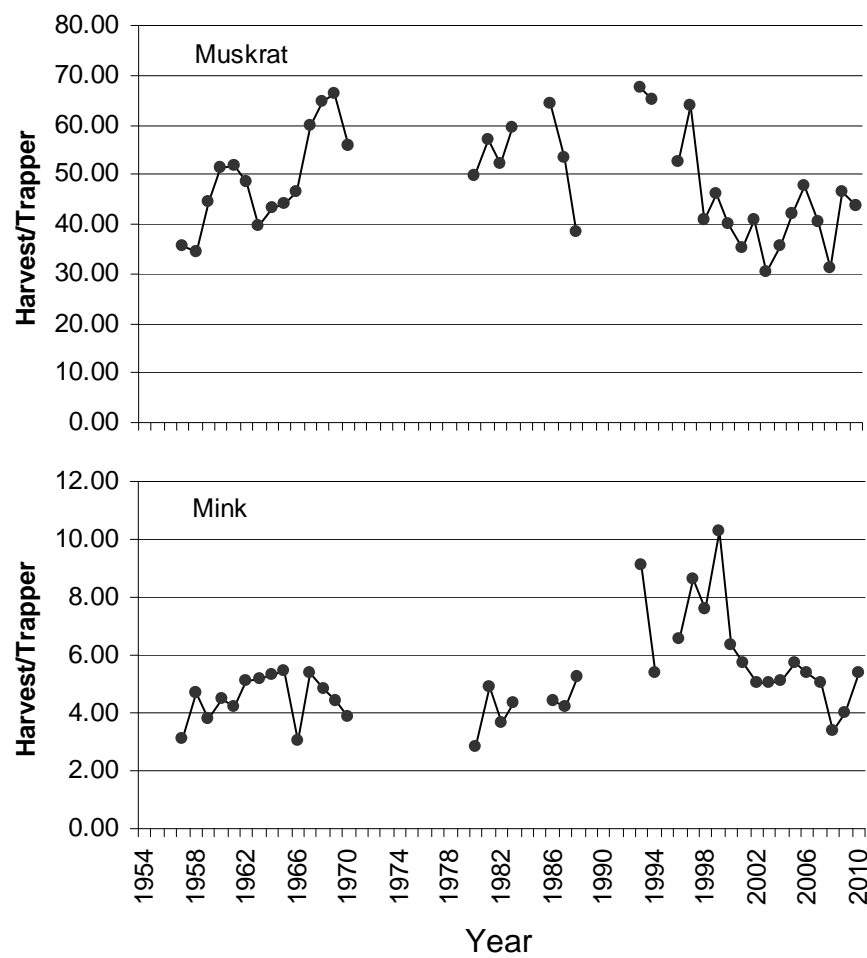


Figure 8. Estimated mean number of furbearers harvested annually by trappers in Michigan estimated from mail harvest surveys, 1954-2010. Data were not available for all years.

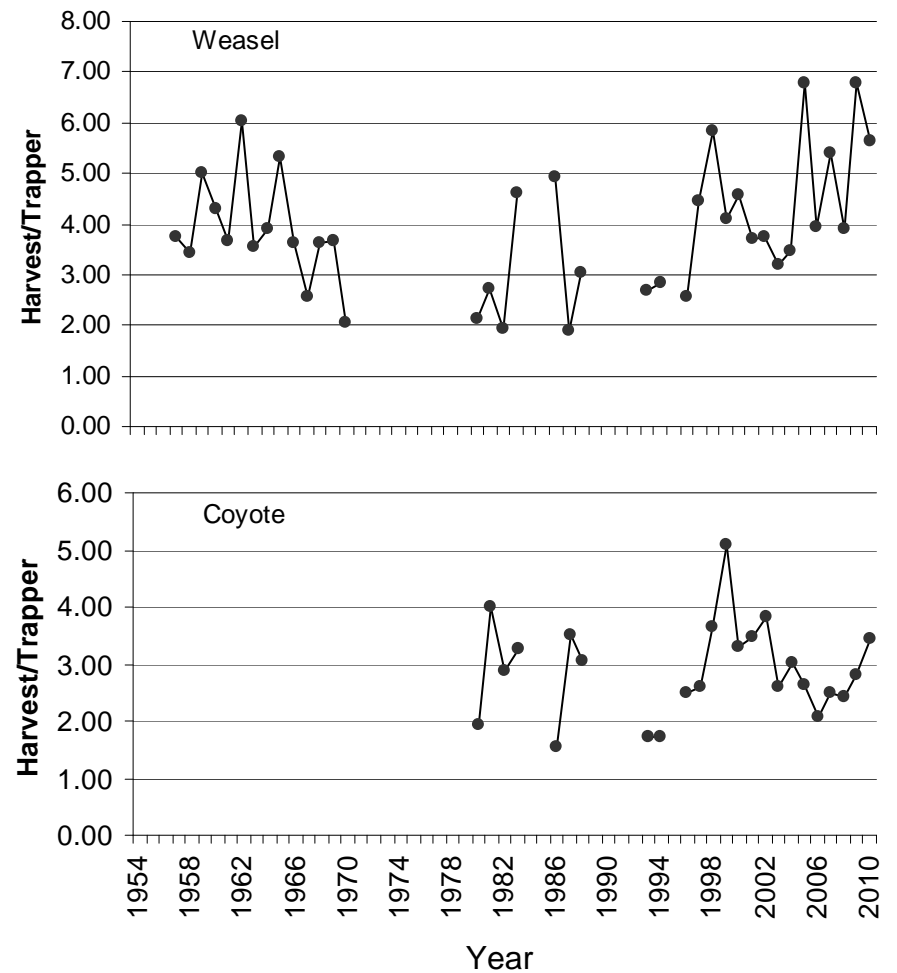
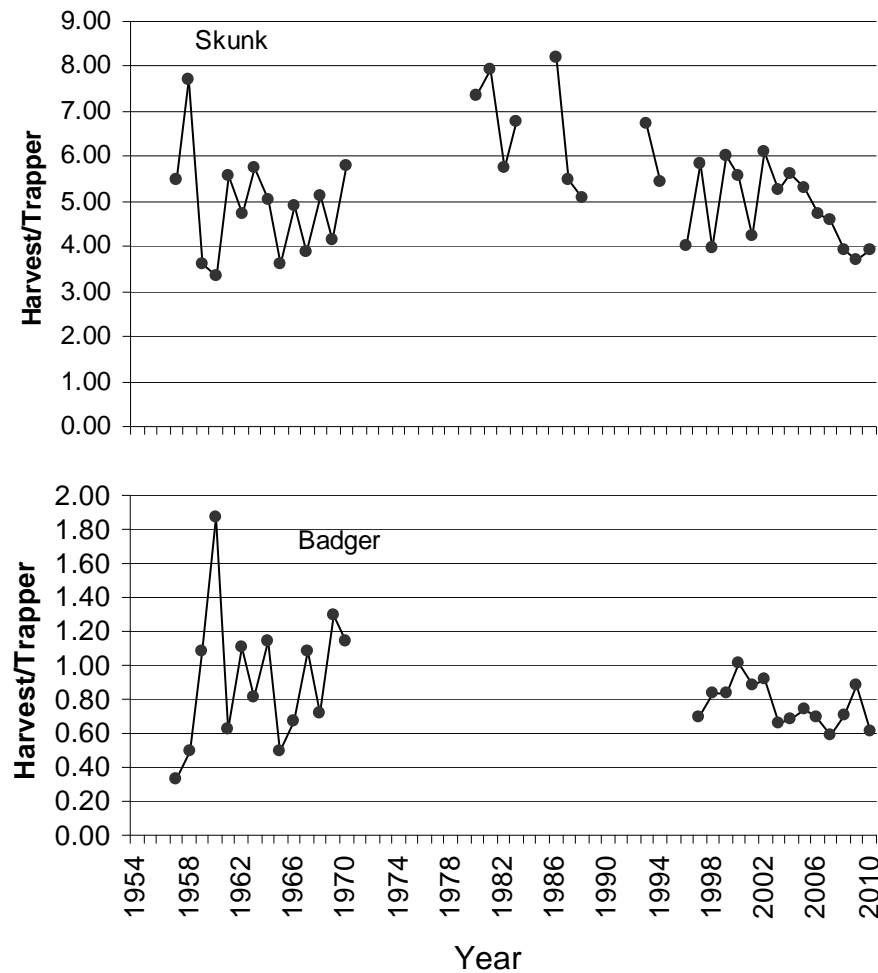


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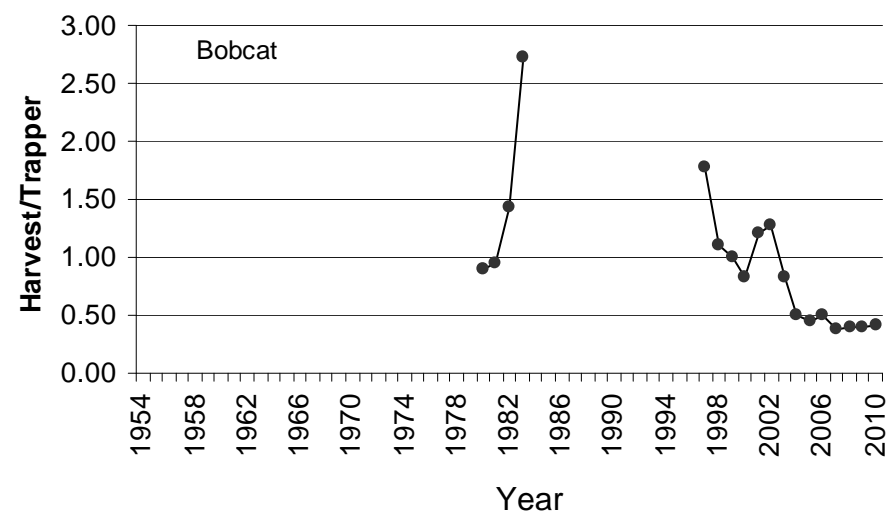
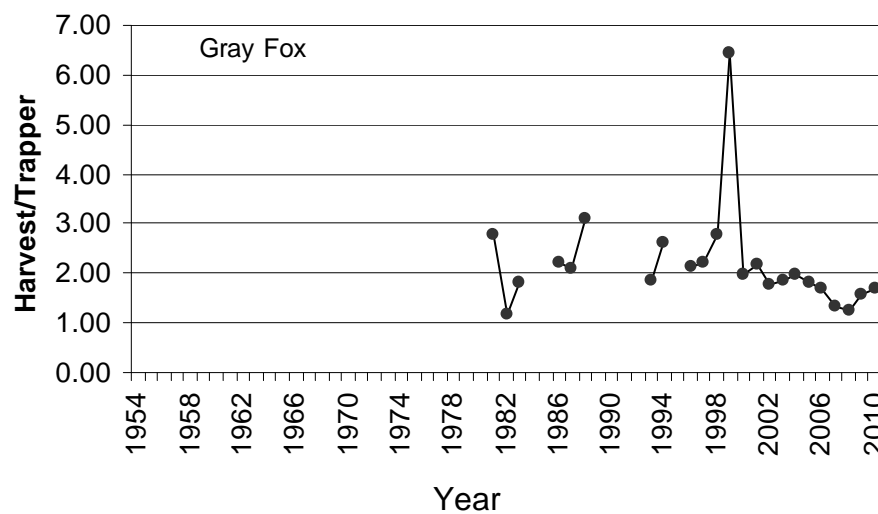
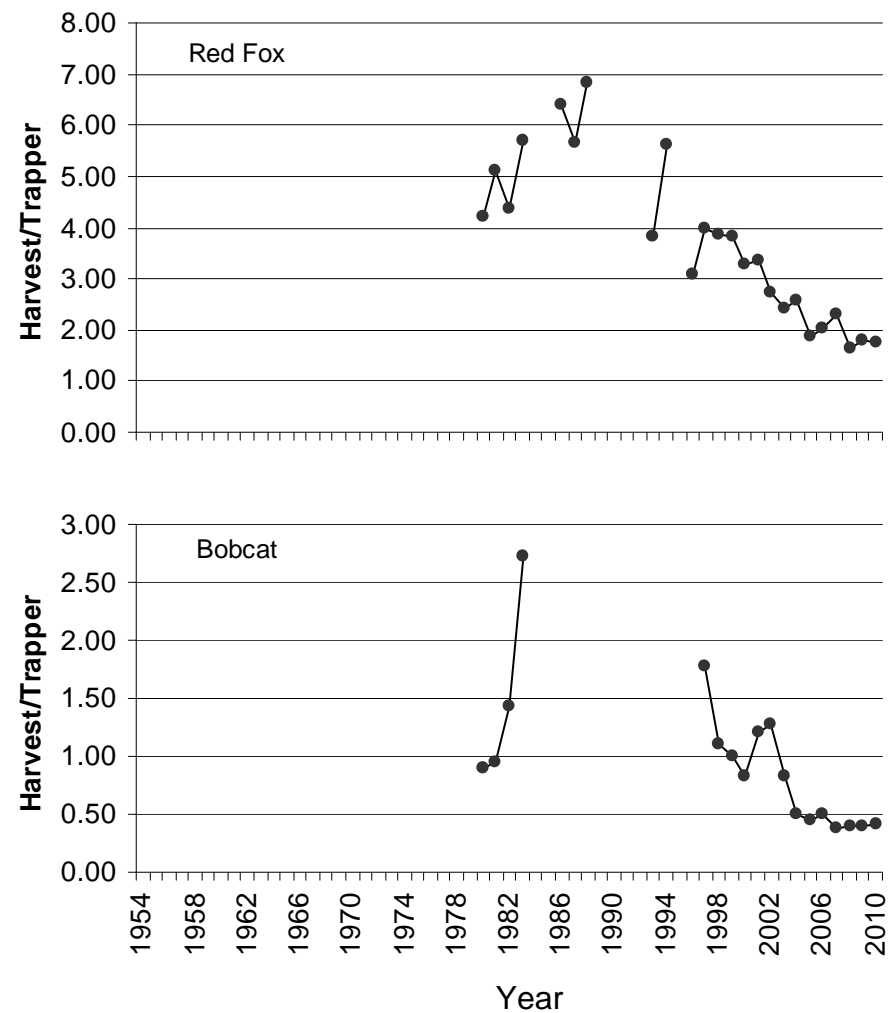
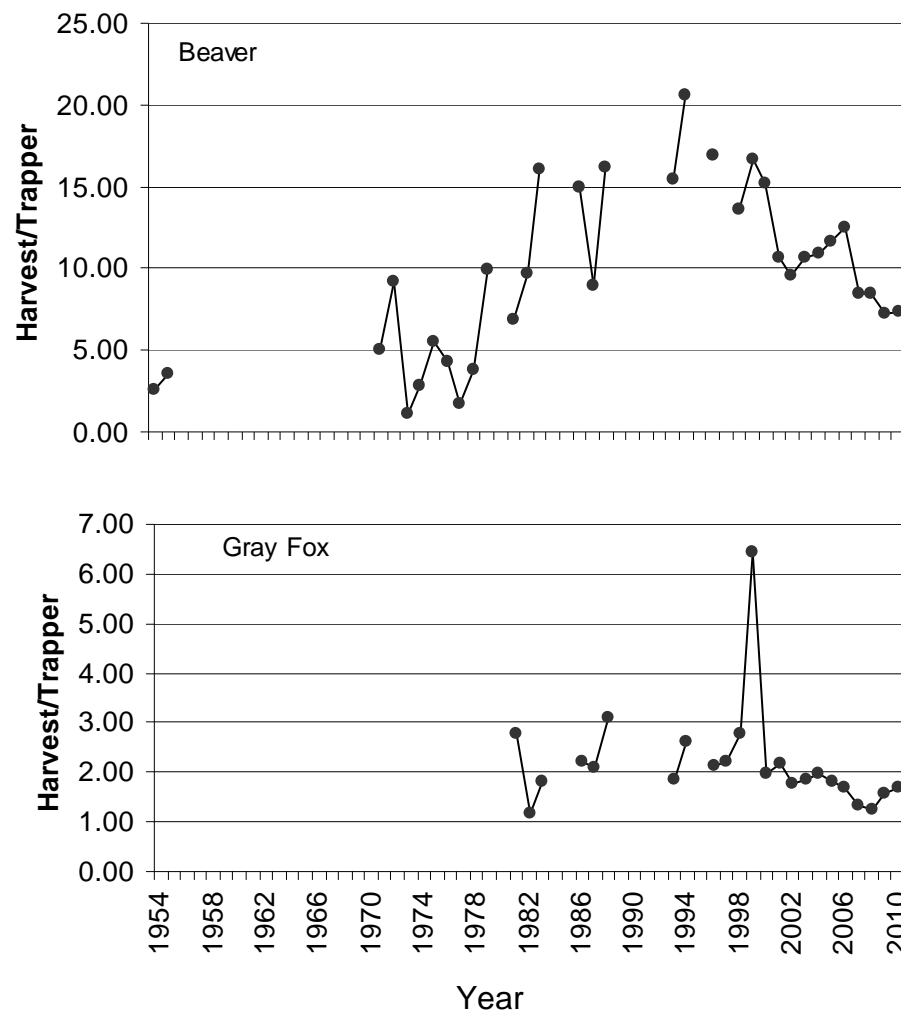


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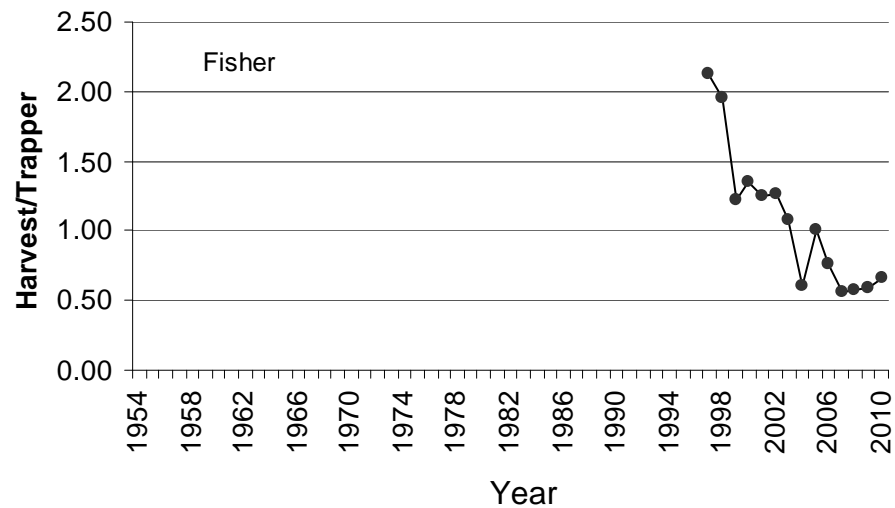
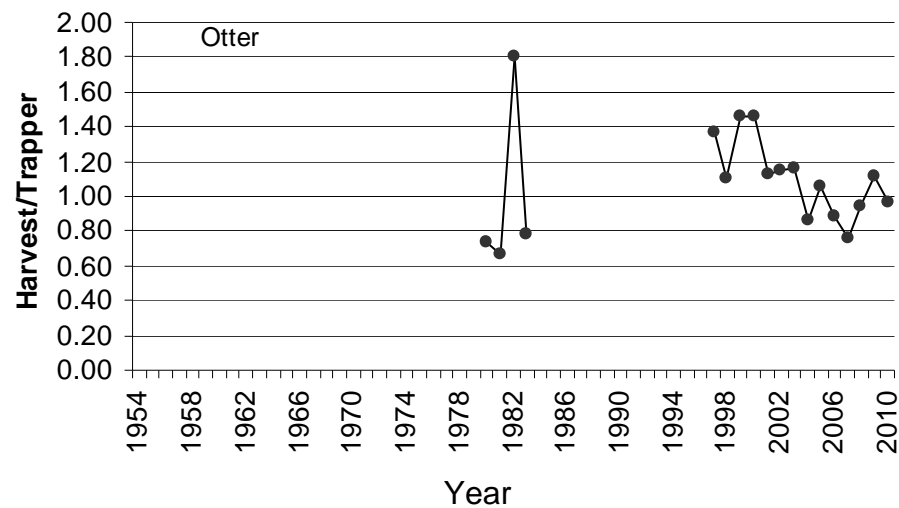


Figure 8 (continued). Estimated mean number of furbearers harvested annually by trappers in Michigan estimated from mail harvest surveys, 1954-2010. Data were not available for all years.

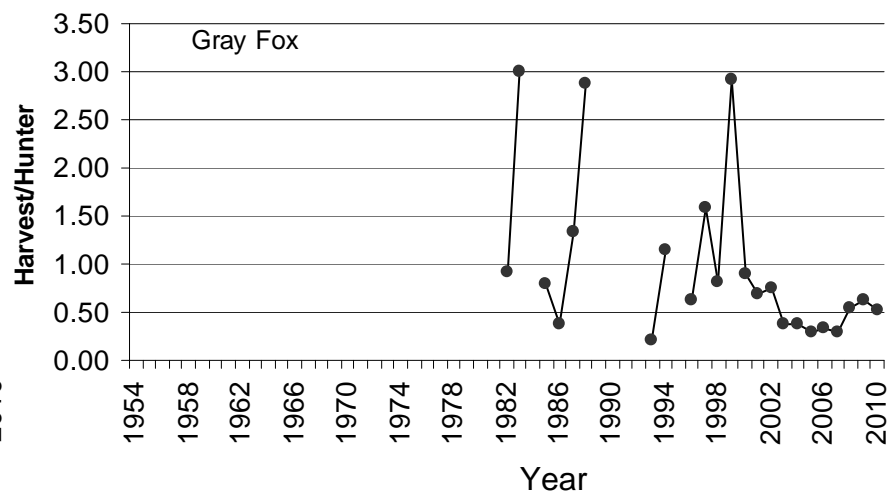
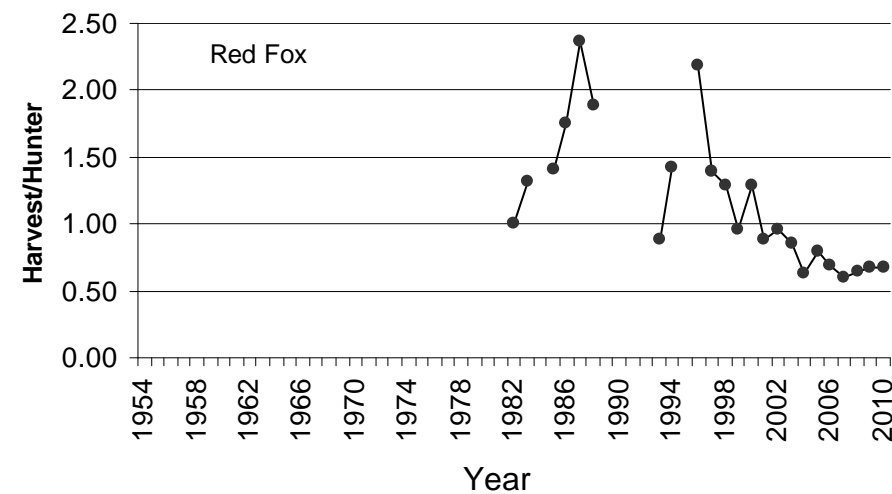
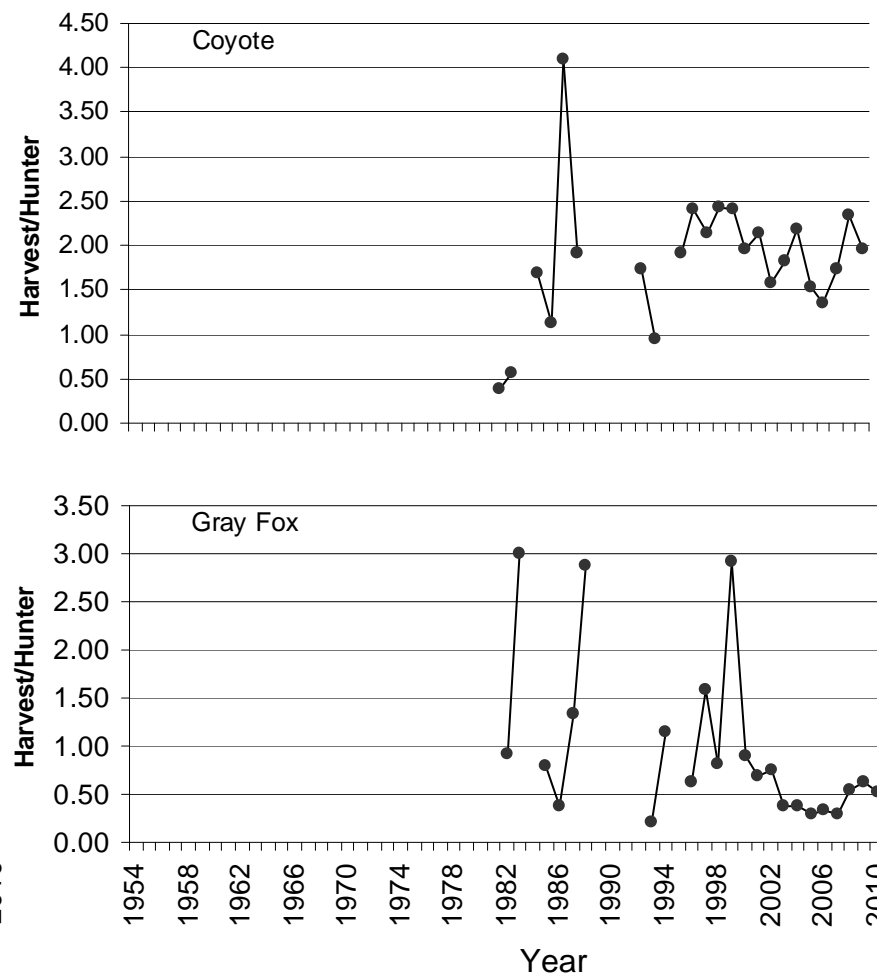
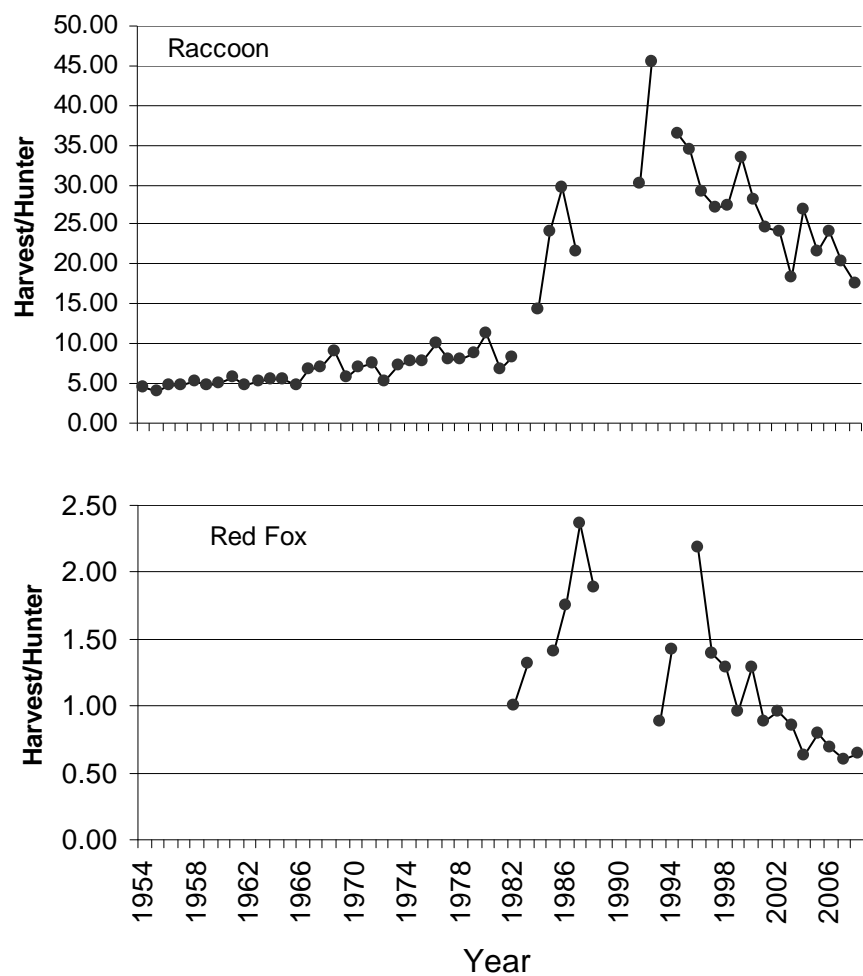


Figure 9. Estimated mean number of furbearers harvested annually by hunters in Michigan estimated from mail harvest surveys, 1954-2010. Data were not available for all years.

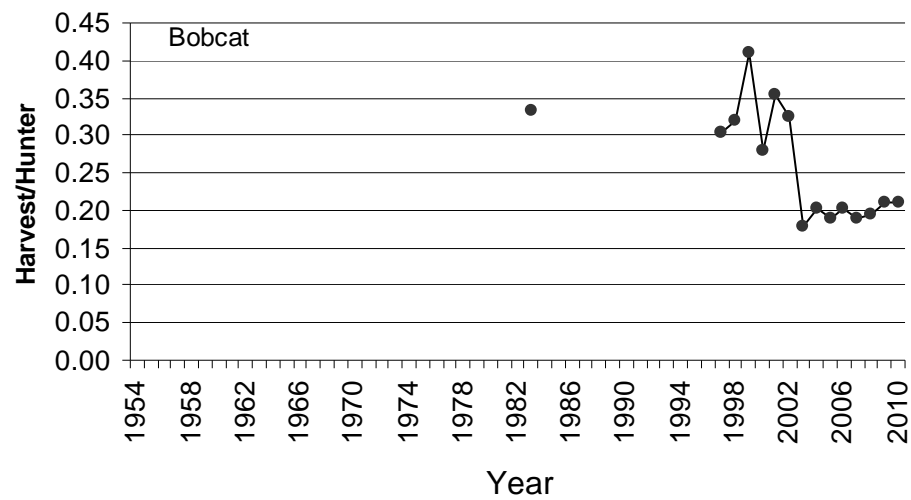


Figure 9 (continued). Estimated mean number of furbearers harvested annually by hunters in Michigan estimated from mail harvest surveys, 1954-2010. Data were not available for all years.

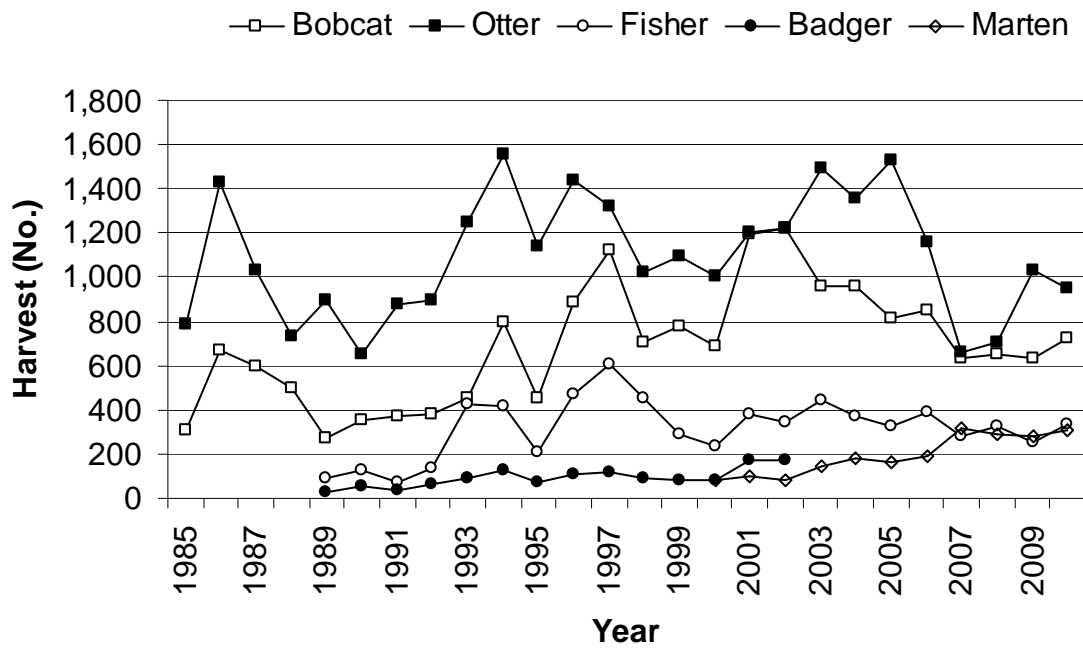


Figure 10. Number of bobcat, otter, fisher, badger, and marten registered by furtakers in Michigan, 1985-2010. Badger and fisher seasons were established in 1989, and marten season started in 2000. Totals for 2010 were preliminary. Beginning in 2003, badger were no longer registered.

Table 1. Trapping and hunting seasons when furbearing animals could be harvested in Michigan during 2010 seasons.<sup>a</sup>

Season, species, and area	Season dates
Trapping seasons <sup>b</sup>	
Muskrat and Mink	
UP	October 25 – January 31
NLP	November 1 – January 31
SLP	November 10 – January 31
Raccoon	
UP and NLP	October 15 – January 31
SLP	November 1 – January 31
Fox and Coyote	
Statewide	October 15 – March 1
Bobcat	
UP	December 1 – February 1
NLP	December 10 – 20
Badger	
UP and NLP	October 15 – November 14
SLP	November 1 – March 1
Fisher and Marten	
UP	December 1 – 15
Beaver and Otter <sup>c</sup>	
UP	October 25 – April 17
NLP	November 1 – April 17
SLP	November 10 – March 31
Hunting seasons	
Bobcat	
UP	January 1 – March 1
NLP (northern portion)	January 1 – March 1
NLP (southern portion)	January 1 – February 1
Fox	
Statewide	October 15 – March 1
Raccoon	
Statewide	October 1 – January 31
Coyote	
Statewide	July 15 – April 15

<sup>a</sup>No closed season for opossum, weasel, and skunk.

<sup>b</sup>Nonresidents may trap from November 15 through the regular season closing date, except for beaver. The opening date for nonresident beaver trapping varied by area.

<sup>c</sup>Resident seasons only. Nonresident season occurred during November 15-April 17 (UP), November 24-April 17 (NLP), and December 15 – March 31 (SLP).



Table 2. Number of fur harvester licenses sold and people receiving and returning harvest questionnaire, 2007-2010.

Item	Year			
	2007	2008	2009	2010
Licenses sold	24,617	24,338	23,520	24,582
Individuals buying licenses <sup>a</sup>	24,296	24,071	23,251	24,288
Questionnaires mailed	4,196	4,196	4,200	4,200
Non-deliverable questionnaires	60	65	57	57
Questionnaires returned	2,531	2,659	2,670	2,661
Questionnaires returned (%) <sup>b</sup>	61	64	64	64

<sup>a</sup>A person was counted only once, regardless of how many licenses they purchased. License types included Fur Harvester, Junior Fur Harvester, Senior Fur Harvester, Non-resident Fur Harvester, Military Fur Harvester, Resident Fur (trap only), and Junior Fur (trap only).

<sup>b</sup>Response rate adjusted to exclude non-deliverable questionnaires.

Table 3. Estimated number of fur harvester license buyers who trapped or hunted furbearers in Michigan, 2008-2010.

Activity	2008		2009		2010		Change between 2009 and 2010 (%)
	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL	
Trapped							
Number	7,478	398	7,224	384	7,812	408	8
%	31	2	31	2	32	2	1
Hunted							
Number	9,529	420	9,756	409	9,783	427	0
%	40	2	42	2	40	2	-2
Trapped or hunted <sup>a</sup>							
Number	13,776	427	13,369	410	14,106	430	6
%	57	2	57	2	58	2	1
Trapped only							
Number	4,247	328	3,612	300	4,323	334	20*
%	18	1	16	1	18	1	2
Hunted only							
Number	6,297	377	6,145	365	6,294	381	2
%	26	2	26	2	26	2	-1
Trapped and hunted							
Number	3,231	294	3,611	301	3,489	306	-3
%	13	1	16	1	14	1	-1

<sup>a</sup>A person was counted only once, although they may have both trapped and hunted furbearers.

\*Non-overlapping 95% confidence intervals indicated estimates differed significantly between 2009 and 2010 ( $P < 0.005$ ).

Table 4. Estimated number of participants, harvest, and days afield during Michigan furbearer seasons, 2009 and 2010.

Species and season	Participants (No.)				Harvest (No.)				Days afield (No.)			
	Year		95% CL <sup>a</sup>	Change (%)	Year		95% CL <sup>a</sup>	Change (%)	Year		95% CL <sup>a</sup>	Change (%)
	2009	2010			2009	2010			2009	2010		
<b>Trapping</b>												
Mink	2,389	2,843	280	19	9,595	15,355	3,911	60	61,300	73,782	10,357	20
Raccoon	4,750	5,136	355	8	66,401	79,371	12,230	20	111,170	128,590	13,982	16
Opossum	2,212	2,242	249	1	20,474	25,781	5,958	26	52,620	76,627	20,046	46
Skunk	1,478	1,629	218	10	5,487	6,392	1,481	16	37,581	45,895	10,123	22
Weasel	801	830	160	4	5,434	4,671	4,051	-14	20,343	21,028	6,049	3
Red fox	2,573	2,765	276	7	4,622	4,834	1,298	5	63,639	69,396	11,168	9
Gray fox	1,540	1,699	222	10	2,406	2,872	771	19	41,088	45,325	9,704	10
Coyote	3,443	3,909	321	14	9,628	13,464	3,226	40	90,837	93,493	12,272	3
Bobcat <sup>b</sup>	794	887	42	12*	317	374	36	18	13,467	17,822	1,307	32*
Beaver <sup>c</sup>	2,104	1,961	239	-7	15,243	14,304	3,464	-6	41,317	40,017	8,575	-3
Muskrat	3,673	4,103	326	12	170,147	179,774	28,271	6	86,243	100,043	12,543	15
Otter <sup>c</sup>	919	944	42	3	1,022	914	64	-11	15,521	17,130	1,381	10
Fisher <sup>d</sup>	398	493	27	24*	232	327	36	41*	3,773	4,942	332	31*
Badger	319	311	98	-3	248	191	80	-23	5,169	7,107	3,112	38
<b>Hunting</b>												
Raccoon	3,822	3,348	298	-12	77,387	58,540	11,224	-24	78,914	60,979	10,975	-23
Red fox	2,866	2,750	275	-4	1,947	1,840	611	-5	38,422	35,969	5,611	-6
Gray fox	1,518	1,440	206	-5	952	749	391	-21	21,644	20,034	4,635	-7
Coyote	7,504	7,681	405	2	17,637	15,094	2,691	-14	104,273	109,293	12,869	5
Bobcat <sup>b</sup>	1,654	1,734	50	5	349	363	31	4	17,215	16,591	899	-4
<b>Trapping and hunting combined</b>												
Raccoon	7,256	7,192	396	-1	143,788	137,910	17,347	-4	190,084	189,569	18,859	0
Red fox	4,721	4,781	346	1	6,569	6,674	1,464	2	102,061	105,365	13,305	3
Gray fox	2,660	2,776	277	4	3,358	3,621	871	8	62,732	65,359	11,740	4
Coyote	9,082	9,636	426	6	27,265	28,558	4,324	5	195,110	202,786	19,446	4
Bobcat <sup>b</sup>	2,234	2,393	50	7*	666	737	46	11	30,701	34,413	1,585	12*

<sup>a</sup>95% CL for the 2010 estimate.<sup>b</sup>Bobcat estimates from separate mail harvest survey (Frawley 2011c). See Table 5 for registration totals.<sup>c</sup>Otter estimates from separate mail harvest survey (Frawley 2011b). See Table 5 for registration totals.<sup>d</sup>Fisher estimates from separate mail harvest survey (Frawley 2011a). See Table 5 for registration totals.

\*Non-overlapping 95% confidence intervals indicated estimates differed significantly between 2009 and 2010 (P&lt;0.005).

Table 5. Number of bobcat, otter, fisher, badger and marten registered by furtakers in Michigan, 1985-2010.<sup>a</sup>

Year	Species							
	Bobcat (by method of capture)				Otter	Fisher <sup>a</sup>	Badger <sup>b,c</sup>	Marten <sup>d</sup>
	Hunting	Trapping	Unknown	Total				
1985	193	100	14	307	791			
1986	268	390	11	669	1,431			
1987	315	277	5	597	1,030			
1988	327	170	0	497	731			
1989	178	91	0	269	900	94	28	
1990	266	85	0	351	654	125	52	
1991	292	79	0	371	877	68	35	
1992	276	104	0	380	896	139	63	
1993	285	163	0	448	1,252	425	90	
1994	373	422	0	795	1,552	417	124	
1995	311	137	1	450	1,143	210	75	
1996	463	420	0	883	1,438	471	109	
1997	347	771	0	1,118	1,324	609	117	
1998	331	375	0	706	1,026	455	91	
1999	434	343	0	777	1,097	291	82	
2000	379	307	0	686	1,006	236	85	85
2001	465	727	0	1,192	1,204	381	174	97
2002	482	741	0	1,223	1,221	348	173	85
2003	340	621	0	961	1,496	442		149
2004	321	637	0	958	1,358	368		184
2005	309	508	0	817	1,526	322		164
2006	336	515	0	851	1,154	390		192
2007	336	299	0	632	663	280		316
2008	284	364	0	648	707	326		290
2009	339	291	0	630	1030	255		284
2010 <sup>e</sup>	371	356	0	727	948	335		304

<sup>a</sup>Registration totals included only animals legally harvested by furtakers during hunting and trapping seasons.

Also, totals only included animals that were registered and returned to the furtaker.

<sup>b</sup>Badger and fisher seasons were established in 1989.

<sup>c</sup>Furtakers no longer were required to register badgers beginning in 2003.

<sup>d</sup>Marten season was established in 2000.

<sup>e</sup>Preliminary totals.

Table 6. Estimated number of trappers using foothold traps and cable restraints (snare) to catch coyote and fox, trapping effort, mean number of traps set per day, number of animals captured, and number of animals escaping from traps in Michigan during 2010 season.<sup>a</sup>

Type of trapper	Trappers		Trapping effort (day)		Traps set per day		Animals caught		Animals that escaped	
	No.	95% CL	No.	95% CL	Mean	95% CL	No.	95% CL	No.	95% CL
Using foothold traps to catch coyote	3,145	293	72,773	10,109	9.7	1.0	8,743	2,343	2,203	568
Using foothold traps to catch fox	2,585	268	67,481	16,004	9.3	1.0	5,447	1,388	957	305
Using cable restraints to catch coyote	910	165	25,897	6,550	16.7	5.2	2,909	1,490	2,938	1,700
Using cable restraints to catch fox	434	115	11,932	4,769	17.1	8.0	281	156	1,066	1,329

<sup>a</sup>Non-overlapping 95% confidence intervals indicated estimates declined significantly between 2009 and 2010 ( $P < 0.005$ ).

Table 7. Estimated number of trappers that caught an incidental bobcat and number of incidental bobcats caught and registered in Michigan, 2010.

Region <sup>a</sup>	Trappers		Incidental bobcats captured and released alive <sup>b</sup>		Incidental bobcats captured and registered <sup>b</sup>	
	No.	95% CL	No.	95% CL	No.	95% CL
Upper Peninsula	41	38	41	60	20	27
Northern Lower Peninsula	93	54	205	142	0	0
Southern Lower Peninsula	54	40	98	82	0	0
Statewide	178	75	343	179	20	27

<sup>a</sup>See Figure 1 for region boundaries.

<sup>b</sup>Incidental bobcats caught in Alcona, Alpena, Cheboygan, Gogebic, Houghton, Lake, Manistee, Mason, Menominee, Montcalm, Newaygo, Osceola, Otsego, Roscommon, Schoolcraft, and Wexford counties.

Table 8. Estimated number of beaver trappers, beaver harvested, and trapping effort (days afield), summarized by trappers with and without an otter harvest tag in Michigan, 2010.

Beaver trapper group	Trappers		Days afield		Harvest	
	No.	95% CL	No.	95% CL	No.	95% CL
Without an otter harvest tag	1,058	178	22,348	6,776	5,826	2,329
With an otter harvest tag	904	167	17,669	5,359	8,479	2,593
Combined	1,961	239	40,017	8,575	14,304	3,464