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## 2004 MICHIGAN FURBEARER HARVEST SURVEY

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### ABSTRACT

*A sample of furtakers was contacted after the 2004 hunting and trapping seasons to estimate the number of participants, days afield (effort), and furbearer harvests. In 2004, about 13,600 furtakers pursued furbearers; an increase of 4% from 2003. About 33% of the license buyers trapped (6,923 trappers), 47% hunted (10,071 hunters) and 16% both trapped and hunted (3,356 furtakers) during 2004. The species most frequently pursued by trappers were raccoons, coyotes, and muskrats. Hunters most commonly sought coyotes, raccoons, and red fox. Harvest levels of most furbearers in 2004 were within historical ranges, except for coyotes. The number of coyotes taken by both hunters and trappers was the highest recorded since 1980. Trends in harvest are affected by both changes in furtaker and furbearer numbers; thus, harvest per furtaker was also examined for trends. The mean number of raccoon and opossum taken per furtaker has increased since the 1980s. The mean harvest of coyotes per hunter has increased since the mid-1980s, while the mean harvest of red fox by both hunters and trappers has declined during this same period. These trends suggest that raccoon, opossum, and coyote may have been increasing in abundance during the last 20 years, while red fox numbers may have been declining. An estimated 23% of trappers used snares to catch coyote or fox, and about 6% of trappers attempted to catch beaver using snares in underwater sets.*



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## INTRODUCTION

The Michigan Department of Natural Resources (DNR) has 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 its 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 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 (*Lutra canadensis*), striped skunk (*Mephitis mephitis*), and weasels (*Mustela* spp.) (Frawley 2004). Opossum, weasels, and skunks could be taken year-round with any hunting or trapping license. The remaining furbearers could be harvested in 2004 during late fall through mid-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 causing damage.

## METHODS

Following the 2004 hunting and trapping seasons, a questionnaire was sent to a random sample of people 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). The primary reason for using a stratified sampling design was to produce more precise estimates. Improved precision means that similar estimates should be obtained if this survey was repeated.

Estimates were calculated along with their 95% confidence limit (CL). In theory, this confidence limit can be added and subtracted from the estimate to calculate the 95% confidence interval. The confidence interval is a measure of the precision associated with the estimate and implies that the true value would be within this interval 95 times out of 100. Unfortunately, there are several other possible sources of error in surveys that are probably more serious than theoretical calculations of sampling error. They include failure of participants to provide answers (nonresponse bias), question wording, and question order. It is very difficult to measure these biases. Furthermore, harvest estimates did not include nuisance animals legally taken out of season or illegal take.

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

Questionnaires were mailed initially during mid-April 2005, and up to two follow-up questionnaires were mailed to nonrespondents. About 2% of the questionnaires were undeliverable (Table 2). Of the questionnaires that were delivered, 73% of the questionnaires were completed and returned.

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, 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. Separate surveys also were conducted to estimate hunting and trapping participation, harvest, and effort for bobcat (Frawley et al. 2005) and marten seasons (Frawley 2005).

While the primary objectives of the fur harvester's survey were estimating harvest, trapper and hunter numbers, 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 snares while attempting to capture coyote, fox, or beaver during 2004-2005 seasons. Bobcat trappers also were asked to report the average number of traps set daily for bobcats.

## **RESULTS AND DISCUSSION**

In 2004, 21,466 licenses were purchased by 21,228 people (Figure 2, Table 2). The number of license buyers in 2004 was 8% higher than the preceding three-year average of 19,688 (2001-2003). Most license buyers were men (98%), with an average age of 44 years (Figure 3). About 5% of the license buyers (1,147) were younger than 17 years of age.

Mail Harvest Survey Overall, approximately 64% of license buyers either hunted or trapped furbearers during 2004 (Table 3). The number of active furtakers increased about 4% from 2003. About 33% of the license buyers trapped and 47% hunted furbearers during 2004. Trappers most often pursued raccoons, coyote, and muskrat (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.

The estimated number of trappers increased by about 4% between 2003 and 2004. However, the estimated number of people trapping 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 increased by 6% between 2003 and 2004, while hunter numbers increased by 24% between 2002 and 2004. Furthermore, the number of people hunting furbearers has surpassed number trapping since 1998 (Figure 4).

Harvest levels of most furbearers in 2004 were within historical ranges, except for harvest of coyote (Figures 5-7). The number of coyotes taken by both hunters and trappers was the highest recorded since 1980. Estimated harvest of raccoon by hunters, muskrat by trappers, and red fox by both hunters and trappers were near their lowest reported levels in 2004 (Figures 5-7).

Many factors influence harvest trends such as hunter 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 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 increased since the early 1980s (Figures 8 and 9). The mean harvest of coyotes per hunter has increased since the mid-1980s, while the mean harvest of red fox by both hunters and trappers has declined during this same period. These trends suggest that raccoon, opossum, and coyote 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 and increasing coyote numbers also 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 number of bobcats taken per trapper declined from 2003 to 2004 (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 (Frawley et al. 2005). The mean number of fisher taken per trapper declined in 2004 (Figure 8); however, the trend for fisher should be viewed cautiously because of limited data. Furthermore, registration data for fisher does not suggest a long-term declining population (Table 5).

Registration Data Compared to 2003, more marten (23% increase) were registered in 2004; however, fewer fisher (17% decline), otter (11%), and bobcats (<1%) were registered (Figure 10, Table 5).

Additional Questions Related to Snaring and Bobcat Trapping An estimated 23% ( $\pm 2\%$ ) of trappers used snares in an attempt to catch coyote or fox (1,585  $\pm$  189 trappers). About 6% ( $\pm 1\%$ ) of trappers attempted to catch beaver using snares in underwater sets (435  $\pm$  102 trappers). Bobcat trappers had an average of 6.5  $\pm$  1.6 traps set daily for bobcat.

## **ACKNOWLEDGEMENTS**

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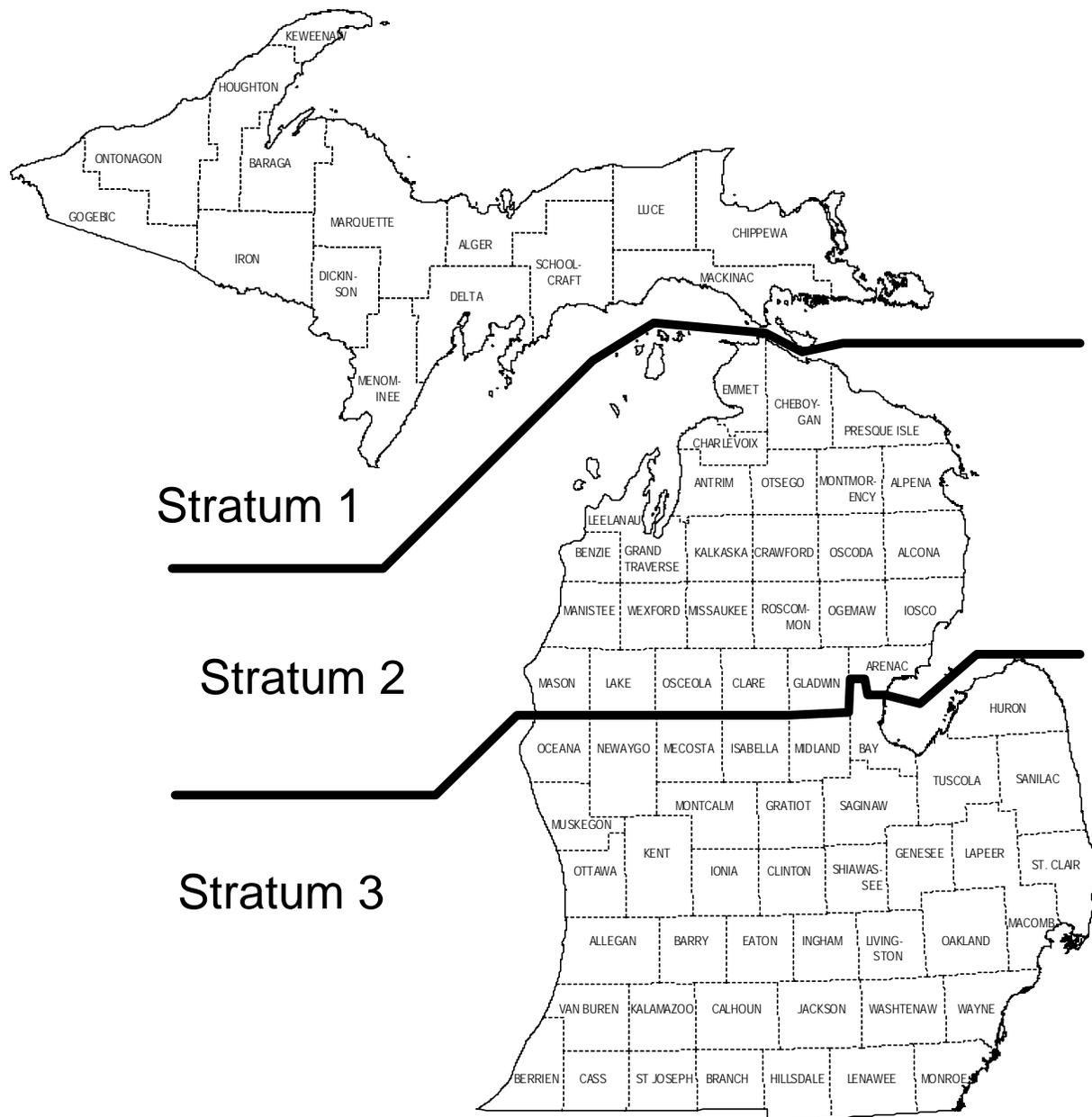


Figure 1. Stratum boundaries used for the analysis of the Michigan furbearer harvest survey. Nonresidents were included as a fourth stratum.

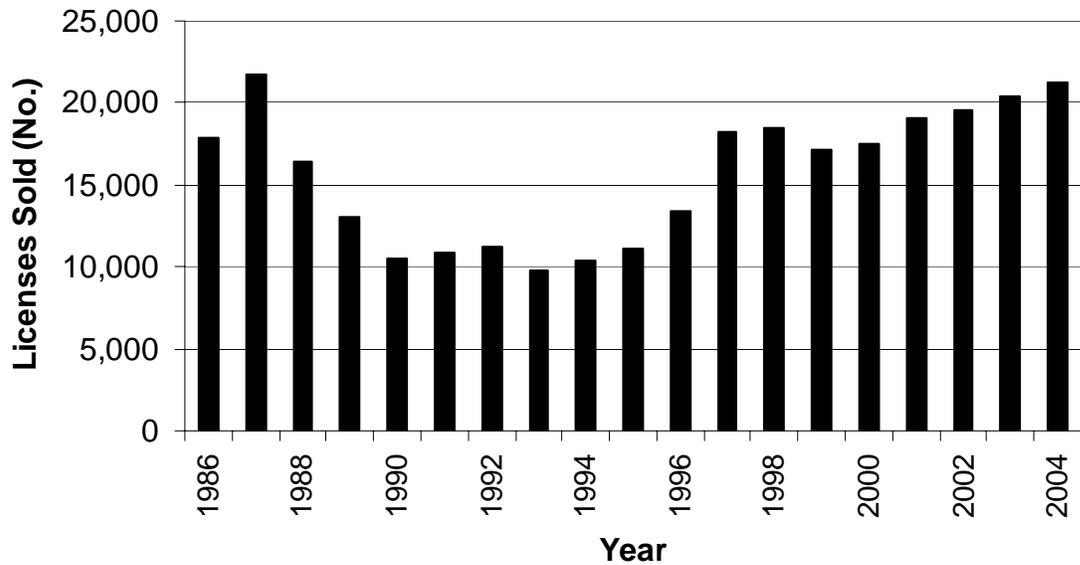


Figure 2. Number of fur harvester licenses sold in Michigan, 1986-2004. Fur harvester licenses included Resident Fur Harvester, Senior Fur Harvester, Junior Fur Harvester, Military Fur Harvester, and Nonresident Fur Harvester licenses. During 1996-2004, totals also included Resident Fur Harvester (trap only) and Junior Fur Harvester (trap only) licenses.

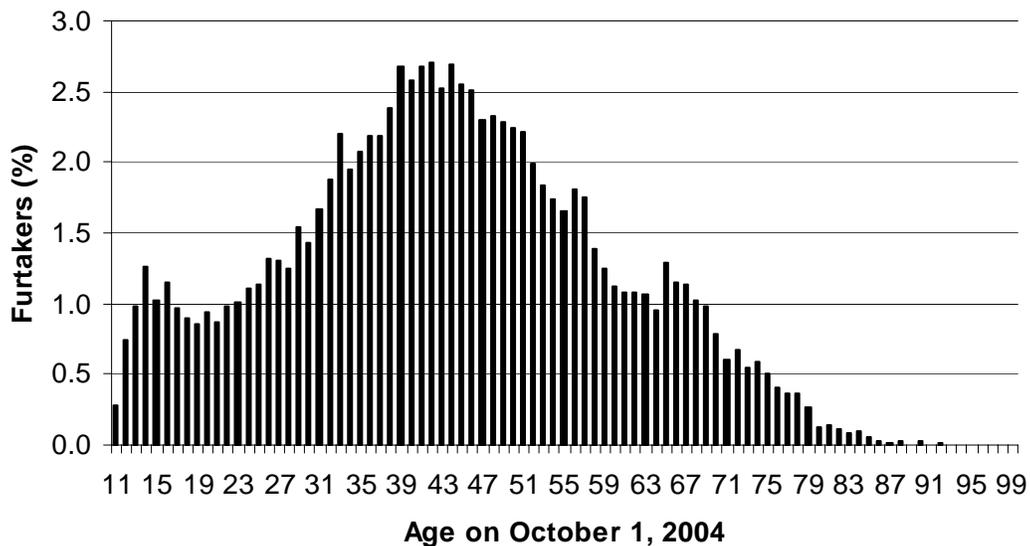


Figure 3. Ages of people that purchased a license to hunt or trap furbearers in Michigan for the 2004 hunting and trapping seasons ( $\bar{x}$  = 44 years).

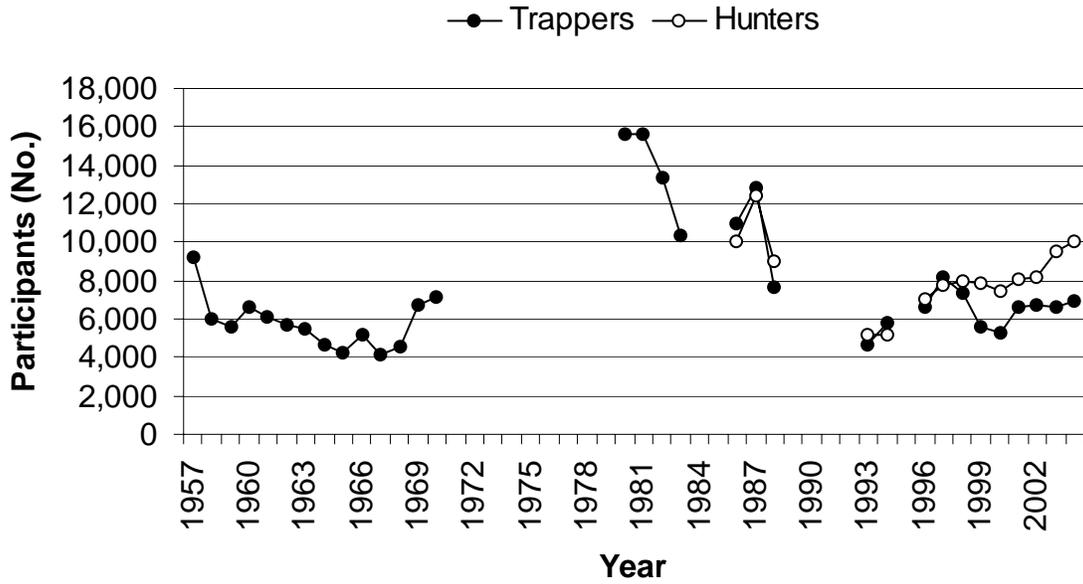


Figure 4. Estimated number of trappers and hunters in Michigan, 1957-2004. Estimates included only license buyers that actually trapped or hunted furbearers (any species). Data were not available for all years.

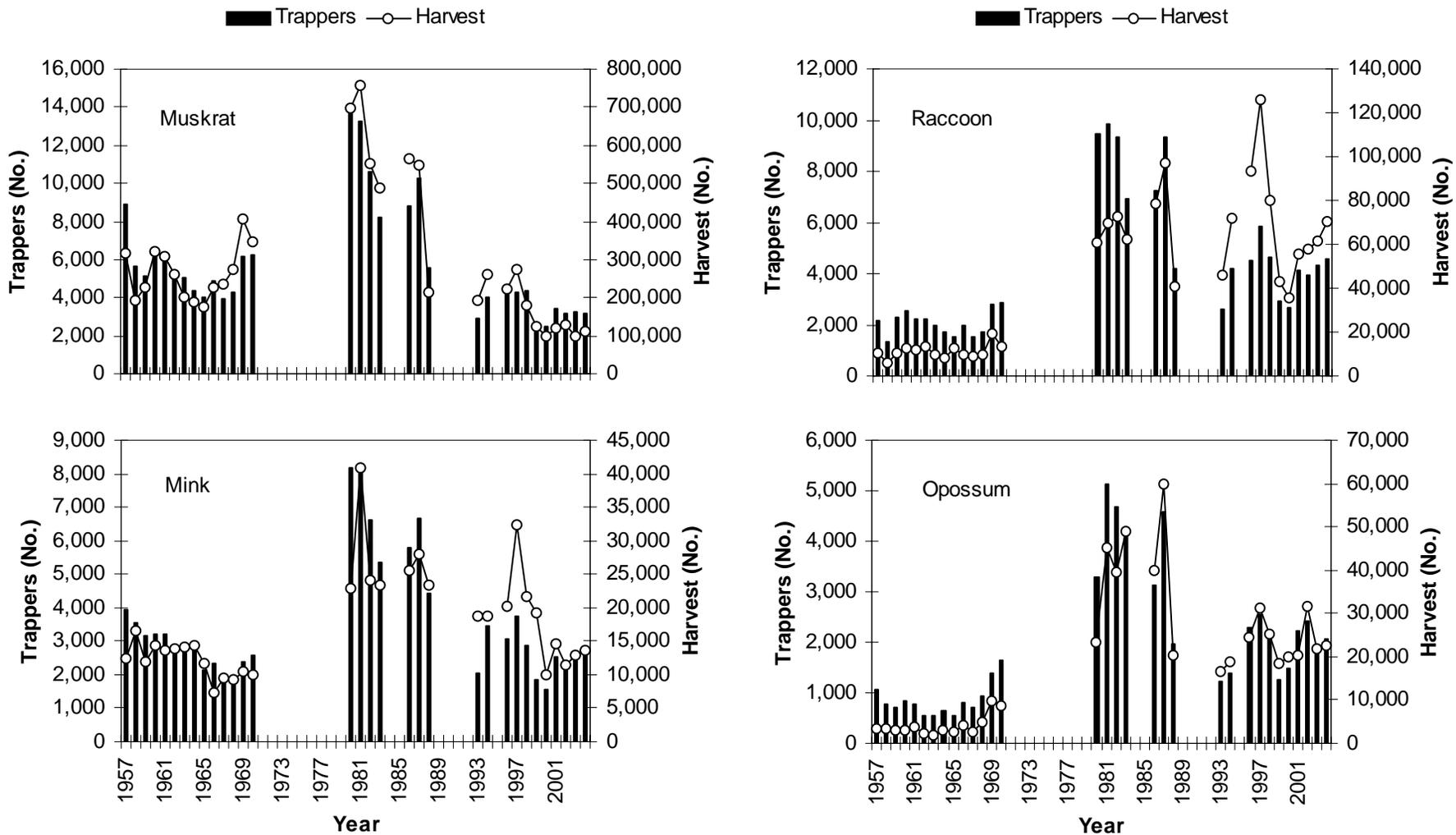


Figure 5. Estimated furbearer harvest by trappers and the number of trappers in Michigan estimated from mail harvest surveys, 1957-2004. Mail survey questionnaires were sent to a random sample of Trapping license buyers during 1957-1969. The sample also included Sportsman's license buyers in 1970-1972. During 1980-1983, the sample included Trapping and Senior Hunting license buyers. During 1986-2004, 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.

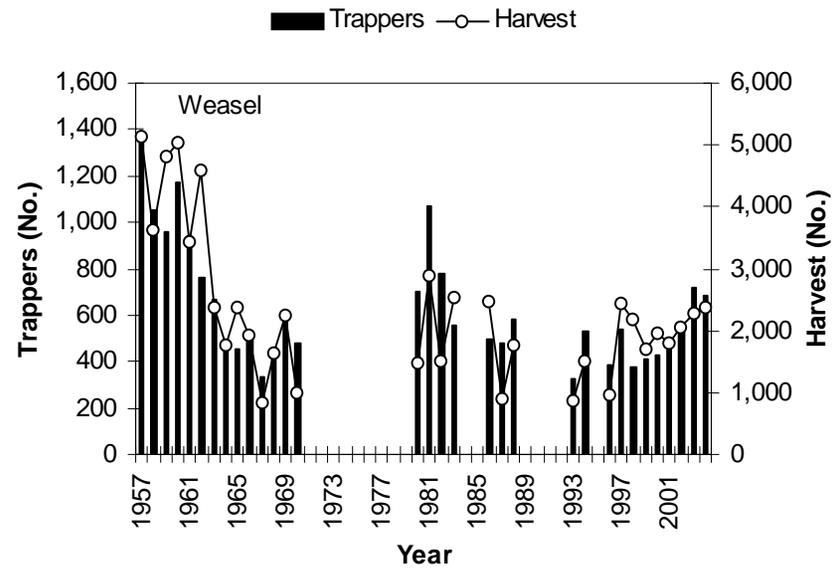
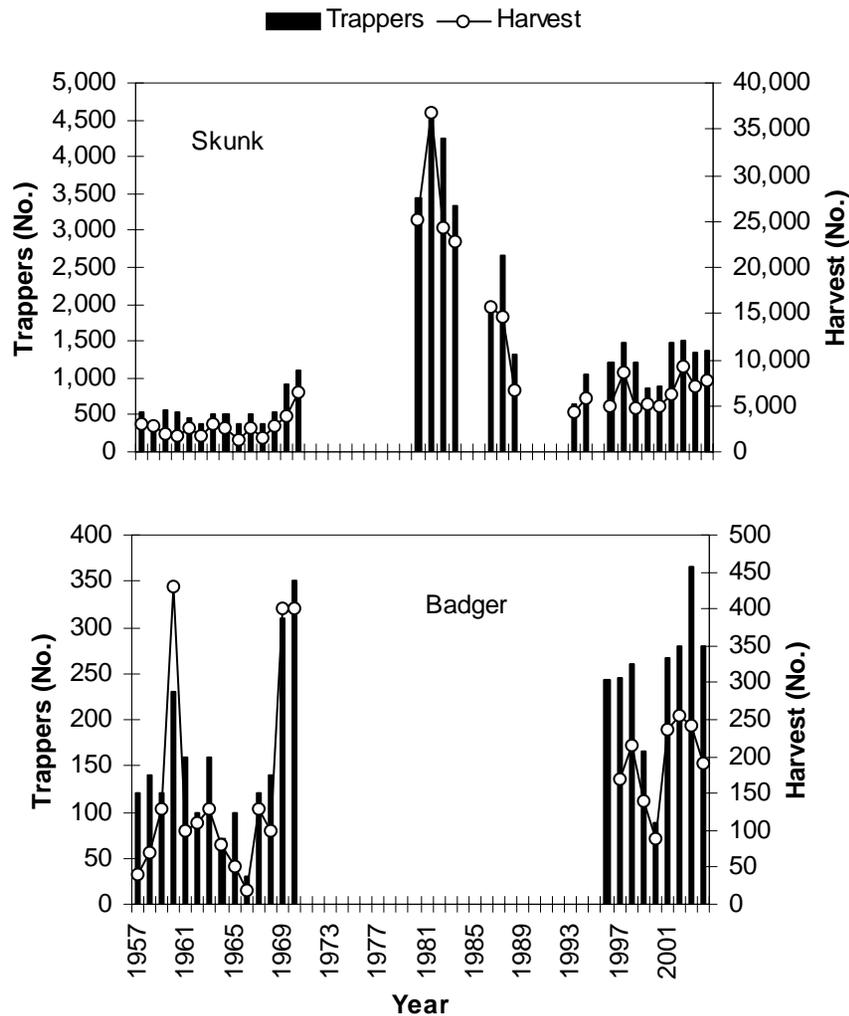


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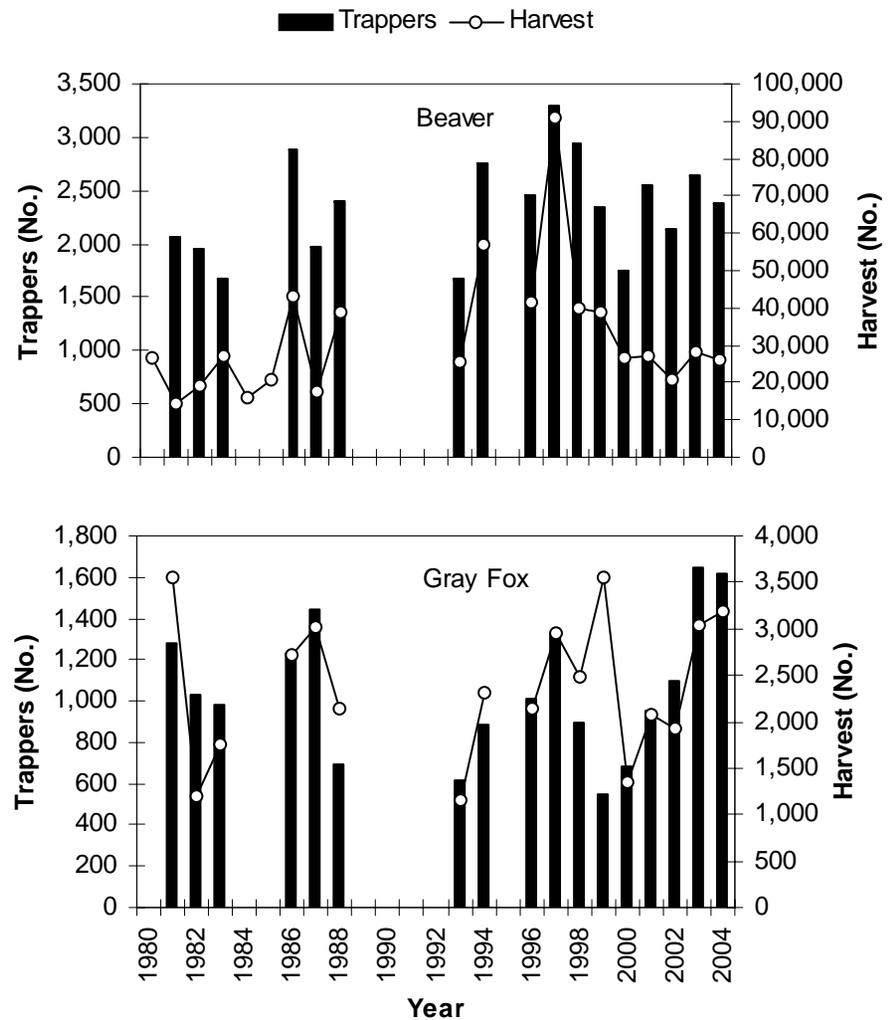
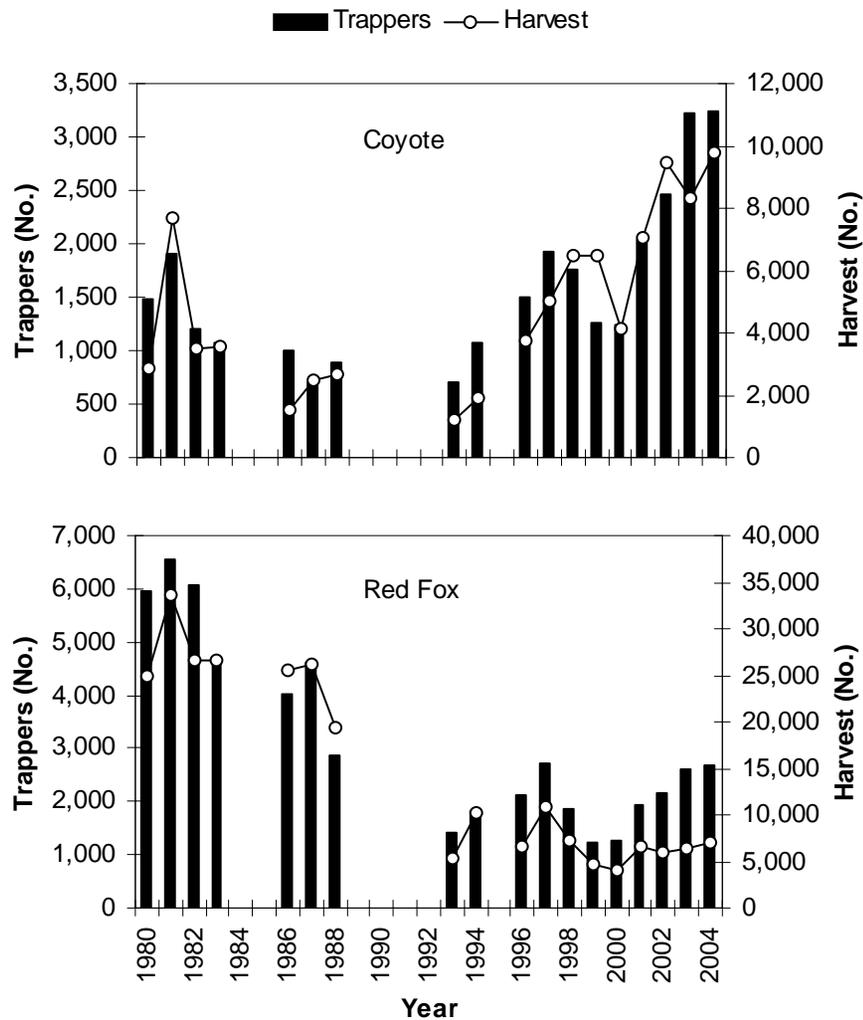


Figure 6. Estimated furbearer harvest by trappers and the number of trappers in Michigan estimated from mail harvest surveys, 1980-2004. The mail survey was sent to a random sample of Trapping and Senior Hunting license buyers during 1980-1983. During 1986-2004, the sample was selected from people buying 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.

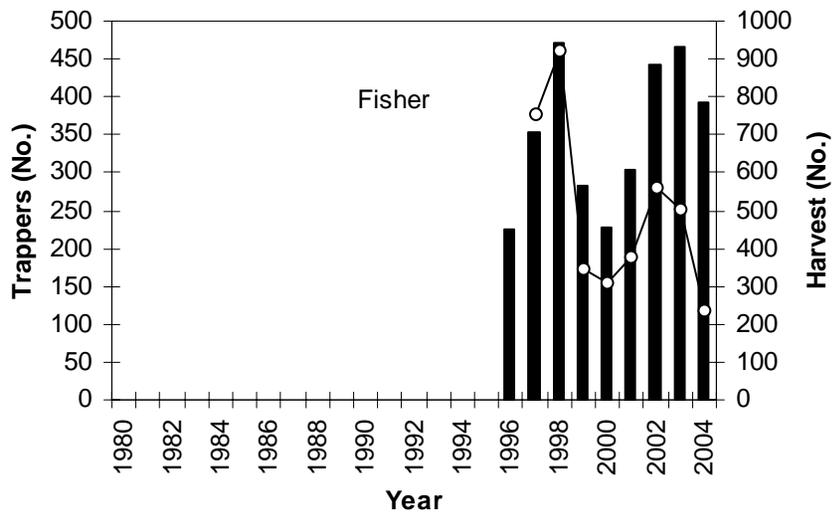
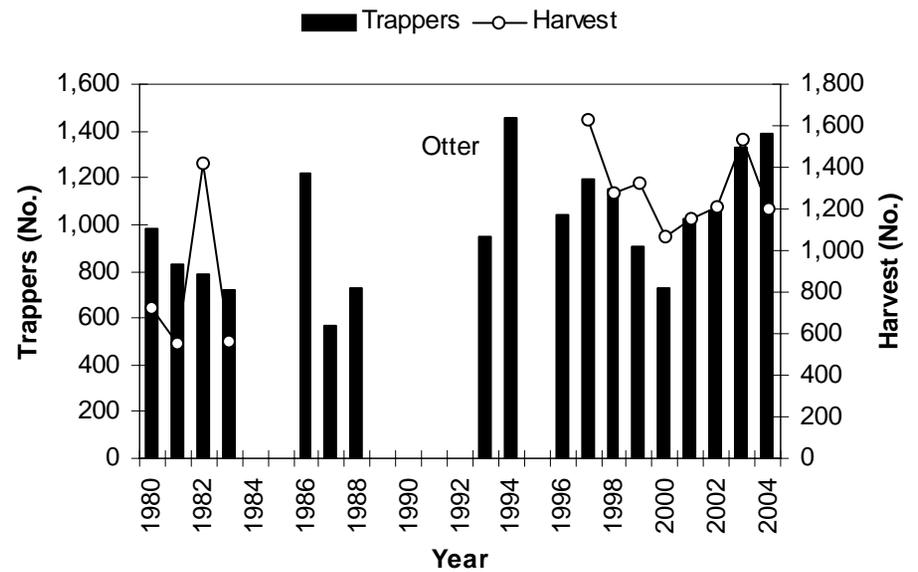
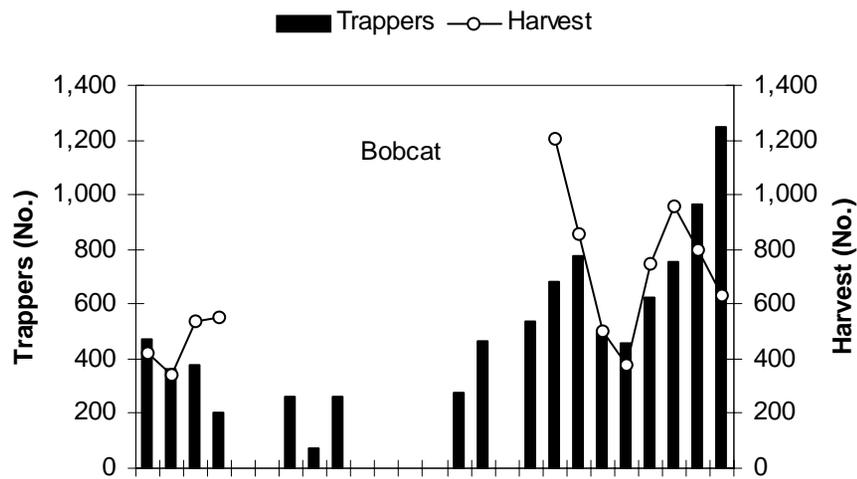


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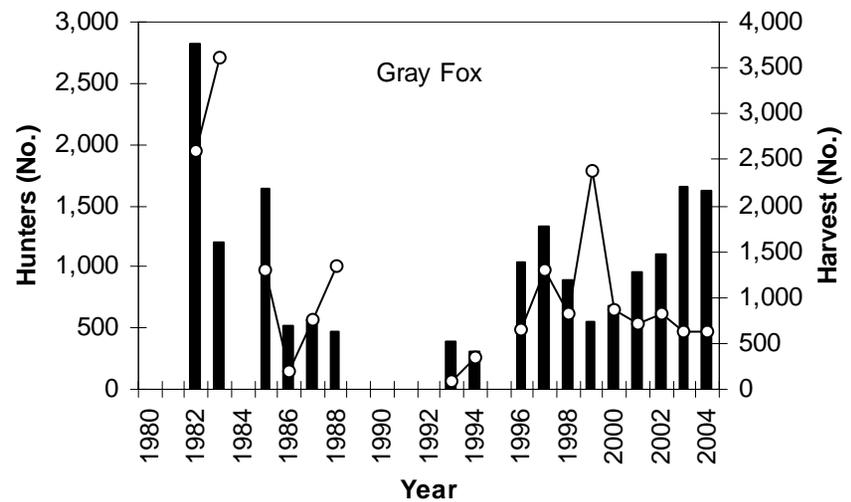
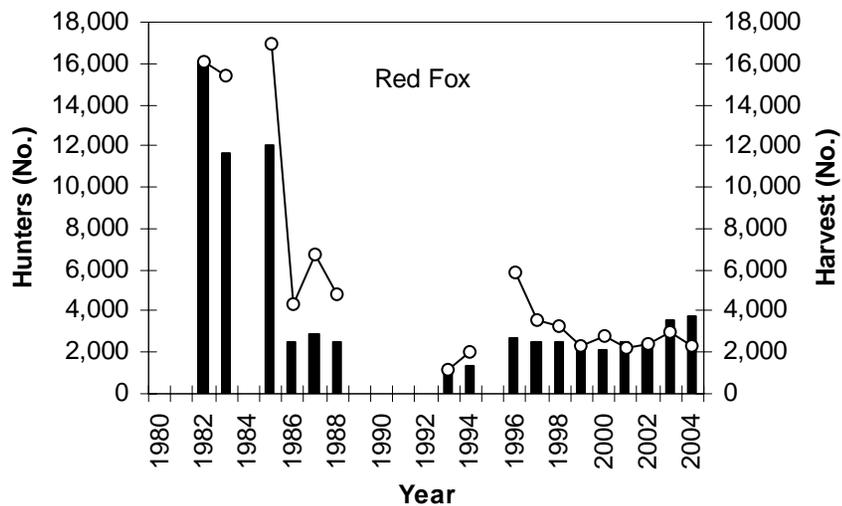
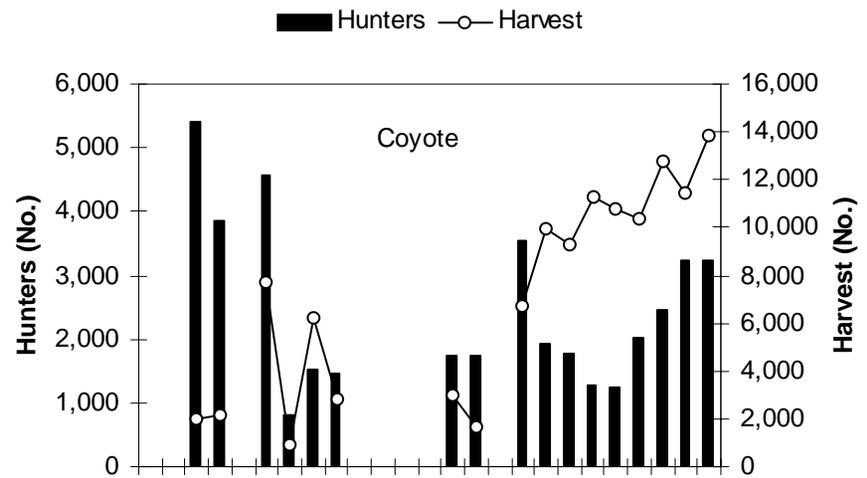
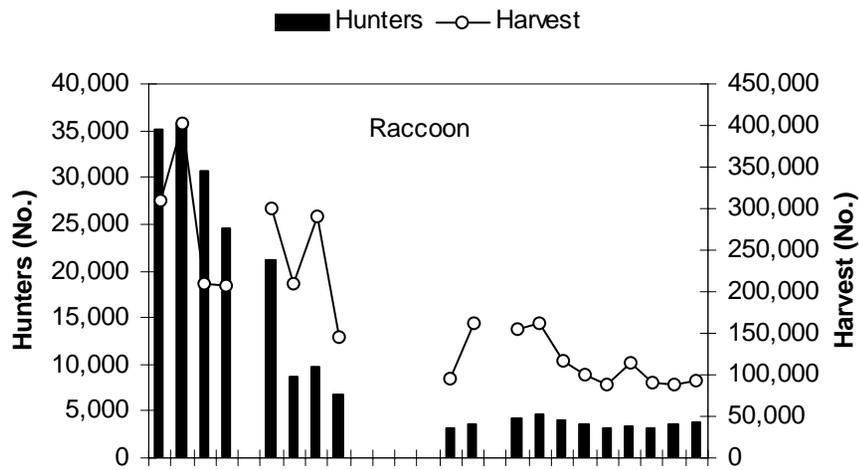


Figure 7. Estimated furbearer harvest by hunters and the number of hunters in Michigan estimated from mail harvest surveys, 1980-2004. The mail survey was sent to a random sample of people buying either small game licenses, Senior Hunting licenses, or Sportsman's licenses during 1980-1985. During 1986-2004, 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.

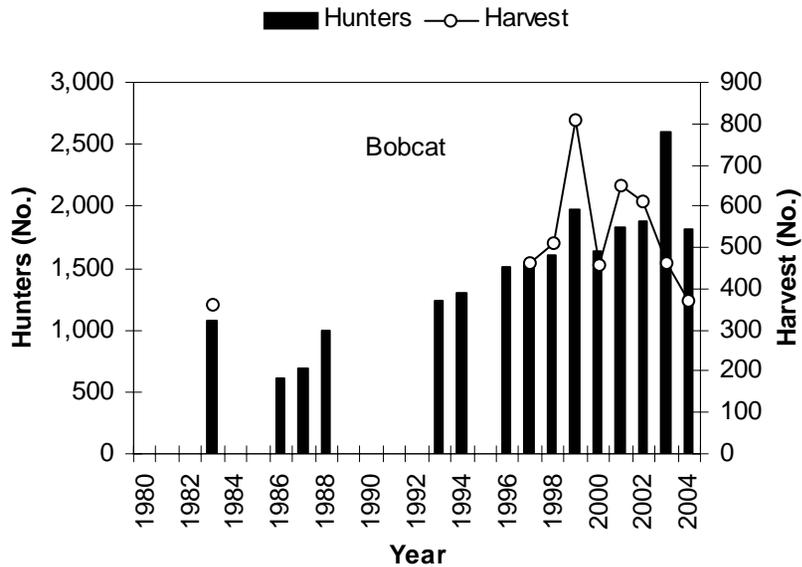


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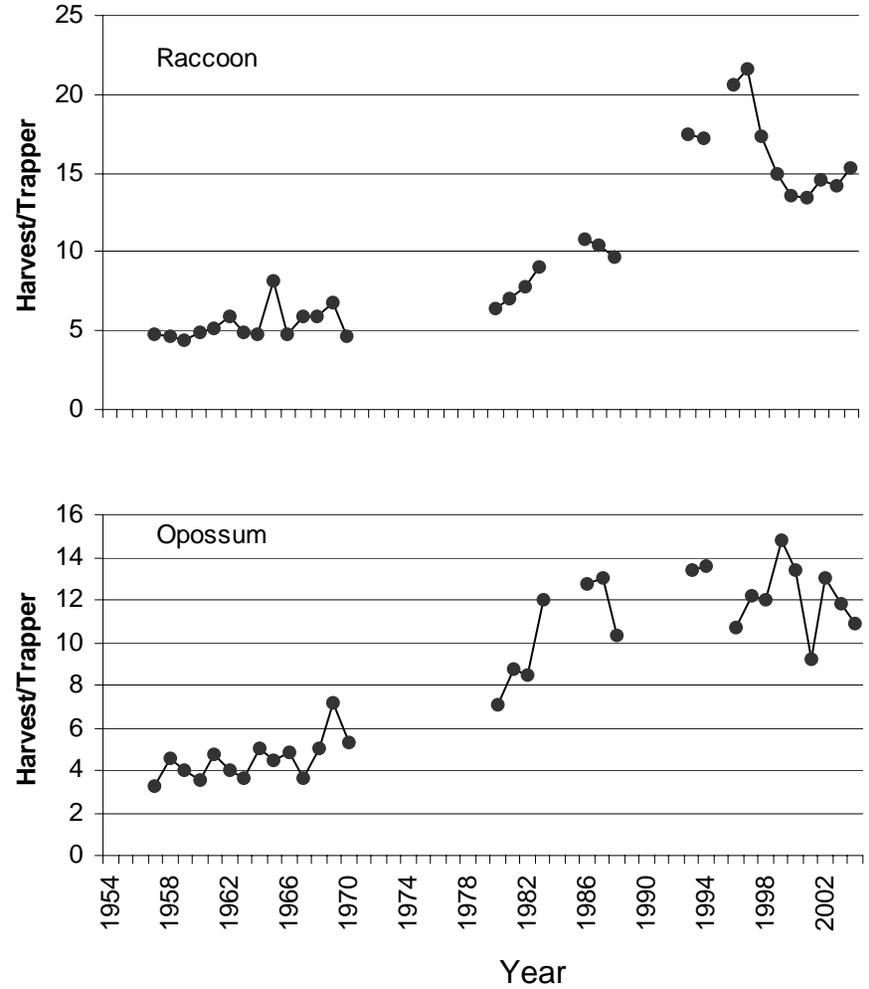
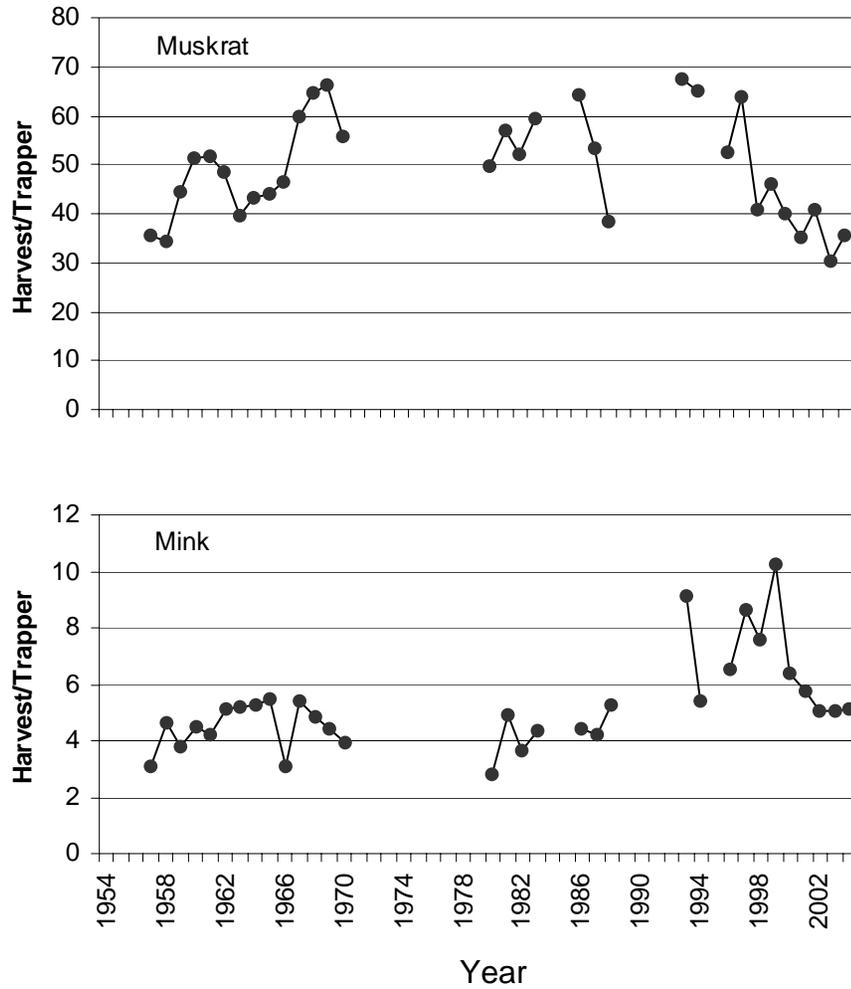


Figure 8. Estimated mean number of furbearers harvested annually by trappers in Michigan estimated from mail harvest surveys, 1954-2004. Data were not available for all years.

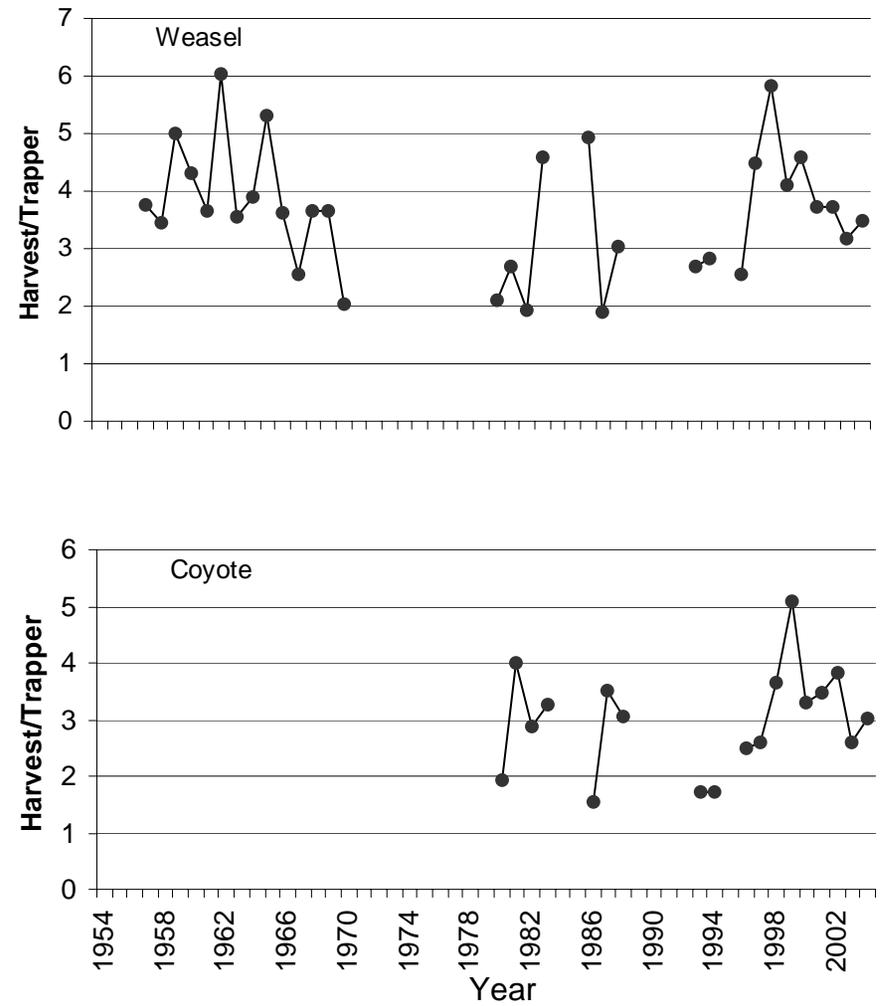
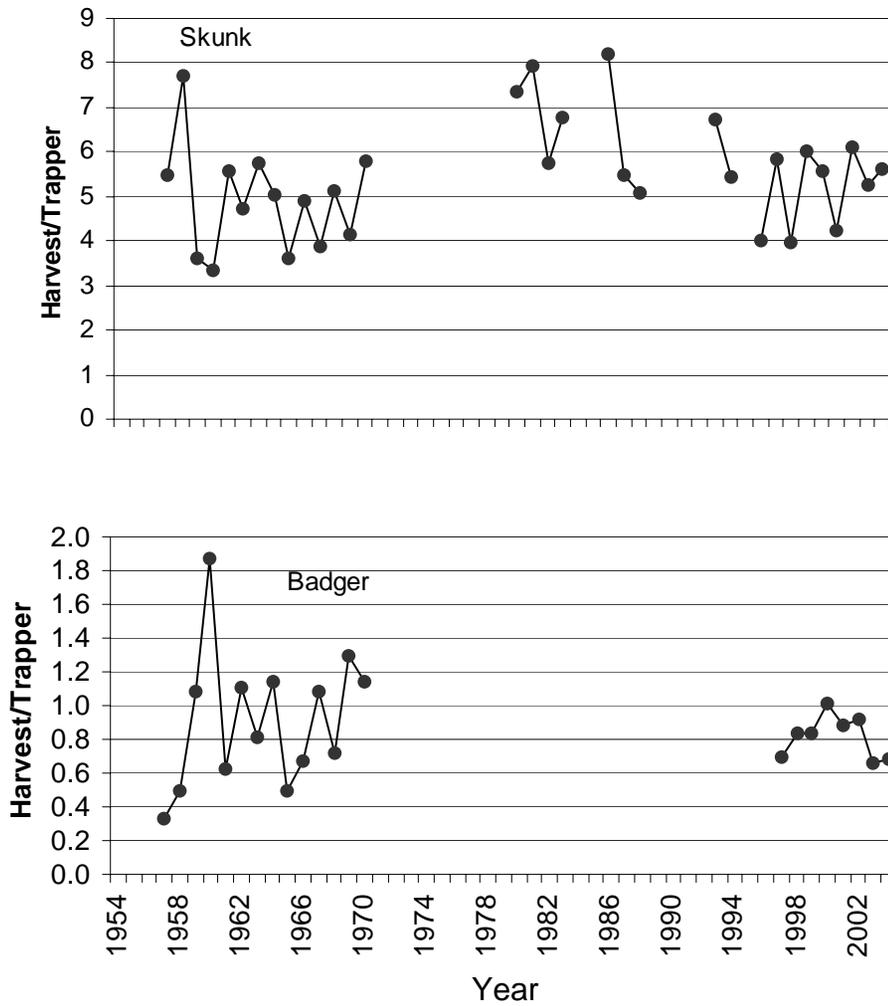


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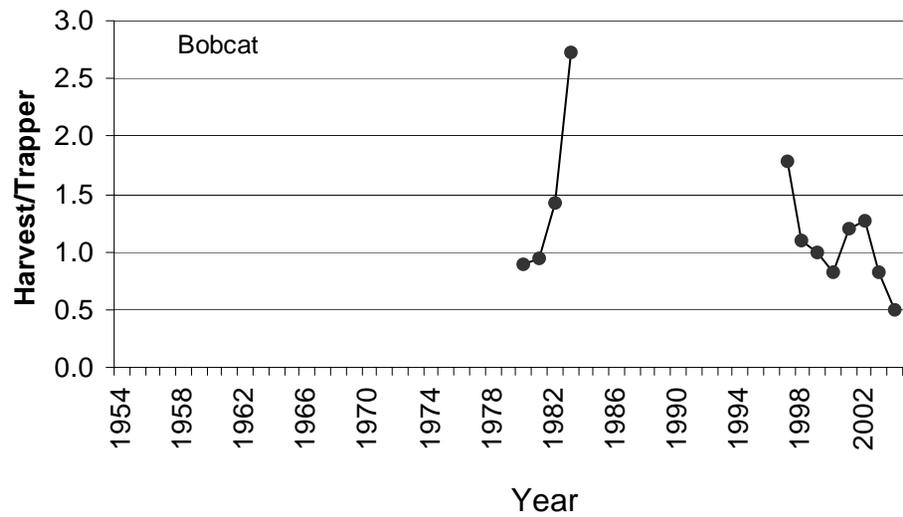
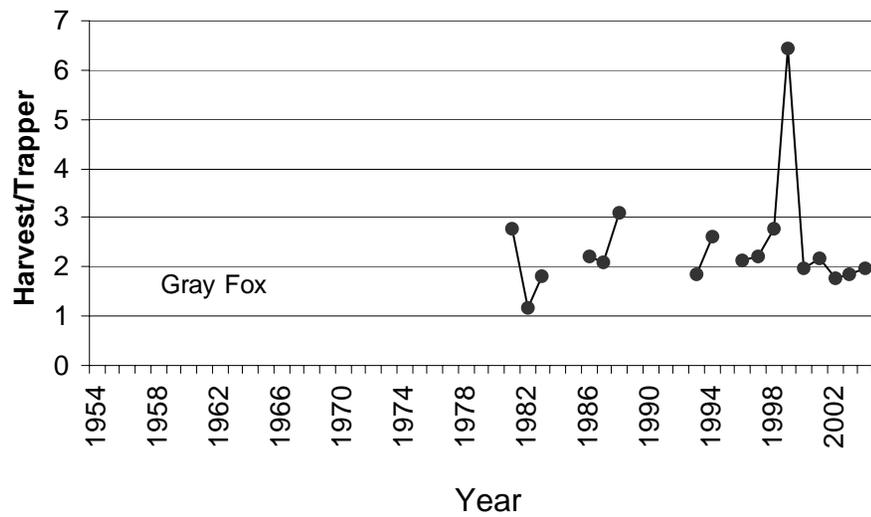
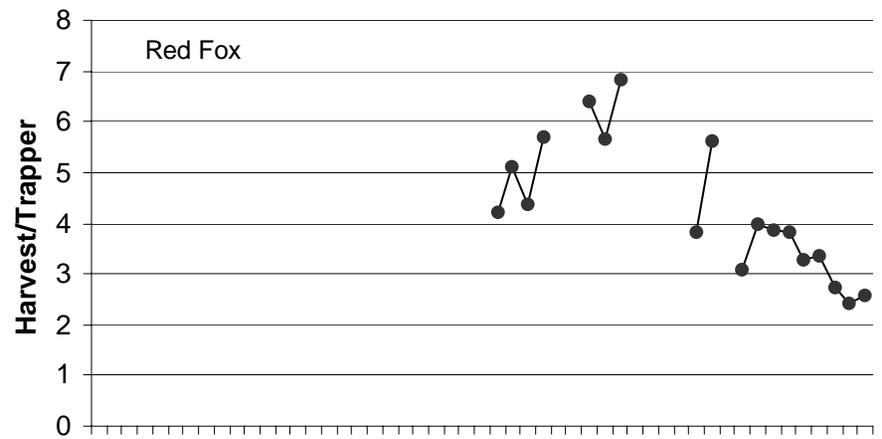
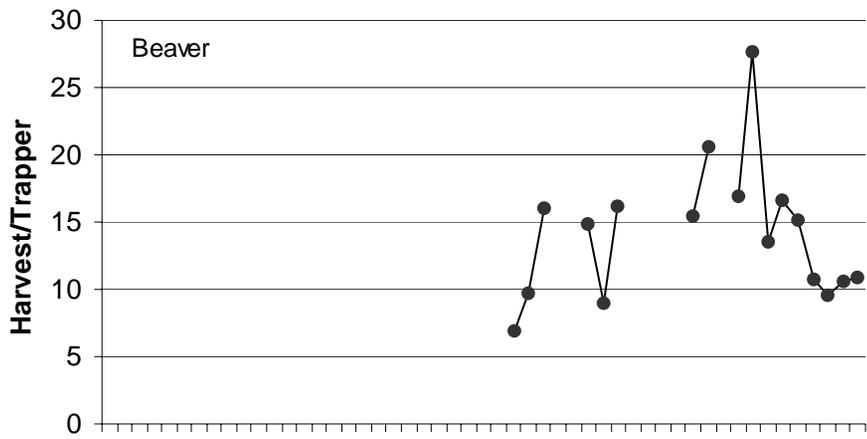


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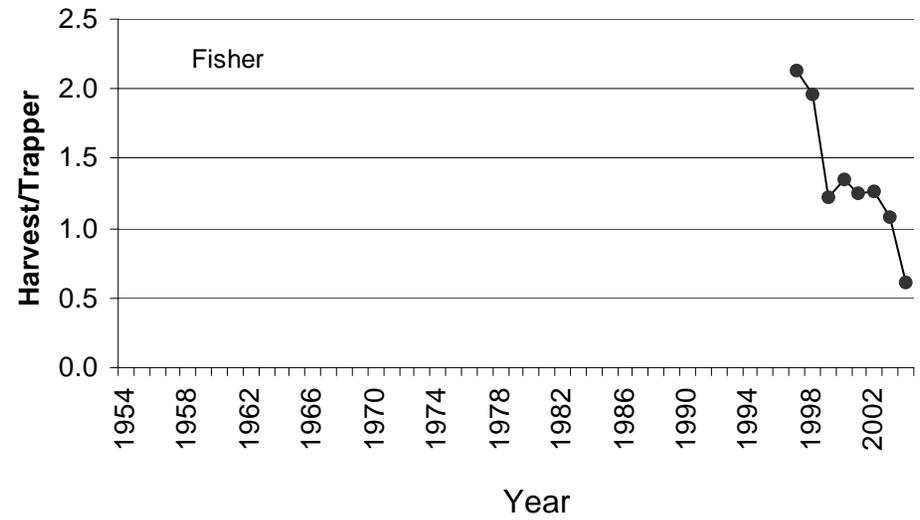
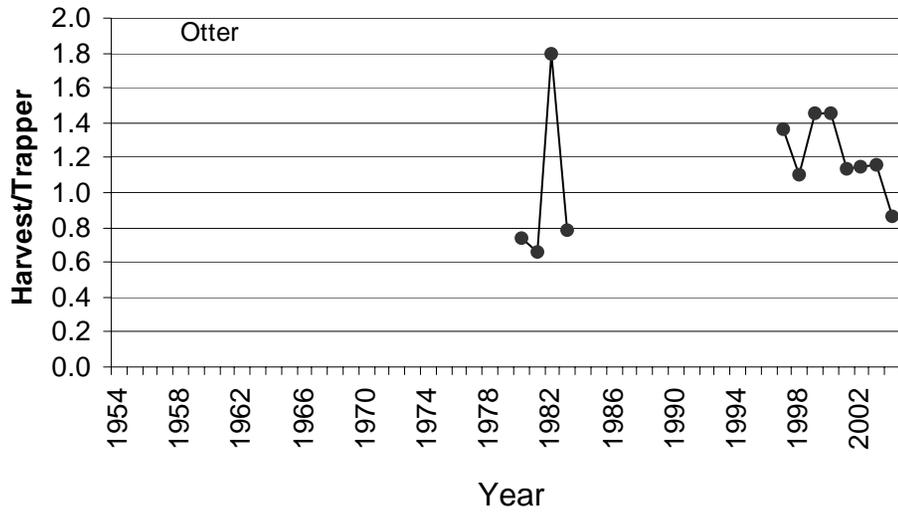


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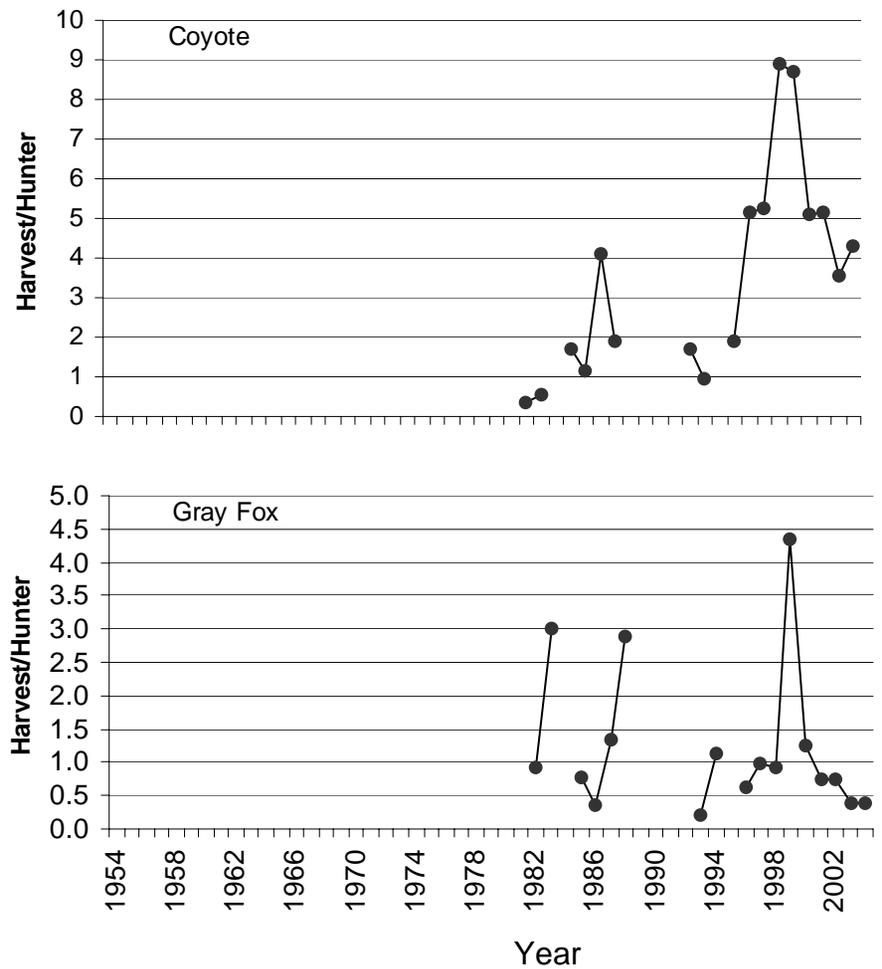
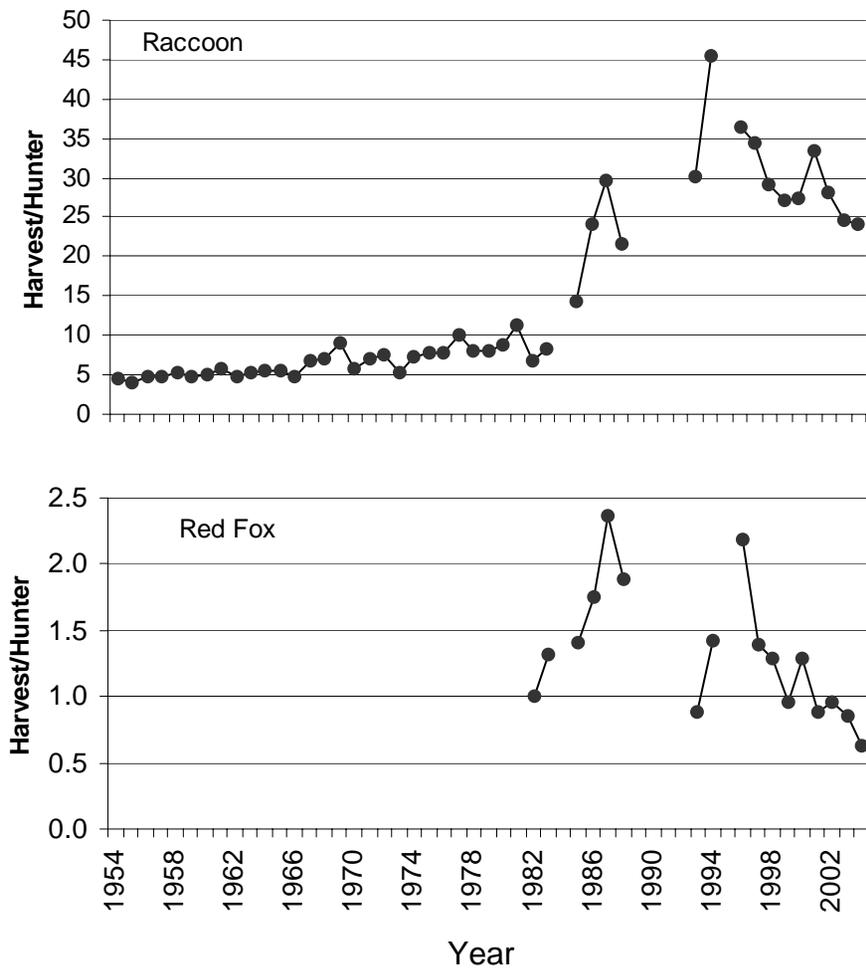


Figure 9. Estimated mean number of furbearers harvested annually by hunters in Michigan estimated from mail harvest surveys, 1954-2004. Data were not available for all years.

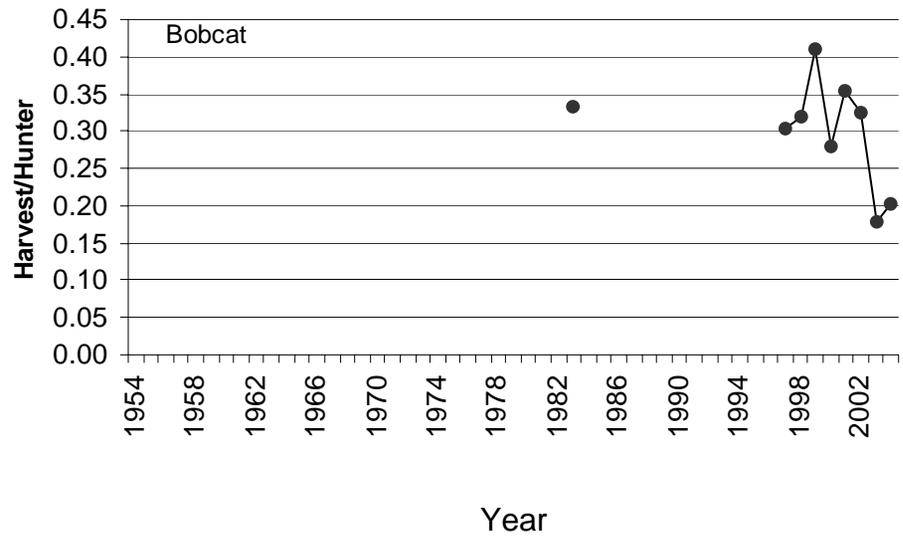


Figure 9 (continued). Estimated mean number of furbearers harvested annually by hunters in Michigan estimated from mail harvest surveys, 1954-2004. Data were not available for all years.

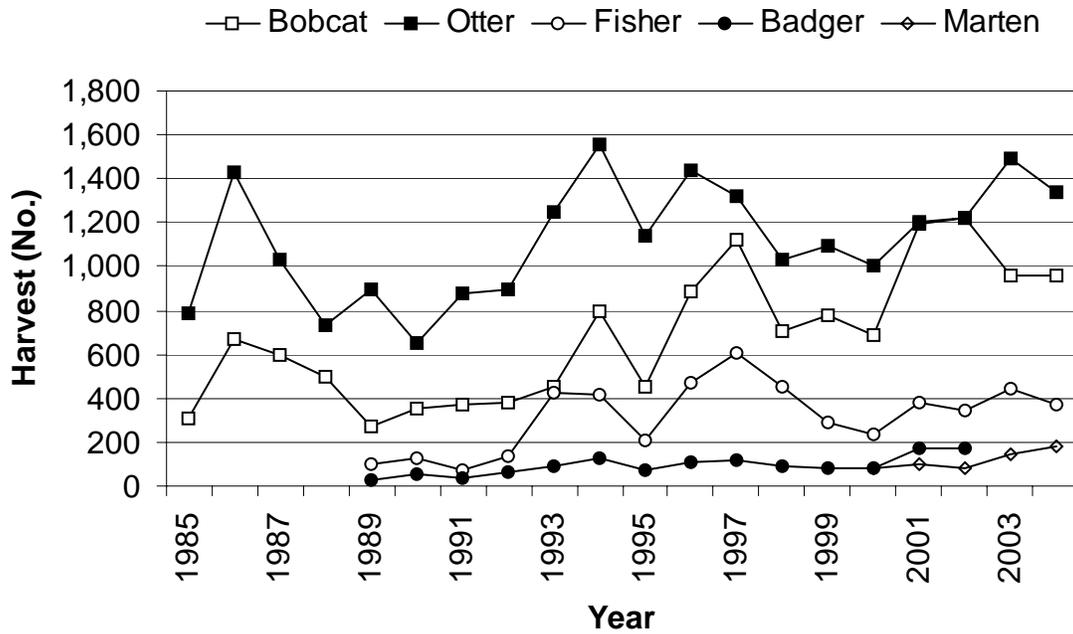


Figure 10. Number of bobcat, otter, fisher, badger, and marten registered by furtakers in Michigan, 1985-2004. Badger and fisher seasons were established in 1989, and marten season started in 2000. Totals for 2004 were preliminary. Beginning in 2003, badger were no longer registered.

Table 1. Trapping and hunting seasons when furbearing animals could be harvested in Michigan during 2004 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	October 25 – March 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 18
NLP	November 1 – April 18
SLP	November 10 – March 31
Hunting seasons	
Bobcat	
UP	December 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 <sup>d</sup>	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.

<sup>d</sup>Season closed during firearm deer season (November 15-30) in the UP.

Table 2. Number of fur harvester licenses sold and people receiving and returning harvest questionnaire, 2001-2004.

Item	Year			
	2001	2002	2003	2004
Licenses sold	19,082	19,577	20,623	21,466
Individuals buying licenses <sup>a</sup>	18,874	19,386	20,405	21,228
Questionnaires mailed	3,100	3,100	8,000	4,000
Non-deliverable questionnaires	69	50	145	70
Questionnaires not returned	657	768	2,280	1,051
Questionnaires returned	2,374	2,282	5,575	2,879
Questionnaires returned (%) <sup>b</sup>	78	75	71	73

<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, 2002-2004.

Activity	2002		2003		2004	
	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL
Trapped						
Number	6,767	347	6,632	213	6,923	336
%	35	2	33	1	33	2
Hunted						
Number	8,212	368	9,534	228	10,071	360
%	42	2	47	1	47	2
Trapped or hunted <sup>a</sup>						
Number	12,168	362	13,068	220	13,638	347
%	63	2	64	1	64	2
Trapped only						
Number	3,956	300	3,534	171	3,567	267
%	20	2	17	1	17	1
Hunted only						
Number	5,437	336	6,436	212	6,716	335
%	28	2	32	1	32	2
Trapped and hunted						
Number	2,776	261	3,098	165	3,356	264
%	14	1	15	1	16	1

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

Table 4. Estimated number of participants, harvest, and days afield during Michigan furbearer seasons, 2003 and 2004.

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 (%)
	2003	2004			2003	2004			2003	2004		
<b>Trapping</b>												
Mink	2,576	2,654	237	3	12,931	13,572	3,047	5	72,629	71,749	9,558	-1
Raccoon	4,339	4,553	296	5	61,722	70,055	12,869	14	121,101	121,290	11,856	0
Opossum	1,858	2,074	212	12	21,946	22,499	4,404	3	57,861	59,998	9,675	4
Skunk	1,339	1,374	177	3	7,070	7,704	2,588	9	45,081	43,203	8,727	-4
Weasel	717	687	126	-4	2,284	2,386	899	4	23,349	19,339	5,841	-17
Red fox	2,593	2,693	239	4	6,320	6,940	2,034	10	74,843	75,523	9,437	1
Gray fox	1,650	1,621	191	-2	3,035	3,183	1,616	5	52,993	44,180	7,026	-17
Coyote	3,222	3,241	258	1	8,325	9,796	2,217	18	97,245	95,454	11,200	-2
Bobcat <sup>b</sup>	965	1,249	38	29*	795	630	37	-21	29,142	29,567	1,586	1
Beaver	2,637	2,382	223	-10	28,047	26,058	5,902	-7	70,116	59,402	9,726	-15
Muskrat	3,209	3,144	255	-2	97,167	111,392	24,131	15	86,094	80,293	9,912	-7
Otter <sup>c</sup>	1,325	1,389	174	5	1,536	1,200	230	-22	40,473	35,158	6,880	-13
Fisher <sup>c</sup>	467	392	95	-16	504	237	100	-53*	4,485	4,213	1,259	-6
Badger	367	280	82	-24	242	191	68	-21	7,505	4,583	1,879	-39
<b>Hunting</b>												
Raccoon	3,540	3,825	275	8	86,965	91,827	14,132	6	80,216	75,292	9,644	-6
Red fox	3,526	3,713	271	5	2,992	2,311	531	-23	45,996	47,572	5,919	3
Gray fox	1,623	1,853	202	14	627	622	193	-1	22,875	24,874	4,259	9
Coyote	7,298	7,583	346	4	11,454	13,859	2,732	21	97,938	99,556	9,959	2
Bobcat <sup>b</sup>	2,605	1,816	40	-30*	461	369	26	-20	27,160	20,768	877	-24*
<b>Trapping and hunting combined</b>												
Raccoon	6,729	7,101	339	6	148,687	161,883	19,475	9	201,316	196,582	15,702	-2
Red fox	5,309	5,512	314	4	9,312	9,251	2,166	-1	120,839	123,095	11,520	2
Gray fox	2,812	3,042	251	8	3,662	3,805	1,635	4	75,868	69,054	8,499	-9
Coyote	8,886	9,201	357	4	19,778	23,656	3,619	20	195,183	195,010	16,230	0
Bobcat <sup>b</sup>	3,256	2,726	35	-16*	1,256	999	44	-20*	56,302	50,335	1,762	-11

<sup>a</sup>95% CL for the 2004 estimate.

<sup>b</sup>Estimates from separate mail harvest survey (Frawley et al. 2005). See Table 5 for the number of animals registered.

<sup>c</sup>Estimates from mail harvest survey. See Table 5 for the number of animals registered.

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

Table 5. Number of bobcat, otter, fisher, badger and marten registered by furtakers in Michigan, 1985-2004.

Year	Species							
	Bobcat (by method of capture)				Otter	Fisher <sup>a</sup>	Badger <sup>a,b</sup>	Marten <sup>c</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	896	99	28	
1990	266	85	0	351	654	125	52	
1991	292	79	0	371	878	68	35	
1992	276	104	0	380	896	140	63	
1993	285	163	0	448	1,251	425	90	
1994	373	422	0	795	1,552	417	124	
1995	311	138	1	450	1,137	208	75	
1996	463	420	0	883	1,438	471	109	
1997	347	771	0	1,118	1,323	609	117	
1998	331	375	0	706	1,028	455	91	
1999	434	343	0	777	1,097	291	82	
2000	379	307	0	686	1,006	236	85	85
2001	464	728	0	1,192	1,203	381	174	97
2002	482	741	0	1,223	1,219	348	173	85
2003	340	621	0	961	1,496	442		149
2004 <sup>d</sup>	321	638	0	959	1,336	368		184

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

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

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

<sup>d</sup>Preliminary totals.