



2011 OTTER AND BEAVER HARVEST SURVEY

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ABSTRACT

A survey was completed to determine the number of otter harvest tag holders that set traps for otter and beaver, the number of animals caught, the types of traps used, and the number of days they trapped. In 2011, 3,441 furtakers obtained a harvest tag to take otter, which was 17% more than in 2010. About 32% of the tag holders set traps for otter (1,110 trappers) and 49% set traps for beaver (1,672). Trappers that targeted otter spent nearly 25,185 days trapping otter (\bar{x} = 23 days/trapper), captured 1,232 otter (included animals released alive), and registered 1,164 otter. An additional 286 otter were registered by trappers that were not targeting otter. The total number of otter registered by all trappers combined increased significantly by 59% between 2010 and 2011. About 64% of trappers targeting otter captured at least one otter. The number of trappers that attempted to catch otter and their trapping effort (days afield) also increased significantly between 2010 and 2011. The mean number of days of effort per registered otter in 2011 (21.6 days) did not change significantly from 2010. Beaver trappers spent nearly 41,810 days trapping beaver (\bar{x} = 25 days/trapper) and captured 19,448 beaver. About 87% of active beaver trappers captured at least one beaver. The number of trappers that attempted to catch beaver increased significantly by 28%, and their days spent trapping and their harvest of beaver increased significantly between 2010 and 2011.

INTRODUCTION

The Michigan Natural Resources Commission and the 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 a management tool used to help accomplish this statutory responsibility. The main objectives of this harvest survey were to determine the number of trappers who set traps for otter (*Lontra canadensis*), the types of traps used, the



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number of days they trapped, and the number of animals captured. Because otter trappers frequently seek to catch beaver (*Castor canadensis*), they also were asked whether they attempted to trap beaver. If they trapped beaver, they were asked to report the number of days they trapped and the number of beaver caught.

While the primary objectives of this survey were estimating harvest, trapper numbers, and trapping effort, this survey also provided an opportunity to collect information about management issues. Questions were added to the questionnaire to determine how often trappers set snares in open water for beaver and how often trappers attempted to capture beaver during April.

In 2011, the state was divided into three management zones (Figure 1), and the otter and beaver trapping seasons were different for each zone (Table 1). Seasons also differed for residents and nonresidents of Michigan. In order to trap otter, trappers were required to obtain a free otter harvest tag in addition to 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]). Beaver trappers also were required to purchase a fur harvesters license but did not need a harvest tag. Trappers were limited to three otter, except no more than two otter could be taken in Zone 2 and one otter from Zone 3. No maximum limit was set for the number of beaver that could be harvested. Successful trappers were required to register all otter taken by May 4, 2012, but trappers were not required to register beaver. Trappers were not allowed to keep incidentally caught otter. However, trappers were required to bring these incidentally caught otter to a registration station if they could not be released alive. Trappers could use body-gripping (conibear type) traps and foothold traps to capture otter and beaver. In addition, trappers could use snares to capture beaver from December 1 through March 31. Snares could be set in the water or under ice. Snares had to be made of 1/16-inch or larger cable. If a snare was not set under ice, at least half of the snare had to be under water, and it had to be set so it would hold a captured beaver completely under the water.

METHODS

A questionnaire (Appendix A) was sent to everyone who obtained an otter harvest tag in 2011 (3,441 harvest tag holders). Trappers receiving the questionnaire were asked to report if they trapped otter or beaver, number of days spent afield, number of otter and beaver caught, number of otter released alive, and number of otter registered (registration estimates included incidentally caught animals that were not returned to the trapper). Trappers were also asked to indicate their impression of the status of the otter and beaver populations in the county where they primarily trapped (i.e., absent, stable, increasing, or decreasing).

Questionnaires were mailed initially during early May 2012, and nonrespondents were mailed up to two follow-up questionnaires. Although 3,441 people were sent the questionnaire, 128 surveys were undeliverable, resulting in an adjusted sample size of 3,313. Questionnaires were returned by 2,019 people, yielding a 61% adjusted response rate.

Although all harvest tag holders were sent a questionnaire, not all questionnaires were returned. To extrapolate from the tag holders that returned their questionnaire to all people obtaining harvest tags, estimates were calculated using a simple random sampling design

(Cochran 1977) and were presented along with their 95% confidence limit (CL). This CL 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 the true value would be within this interval 95 times out of 100. Estimates were not adjusted for possible response or nonresponse bias. The 2011 estimate of otter registered included incidental animals that trappers were not allowed to keep (i.e., harvest exceeding the bag limit); however, it did not include animals taken by trappers as part of a nuisance control business.

Furtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. Rather, these estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.

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).

RESULTS AND DISCUSSION

Otter

In 2011, 3,441 trappers obtained harvest tags to trap otter, which was 17% more than the 2,949 trappers obtaining tags in 2010. In 2011, most of the harvest tags (3,279) were obtained by men. Harvest tags were obtained by 155 women, and the sex of 7 tag holders was unknown. About 32% of the otter tag holders set traps targeting otter (1,110 trappers, Table 2). These trappers spent 25,185 days trapping otter ($\bar{x} = 22.7 \pm 1.3$ days/trapper), captured 1,232 otter, and registered 1,164 otter (Table 3). About 64% of trappers targeting otter successfully captured at least one otter.

The estimated number of otter registered by trappers that targeted otter increased significantly by 65% between 2010 and 2011 (707 versus 1,164 otter, Table 3). An additional 286 otter were registered by trappers that were not targeting otter. The estimated total number of otter registered by all trappers combined increased significantly by 59% between 2010 and 2011 (914 versus 1,450 otter, Table 3). About equal numbers of otter were taken in the Upper Peninsula (UP) and Lower Peninsula (LP) management zones (Table 4). Iron (99), Ontonagon (90), Gogebic (77) and Marquette (77) counties had the highest county harvest estimates (Table 5).

The number of otter registered (including incidental take) by trappers at registration stations increased 45% between 2010 and 2011 (954 versus 1,387 otter, Figure 2). The number of trappers that attempted to catch otter and their effort also increased significantly between 2010 and 2011 (Table 3, Figure 2). Among trappers targeting otter, the mean number of days of effort per registered otter was 21.6 days in 2011, which was not significantly different than the 24.2 days in 2010 (Tables 3 and 6, Figure 3).

The number of otter registered in 2011 was 58% above the long-term yearly average since 1950 (\bar{x} = 881 during 1950-2011, Figure 4). Changes in otter harvest during recent years have tracked changes in trapping effort (Figure 2) and changes in otter pelt prices (Figures 5 and 6). Although otter harvest increased between 2010 and 2011, estimates of effort per catch for otters did not change significantly; suggesting otter numbers are stable statewide (Figure 3).

The number of otter registered was correlated with the mean value of otter pelts during 1989-2011 (Pearson product moment correlation coefficient [r] = 0.82, probability of obtaining this result [P] < 0.01) (Figure 6). The correlation between mean days of effort per registered otter and pelt prices during 1997-2011 (r = 0.75, P < 0.01) was also significant.

Most otter trappers used conibear-type traps to capture otter ($92 \pm 1\%$), although foothold traps also were used frequently ($41 \pm 2\%$). Among trappers using conibear traps, the mean number of conibear traps set was 4.8 ± 0.2 traps. Among trappers using foothold traps, the mean number of foothold traps set was 4.0 ± 0.3 traps.

Thirty percent of otter trappers ($\pm 2\%$) believed otter numbers were increasing in the county where they trapped most often, while $57 \pm 2\%$ thought otter numbers were stable, $7 \pm 1\%$ thought otter were declining, $3 \pm 1\%$ indicated otter were not present, and $3 \pm 1\%$ did not comment on the status of otter.

Beaver

Furtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping did not include all furtaker participation, effort, or harvest. Rather, these estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag. Furthermore, trappers taking beaver as part of a nuisance control business were asked to exclude nuisance animals from their reported harvest on annual harvest surveys beginning in 2003. Thus, estimates associated with beaver may not be directly comparable among years.

About 49% of the otter harvest tag holders set traps for beaver (1,672 trappers, Table 2). Trappers spent 41,810 days trapping (25.0 ± 1.3 days/trapper) and captured 19,448 beaver (Table 7). About $87 \pm 1\%$ of active trappers successfully captured at least one beaver. About equal numbers of beaver were taken in the UP and LP management zones (Table 8). Ontonagon (1,623), Marquette (1,092), and Chippewa (1,035) counties had the highest county harvest estimates (Table 9).

The number of people trapping beavers increased significantly by 28% between 2010 and 2011 (1,306 versus 1,672 trappers, Table 7). The number of days spent trapping and the number of beaver harvested also increased significantly between 2010 and 2011 (Table 7, Figure 7).

Most beaver trappers used conibear-type traps to capture beaver ($92 \pm 1\%$), although $61 \pm 2\%$ of trappers used foothold traps and $8 \pm 1\%$ used snares. Among trappers using conibear traps, the mean number of conibear traps set was 7.9 ± 0.3 traps. Among trappers using

foothold traps, the mean number of foothold traps set was 6.7 ± 0.4 traps, and among trappers using snares, the mean number of snares set was 12.0 ± 5.1 .

Twenty-one percent of beaver trappers ($\pm 2\%$) believed beaver numbers were increasing in the county where they trapped most often, while $56 \pm 2\%$ thought beaver numbers were stable, $20 \pm 2\%$ thought they were declining, and about 4% of trappers either indicated beaver were absent in the area they trapped or did not comment on the status of beaver.

An estimated 90 trappers caught 194 beaver with snares in open water during the 2011 season (Table 7). About 629 trappers caught 5,142 beaver during April 2012. Beaver harvested with snares in open water and taken during April represented about 1% and 26% of the estimated total beaver harvest, respectively. Among trappers that set traps for beaver, $17 \pm 1\%$ caught otter in their beaver sets. These trappers caught 445 ± 52 otter.

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LITERATURE CITED

- Abraham, J, and M.H. Dexter. 2010. Minnesota fur buyers survey for the 2009-2010 hunting and trapping season. Unpublished report, Division of Fish and Wildlife, Minnesota Department of Natural Resources, St. Paul, USA.
- Bureau of Labor Statistics. 2011. Consumer Price Index-All Urban Consumers, United States Department of Labor. <http://www.bls.gov>. Accessed 4 October 2012.
- Cochran, W. G. 1977. Sampling techniques. John Wiley & Sons, New York. USA.
- Dhuey, B. 2012. Wisconsin fur buyers report 2011-2012. Wisconsin Wildlife Surveys, Wisconsin Department of Natural Resources, Madison, Wisconsin, USA.
- Payton, M. E., M. H. Greenstone, and N. Schenker. 2003. Overlapping confidence intervals or standard error intervals: what do they mean in terms of statistical significance? *Journal of Insect Science* 3:34.

Table 1. Otter and beaver trapping seasons in Michigan, 2011.

Zone	Season	
	Resident	Nonresident
1	October 25 – April 15 ^a	November 15 – April 15
2	November 1 – April 15	November 24 – April 15
3	November 10 – March 31	December 15 – March 31

^aThe season extended through April 30 in Zone 1 on designated trout streams for residents.

Table 2. Estimated number of otter harvest tag holders that attempted to trap otter or beaver in Michigan during 2011 season.

Harvest tag holders	%	95% CL ^a	Total	95% CL ^a
Trapped only otter	7	1	247	25
Trapped only beaver	24	1	810	41
Trapped both otter and beaver	25	1	862	42
Trapped either otter or beaver	56	1	1,919	48
Trapped otter ^b	32	1	1,110	45
Trapped beaver ^c	49	1	1,672	48

^a95% confidence limits.

^bSum of trappers that trapped only otter and trappers that trapped both otter and beaver.

^cSum of trappers that trapped only beaver and trappers that trapped both otter and beaver.

Table 3. Estimated number of otter trappers, their trapping effort (days), number of otter captured, mean days required to harvest an otter, and trapping success in Michigan during 2009-2011. Estimates presented separately for trappers targeting otter and for trappers that were not targeting otter.

Variable	Year						Change ^a (%)
	2009		2010		2011		
	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL	
Among trappers targeting otter							
Trappers (No)	739	36	803	40	1,110	45	38*
Effort (Days)	15,521	1,264	17,130	1,381	25,185	1,775	47*
Otters captured (No.)	810	63	741	59	1,232	79	66*
Otters released alive (No.)	56	17	34	12	68	19	100*
Otters registered (No.)	754	57	707	56	1,164	73	65*
Trappers that captured an otter (%)	63	3	58	3	64	2	5*
Trappers that released an otter (%)	5	1	3	1	4	1	1
Trappers that registered an otter (%)	63	3	58	3	63	2	5*
Mean days required to harvest an otter	20.6	1.7	24.2	1.9	21.6	1.5	-11
Among trappers that did not target otter							
Trappers (No)	195	21	155	20	203	23	31*
Otters captured (No.)	317	54	248	38	317	43	28
Otters registered (No.)	268	36	207	33	286	38	39*
Among all trappers^b							
Trappers (No)	919	38	944	42	1,282	47	36*
Otters captured (No.)	1,127	81	989	69	1,549	90	57*
Otters registered (No.)	1,022	65	914	64	1,450	81	59*
Mean days required to harvest an otter	15.2	1.3	18.8	1.5	17.4	1.2	-7

^aThe change between 2010 and 2011 for proportion of trappers catching otters and registering otters is reported as the difference between years rather than the proportional change.

^bTotals among all trappers may equal to sum of trappers targeting otter and trappers that did not target otter because of rounding error.

*P<0.005.

Table 4. Estimated number of trappers, trapping effort, otter captured, otter released alive, otter registered, and success among otter trappers during the 2011 Michigan trapping season, summarized by area.

Area	Trappers		Trapping effort (days)		Otter captured ^a		Otter released alive		Otter registered ^b		Trapper success	
	Total	95% CL ^c	Total	95% CL ^c	Total	95% CL ^c	Total	95% CL ^c	Total	95% CL ^c	%	95% CL ^c
Among trappers targeting otter												
Upper Peninsula	457	33	9,278	1,040	620	63	37	15	583	58	68	4
Lower Peninsula	665	38	15,872	1,503	602	52	31	11	571	48	60	3
Zone 2	436	32	9,761	1,128	423	43	24	9	399	40	64	4
Zone 3	262	26	6,112	899	179	27	7	5	172	26	53	5
Unknown	12	6	34	25	10	9	0	0	10	9	29	22
Statewide	1,110	45	25,185	1,775	1,232	79	68	19	1,164	73	63	2
Among trappers that did not target otter												
Upper Peninsula	65	13	NA	NA	119	26	7	5	112	26	NA	NA
Lower Peninsula	135	19	NA	NA	203	35	29	15	174	29	NA	NA
Zone 2	89	15	NA	NA	136	30	15	10	121	24	NA	NA
Zone 3	53	12	NA	NA	66	17	14	11	53	13	NA	NA
Unknown	0	0	NA	NA	0	0	0	0	0	0	NA	NA
Statewide	203	23	NA	NA	317	43	36	16	286	38	NA	NA
Among all trappers combined												
Upper Peninsula	508	34	9,278	1,040	740	70	44	17	695	65	69	4
Lower Peninsula	786	41	15,872	1,503	804	62	60	19	745	55	64	3
Zone 2	515	34	9,761	1,128	559	52	39	13	520	46	68	3
Zone 3	314	28	6,112	899	245	32	20	13	225	29	59	5
Unknown	12	6	34	25	10	9	0	0	10	9	29	22
Statewide	1,282	47	25,185	1,775	1,549	90	104	25	1,450	81	66	2

^aAll otter removed from traps, including all incidental catches and releases.

^bIncluded incidentally caught otter that were not returned to the trapper.

^c95% confidence limits.

Table 5. Estimated number of trappers, trapping effort, otter captured (including all incidental catches and releases), otter released alive, and otter registered (including incidental catches) among otter trappers during the 2011 Michigan trapping season, summarized by county.^a

County	Trappers		Trapping effort (days)		Otter captured ^b		Otter released alive		Otter registered ^c	
	Total	95% CL ^d	Total	95% CL ^d	Total	95% CL ^d	Total	95% CL ^d	Total	95% CL ^d
Alcona	26	8	447	169	32	13	0	0	32	13
Alger	36	10	660	205	36	13	0	0	36	13
Allegan	9	5	17	11	7	4	0	0	7	4
Alpena	31	9	643	273	27	11	2	2	26	11
Antrim	12	6	80	55	10	5	0	0	10	5
Arenac	12	6	155	96	15	8	2	2	14	7
Baraga	39	10	351	155	48	18	0	0	48	18
Barry	26	8	469	175	12	6	0	0	12	6
Bay	5	4	85	64	3	3	0	0	3	3
Benzie	9	5	118	82	5	5	0	0	5	5
Berrien	2	2	0	0	2	2	0	0	2	2
Branch	2	2	12	15	0	0	0	0	0	0
Calhoun	14	6	319	182	5	4	0	0	5	4
Cass	3	3	119	131	2	2	0	0	2	2
Charlevoix	9	5	75	71	5	4	0	0	5	4
Cheboygan	29	9	322	136	39	15	7	4	32	13
Chippewa	55	12	830	401	68	22	0	0	68	22
Clare	39	10	755	321	41	13	3	3	37	12
Clinton	9	5	61	41	3	3	0	0	3	3
Crawford	15	6	257	123	14	7	0	0	14	7
Delta	31	9	424	156	32	13	2	2	31	12
Dickinson	43	11	668	225	34	13	0	0	34	13
Eaton	12	6	220	127	9	5	0	0	9	5
Emmet	9	5	201	119	7	6	0	0	7	6
Genesee	3	3	43	39	0	0	0	0	0	0
Gladwin	29	9	409	229	26	10	2	2	24	10
Gogebic	48	11	636	186	77	27	12	11	65	21
Gd. Traverse	20	7	504	265	20	9	0	0	20	9
Gratiot	15	6	143	83	10	6	2	2	9	5

^aIncluded activity of trappers targeting otter and trappers not targeting otter combined.

^bAll otter removed from traps, including all incidental catches and releases.

^cIncluded incidentally caught otter that were not returned to the trapper.

^d95% confidence limits.

Table 5 (continued). Estimated number of trappers, trapping effort, otter captured (including all incidental catches and releases), otter released alive, and otter registered (including incidental catches) among otter trappers during the 2011 Michigan trapping season, summarized by county.^a

County	Trappers		Trapping effort (days)		Otter captured ^b		Otter released alive		Otter registered ^c	
	Total	95% CL ^d	Total	95% CL ^d	Total	95% CL ^d	Total	95% CL ^d	Total	95% CL ^d
Hillsdale	0	0	0	0	0	0	0	0	0	0
Houghton	41	10	796	291	48	18	7	5	41	16
Huron	2	2	24	30	0	0	0	0	0	0
Ingham	0	0	0	0	0	0	0	0	0	0
Ionia	7	4	37	28	5	4	2	2	3	3
Iosco	31	9	607	352	31	12	3	3	27	10
Iron	61	13	850	259	99	29	10	9	89	24
Isabella	9	5	205	163	7	5	0	0	7	5
Jackson	3	3	32	32	0	0	0	0	0	0
Kalamazoo	0	0	0	0	0	0	0	0	0	0
Kalkaska	39	10	907	357	53	24	10	9	43	16
Kent	29	9	579	313	24	13	9	11	15	6
Keweenaw	2	2	68	86	5	6	0	0	5	6
Lake ^d	10	5	155	95	5	5	0	0	5	5
Lapeer	3	3	26	32	0	0	0	0	0	0
Leelanau	3	3	58	52	7	9	3	4	3	4
Lenawee	0	0	0	0	0	0	0	0	0	0
Livingston	3	3	27	25	0	0	0	0	0	0
Luce	24	8	257	149	12	8	0	0	12	8
Mackinac	29	9	486	215	32	14	3	3	29	13
Macomb	0	0	0	0	0	0	0	0	0	0
Manistee	24	8	370	146	26	12	3	4	22	10
Marquette	53	12	1,217	419	77	21	2	2	75	21
Mason	10	5	159	89	7	4	0	0	7	4
Mecosta	17	7	532	315	15	8	0	0	15	8
Menominee	29	9	537	225	41	16	2	2	39	16
Midland	31	9	648	366	31	13	3	4	27	10
Missaukee	29	9	648	368	27	11	0	0	27	11
Monroe	0	0	0	0	0	0	0	0	0	0

^aIncluded activity of trappers targeting otter and trappers not targeting otter combined.

^bAll otter removed from traps, including all incidental catches and releases.

^cIncluded incidentally caught otter that were not returned to the trapper.

^d95% confidence limits.

Table 5 (continued). Estimated number of trappers, trapping effort, otter captured (including all incidental catches and releases), otter released alive, and otter registered (including incidental catches) among otter trappers during the 2011 Michigan trapping season, summarized by county.^a

County	Trappers		Trapping effort (days)		Otter captured ^b		Otter released alive		Otter registered ^c	
	Total	95% CL ^d	Total	95% CL ^d	Total	95% CL ^d	Total	95% CL ^d	Total	95% CL ^d
Montcalm	48	11	1,086	350	29	9	3	3	26	8
Montmorency	10	5	199	113	10	6	0	0	10	6
Muskegon	20	7	264	128	26	10	0	0	26	10
Newaygo	32	9	523	266	36	13	0	0	36	13
Oakland	5	4	63	62	5	4	0	0	5	4
Oceana	31	9	397	190	29	11	0	0	29	11
Ogemaw	10	5	245	137	7	6	0	0	7	6
Ontonagon	56	12	1,074	422	90	26	5	5	85	25
Osceola	20	7	169	88	17	8	2	2	15	8
Oscoda	19	7	227	147	15	7	0	0	15	7
Otsego	15	6	291	160	10	7	0	0	10	7
Ottawa	7	4	247	280	3	3	0	0	3	3
Presque Isle	36	10	787	267	37	12	0	0	37	12
Roscommon	32	9	428	186	26	9	2	2	24	9
Saginaw	5	4	39	45	3	3	0	0	3	3
St. Clair	0	0	0	0	0	0	0	0	0	0
St. Joseph	14	6	97	70	5	4	2	2	3	3
Sanilac	3	3	119	131	0	0	0	0	0	0
Schoolcraft	36	10	424	140	41	16	2	2	39	15
Shiawassee	2	2	17	21	0	0	0	0	0	0
Tuscola	7	4	58	42	3	3	0	0	3	3
Van Buren	0	0	0	0	0	0	0	0	0	0
Washtenaw	0	0	0	0	0	0	0	0	0	0
Wayne	0	0	0	0	0	0	0	0	0	0
Wexford	15	6	148	84	10	5	0	0	10	5
Unknown	12	6	34	25	10	9	0	0	10	9
Statewide ^e	1,282	47	25,185	1,775	1,549	90	104	25	1,450	81

^aIncluded activity of trappers targeting otter and trappers not targeting otter combined.

^bAll otter removed from traps, including all incidental catches and releases.

^cIncluded incidentally caught otter that were not returned to the trapper.

^d95% confidence limits.

^eNumber of trappers does not add up to statewide total because trappers could trap in more than one county. Column totals for trapping effort and capture may not equal statewide totals because of rounding errors.

Table 6. Mean days required to harvest an otter among trappers, 1997-2011.

Year	Region							
	Upper Peninsula		Northern Lower Peninsula		Southern Lower Peninsula		Statewide	
	Mean	95% CL ^a	Mean	95% CL ^a	Mean	95% CL ^a	Mean	95% CL ^a
1997	17.2	13.3	33.0	19.1	16.7	21.6	22.5	10.2
1998	13.6	5.6	21.5	11.2	34.0	28.0	16.2	5.2
1999	12.9	2.7	25.8	7.4	23.3	20.2	17.2	3.1
2000	15.3	5.4	31.2	10.9	23.0	15.7	19.9	4.9
2001	13.5	3.5	25.5	6.7	32.7	26.1	19.2	3.8
2002	27.0	9.0	25.6	9.5	26.5	14.8	26.2	6.3
2003	21.8	3.4	42.5	9.3	28.8	8.5	26.3	3.2
2004	23.1	5.8	36.7	11.1	62.5	29.1	29.3	5.5
2005	19.6	5.3	38.5	14.1	35.1	21.1	26.9	6.1
Among trappers targeting otter ^b								
2006	21.5	1.7	37.9	4.5	43.6	7.2	27.7	1.8
2007	23.7	2.6	42.8	6.5	33.5	7.2	28.7	2.4
2008	19.3	2.2	33.4	5.4	35.5	8.6	25.6	2.4
2009	14.1	1.5	31.2	4.3	34.7	6.7	20.6	1.7
2010	17.7	1.8	32.7	4.5	41.0	7.5	24.2	1.9
2011	15.9	1.6	24.5	2.5	35.5	5.5	21.6	1.5
Among all trappers ^b								
2006	17.8	1.5	26.5	3.4	29.6	4.9	20.6	1.4
2007	20.7	2.3	31.7	5.0	24.8	5.1	22.8	1.9
2008	15.4	1.8	27.4	4.4	28.3	6.7	18.9	1.7
2009	11.0	1.2	20.7	2.9	23.6	4.6	15.2	1.3
2010	14.6	1.6	23.1	3.3	29.7	5.4	18.8	1.5
2011	13.3	1.4	18.8	2.0	27.2	4.1	17.4	1.2

^a95% confidence limits.

^bBeginning in 2006, two separate estimates were calculated: (1) an estimate excluding the activity of trappers that did not target otter and (2) an estimate of all trappers combined. The latter estimates are more comparable to estimates from previous years.

Table 7. Estimated number of beaver trappers, their trapping effort (days), number of beaver captured, and trapping success in Michigan during 2007-2011.^a

Variable	Year						Change ^c (%)
	2009		2010		2011		
	Estimate	95% CL ^b	Estimate	95% CL ^b	Estimate	95% CL ^b	
Trappers (No.)	1,218	39	1,306	44	1,672	48	28*
Trapping effort (Days)	31,455	2,031	29,736	1,905	41,810	2,452	41*
Beavers captured (No.)	15,273	1,173	13,423	1,066	19,448	1,373	45*
Trappers that captured a beaver (%)	90	1	88	1	87	1	-1
Trappers using snares in open water (No.)	69	13	75	14	90	15	20
Beaver caught with snares in open water (No.)	128	51	191	63	194	62	2
Trapped beaver in April (Trappers)	527	32	492	33	629	37	28*
Beaver caught in April (No.)	5,253	618	5,551	772	5,142	553	-7

^aFurtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.

^b95% confidence limits.

^cThe change between 2010 and 2011 for proportion of trappers catching beaver is reported as the difference between years rather than the proportional change.

*P<0.005.

Table 8. Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2011 Michigan trapping season, summarized by area.^a

Area	Trappers		Trapping effort (days)		Beaver captured ^a		Trapper success	
	Total	95% CL ^b	Total	95% CL ^b	Total	95% CL ^b	%	95% CL ^b
Upper Peninsula	699	39	14,313	1,215	9,200	1,018	89	2
Lower Peninsula	999	44	26,942	2,237	9,684	912	85	2
Zone 2	706	39	17,536	1,870	6,896	736	87	2
Zone 3	387	30	9,406	1,109	2,788	446	85	3
Unknown	27	9	556	332	564	375	NA	NA
Statewide	1,672	48	41,810	2,452	19,448	1,373	87	1

^aFurtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.

^b95% confidence limits.

Table 9. Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2011 Michigan trapping season, summarized by county.^a

County	Trappers		Trapping effort (days)		Beaver captured	
	Total	95% CL ^b	Total	95% CL ^b	Total	95% CL ^b
Alcona	37	10	794	263	390	137
Alger	41	10	748	223	513	193
Allegan	0	0	0	0	0	0
Alpena	43	11	1,386	538	297	114
Antrim	15	6	172	87	87	44
Arenac	20	7	283	134	191	118
Baraga	63	13	977	350	522	156
Barry	31	9	644	249	107	38
Bay	15	6	348	183	53	26
Benzie	12	6	159	90	39	23
Berrien	0	0	0	0	0	0
Branch	5	4	41	30	14	13
Calhoun	24	8	327	160	401	228
Cass	7	4	290	240	189	206
Charlevoix	24	8	503	302	82	40
Cheboygan	41	10	827	353	438	180
Chippewa	102	16	1,537	442	1,035	319
Clare	48	11	1,375	504	445	191
Clinton	7	4	87	55	7	7
Crawford	24	8	358	140	264	126
Delta	41	10	694	224	283	122
Dickinson	55	12	1,012	268	537	163
Eaton	7	4	153	112	15	16
Emmet	10	5	380	278	73	45
Genesee	12	6	140	83	44	22
Gladwin	55	12	939	289	334	109
Gogebic	43	11	712	205	820	329
Gd. Traverse	22	8	443	249	111	53
Gratiot	9	5	106	75	9	8

^aFurtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.

^b95% confidence limits.

Table 9 (continued). Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2011 Michigan trapping season, summarized by county.^a

County	Trappers		Trapping effort (days)		Beaver captured	
	Total	95% CL ^b	Total	95% CL ^b	Total	95% CL ^b
Hillsdale	2	2	2	2	2	2
Houghton	60	13	821	245	476	197
Huron	2	2	7	9	7	9
Ingham	5	4	46	44	34	33
Ionia	17	7	290	188	95	83
Iosco	43	11	971	424	465	197
Iron	80	15	1,651	413	736	191
Isabella	17	7	518	249	111	54
Jackson	3	3	31	31	3	4
Kalamazoo	7	4	167	137	31	28
Kalkaska	46	11	1,048	413	401	166
Kent	15	6	421	283	89	57
Keweenaw	9	5	281	262	210	189
Lake	20	7	370	153	104	54
Lapeer	14	6	251	157	220	142
Leelanau	3	3	31	31	10	13
Lenawee	0	0	0	0	0	0
Livingston	7	4	107	77	49	34
Luce	44	11	506	176	247	85
Mackinac	39	10	612	220	373	125
Macomb	3	3	17	15	10	11
Manistee	17	7	286	161	89	46
Marquette	92	16	1,801	396	1,092	364
Mason	22	8	431	226	85	36
Mecosta	43	11	1,016	403	206	94
Menominee	29	9	372	132	116	51
Midland	41	10	1,031	419	252	90
Missaukee	46	11	946	365	614	271
Monroe	0	0	0	0	0	0

^aFurtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.

^b95% confidence limits.

Table 9 (continued). Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2011 Michigan trapping season, summarized by county.^a

County	Trappers		Trapping effort (days)		Beaver captured	
	Total	95% CL ^b	Total	95% CL ^b	Total	95% CL ^b
Montcalm	39	10	878	312	121	59
Montmorency	34	10	503	203	206	102
Muskegon	19	7	496	239	106	54
Newaygo	41	10	656	212	184	65
Oakland	12	6	404	226	140	90
Oceana	37	10	743	255	247	99
Ogemaw	19	7	581	290	365	248
Ontonagon	82	15	1,793	440	1,623	511
Osceola	53	12	760	274	455	171
Oscoda	26	8	496	283	153	77
Otsego	32	9	625	309	147	61
Ottawa	9	5	99	73	27	17
Presque Isle	43	11	937	300	228	90
Roscommon	48	11	862	315	448	161
Saginaw	17	7	172	103	37	24
St. Clair	5	4	75	57	19	16
St. Joseph	10	5	239	149	75	54
Sanilac	7	4	82	55	55	37
Schoolcraft	53	12	794	239	619	218
Shiawassee	9	5	95	60	9	6
Tuscola	12	6	160	79	66	43
Van Buren	3	3	12	12	2	2
Washtenaw	0	0	0	0	0	0
Wayne	0	0	0	0	0	0
Wexford	26	8	326	132	128	80
Unknown	27	9	556	332	564	375
Statewide ^c	1,672	48	41,810	2,452	19,448	1,373

^aFurtakers trapping beaver were not required to obtain an otter harvest tag; thus, estimates associated with beaver trapping do not include all furtaker participation, effort, or harvest. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.

^b95% confidence limits.

^cNumber of trappers does not add up to statewide total because trappers could trap in more than one county. Column totals for trapping effort and capture may not equal statewide totals because of rounding errors.



Figure 1. Otter and beaver management zones in Michigan, 2011.

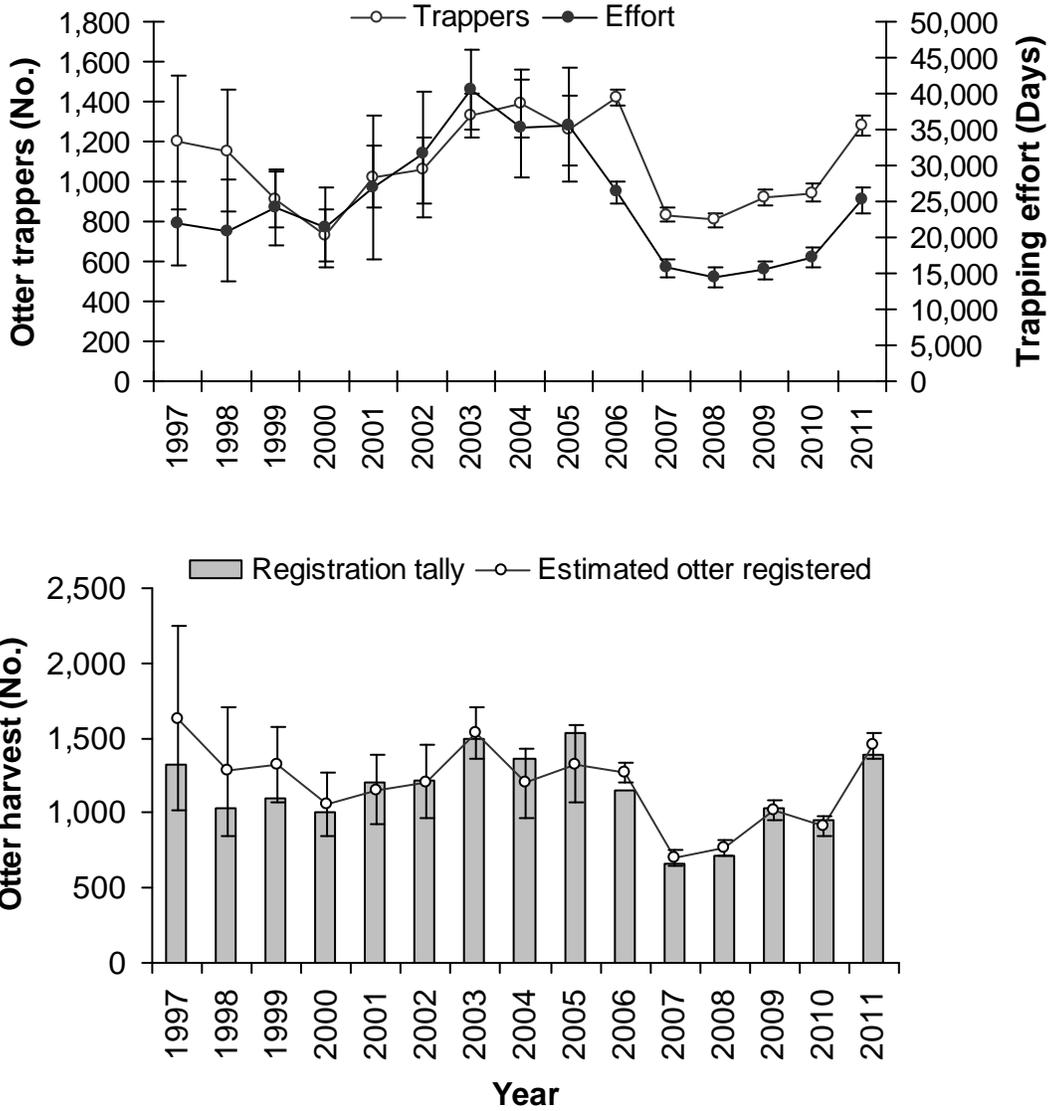


Figure 2. Estimated number of trappers, trapping effort (days), and number of otter captured and registered in Michigan, 1997-2011. Estimates of trapper numbers, trapping effort, and harvest were derived from harvest survey, while registration total was a tally of animals registered by trappers at registration stations (registration total included incidental catches not returned to trappers but excluded non-trapping mortality [e.g., road-kills]). Vertical bars represent the 95% confidence interval.

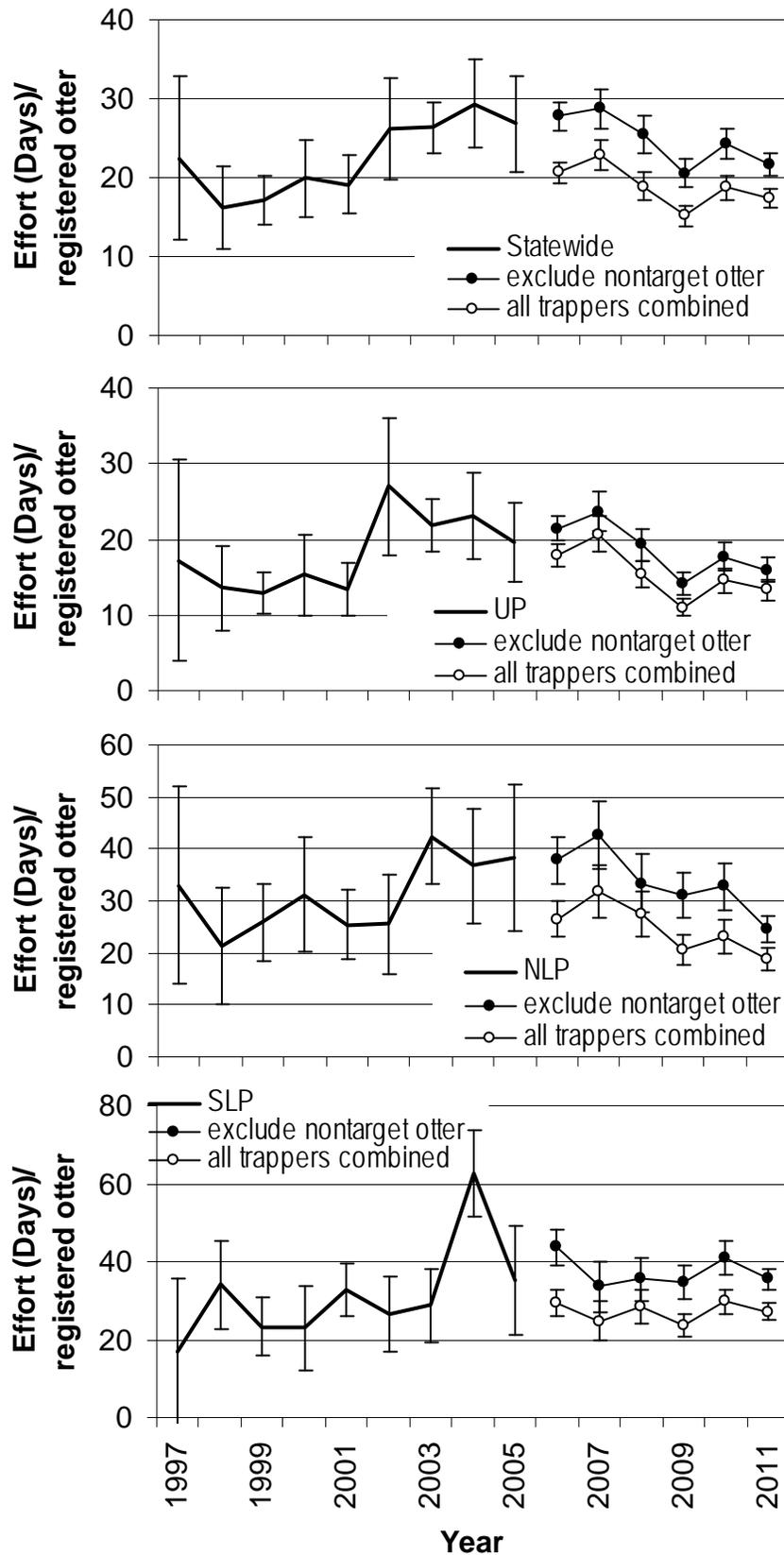


Figure 3. Estimated mean number of days required to harvest an otter in Michigan during 1997-2011, summarized by management zone. Beginning in 2006, two separate estimates were calculated: (1) an estimate excluding the activity of trappers that did not target otter and (2) an estimate of all trappers combined. The latter estimates are more comparable to estimates from previous years.

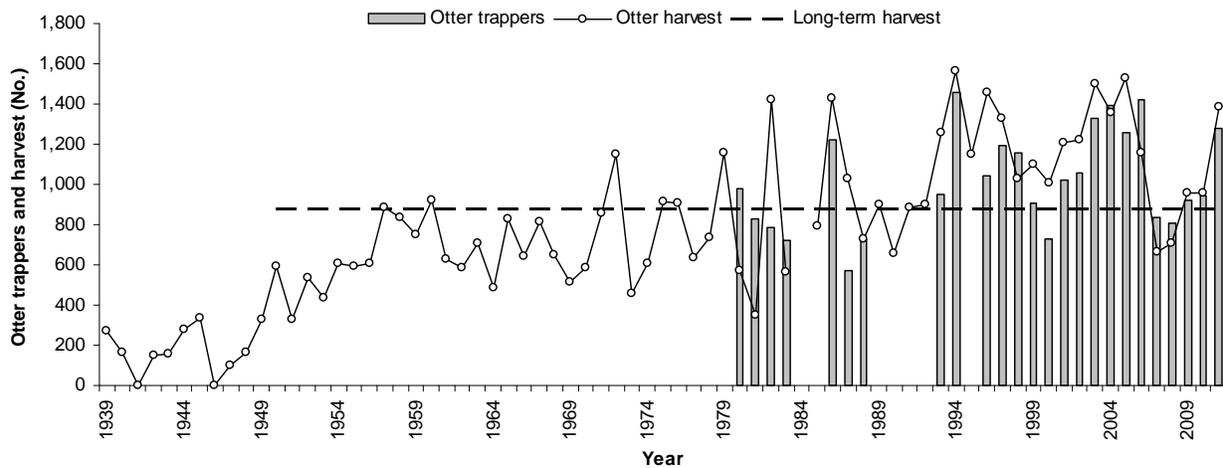


Figure 4. Otter harvest (sealing or registration tally, unpublished data) and estimated number of otter trappers (estimates from harvest survey) in Michigan, 1939-2011. Long-term (1950-2011) average harvest was 881 otter. Estimates were not available for years when values were not plotted.

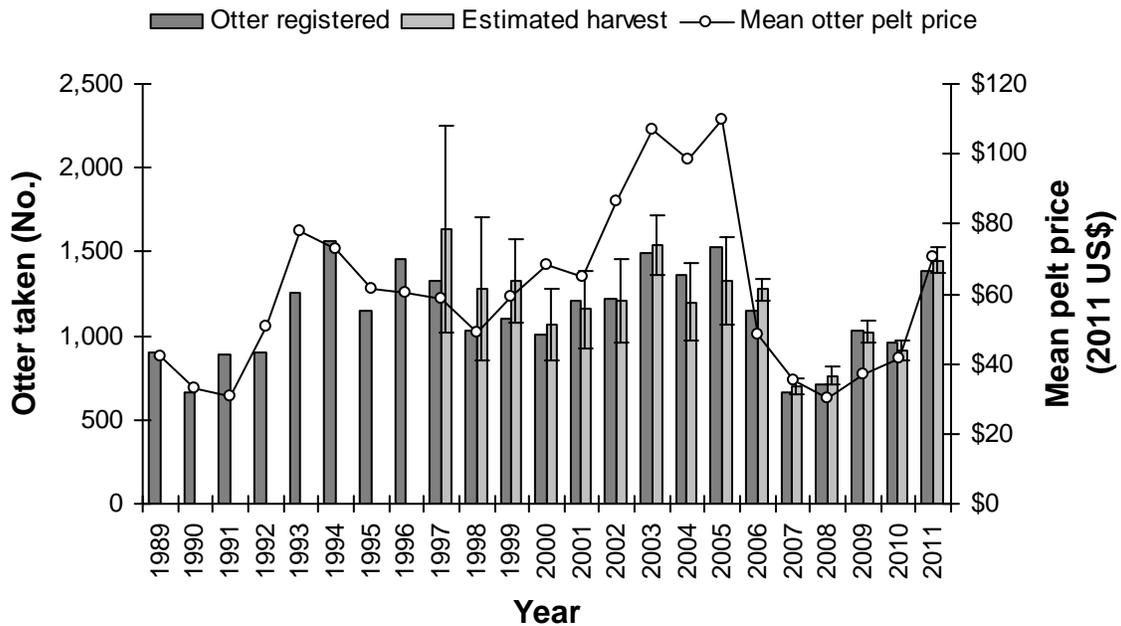


Figure 5. Otter registration totals, estimated otter harvest, and mean otter pelt prices in Michigan during 1989-2011. Mean pelt prices were the average paid in Minnesota and Wisconsin (Abraham and Dexter 2010, Dhuey 2012). Pelt prices were reported in 2011 dollars by adjusting for inflation using the Consumer Price Index (Bureau of Labor Statistics 2011). Vertical bars represent the 95% confidence interval. Estimates were not available for years when values were not plotted.

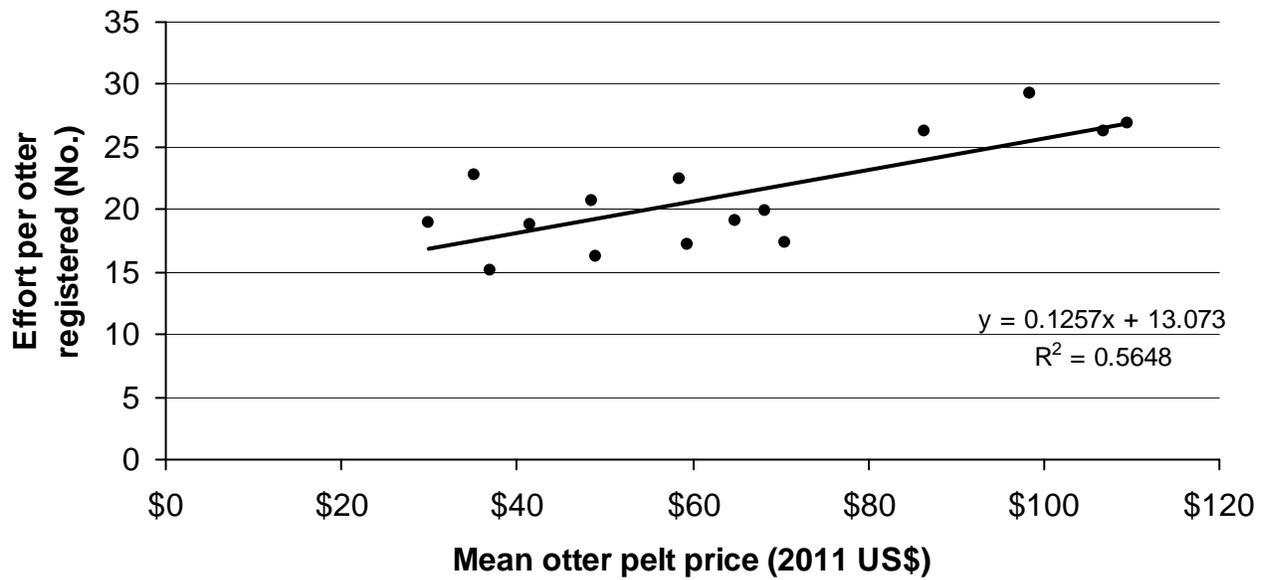
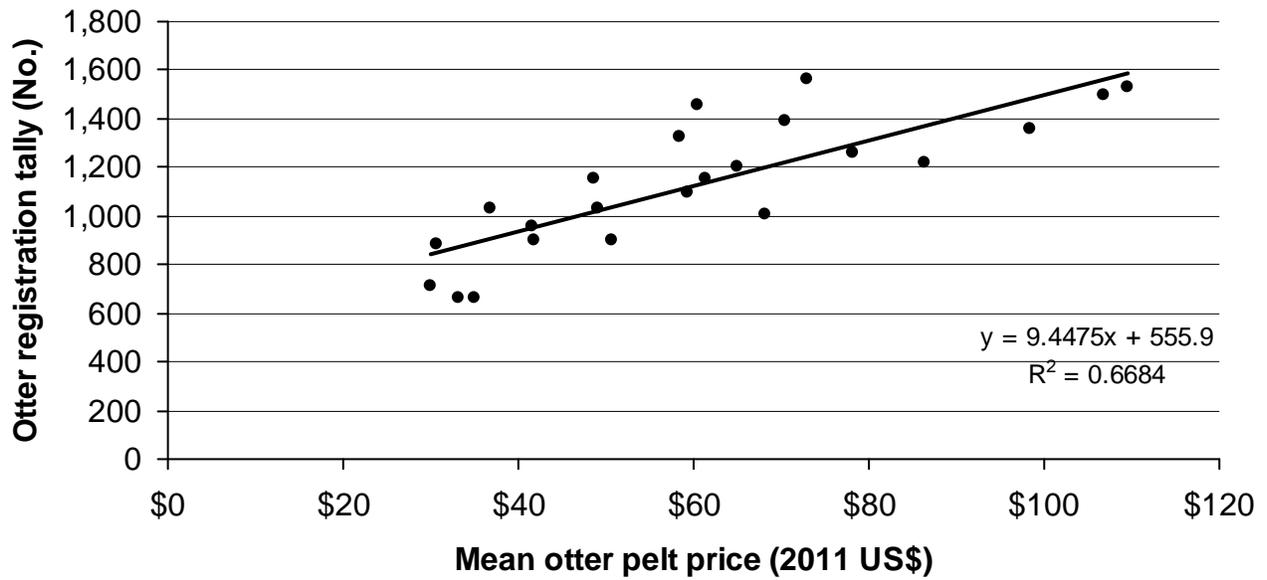


Figure 6. The relationship between the number of otter registered and mean otter pelt prices in Michigan during 1989-2011 (top), and the relationship between trapping effort per otter registered and mean otter pelt prices in Michigan during 1997-2011 (bottom).

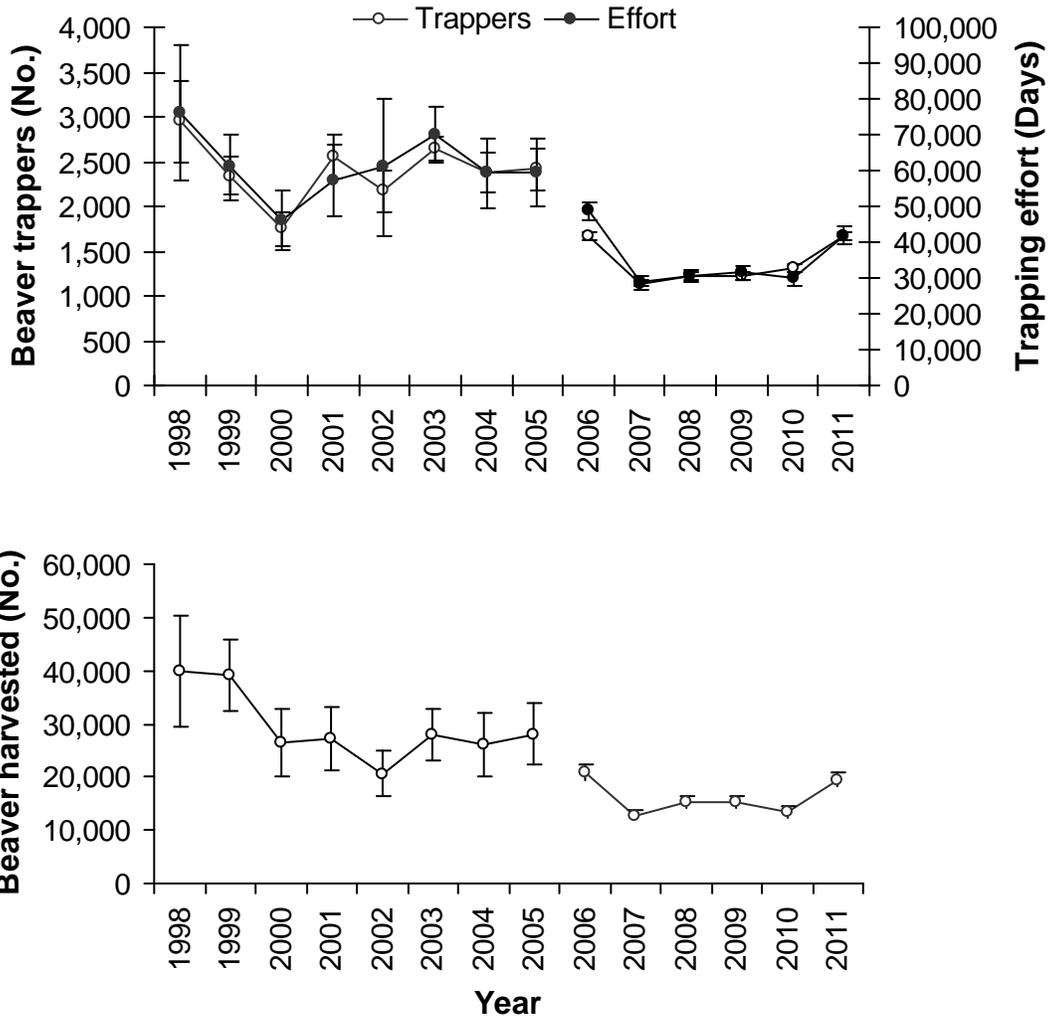


Figure 7. Estimated number of trappers, trapping effort (days), and number of beaver captured in Michigan, 1998-2011. Vertical bars represent the 95% confidence interval. The 2006-2011 estimates were not directly comparable to estimates from previous years because the 2006-2011 estimates only represent the participation, effort, and harvest of trappers that obtained an otter harvest tag. Also beginning in 2003, trappers taking beaver as part of a nuisance control business were asked to exclude nuisance animals from their reported harvest on annual harvest surveys.

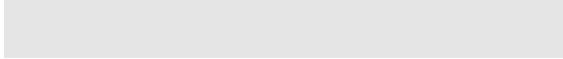
Appendix A. Questionnaire used to collect data for 2011 otter and beaver harvest survey in Michigan.



2011-12 OTTER AND BEAVER HARVEST REPORT

PO BOX 30030 LANSING MI 48909-7530

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 trap or capture any otter or beaver.

1. Did you place traps specifically for otter during the 2011-12 season?

¹ Yes ² No, Skip to question number 5.

2. If you trapped during the 2011-12 otter season, please complete the following table.
(Do not report trapping done as part of a nuisance control business.)

COUNTY TRAPPED (List each county that you trapped for otter.)	NUMBER OF DAYS TRAPPED FOR OTTER	NUMBER OF OTTER CAUGHT AND RELEASED (Count only otters you released alive from your traps.)	NUMBER OF OTTER CAUGHT AND REGISTERED (Count all otter that were registered including incidental catches that were not returned to you.)

3. How many of the following traps did you set for otter in 2011-12?

(For each type, record the average number used per day.)

_____ Foothold
 _____ Conibear

4. What is the status of otter in the county you trapped most often in 2011-12?

¹ Increasing ² Decreasing ³ Stable ⁴ Not present

5. Did you incidentally catch any otter while trapping for other species that you have not already reported in Question #2.

¹ Yes ² No, Skip to question number 7.

6. If you answered yes in the previous question, please report the location and number of incidental otters you captured. Please do not report otter already reported in question #2.

COUNTY WHERE INCIDENTAL OTTER CAUGHT (List each county that you caught an incidental otter.)	NUMBER OF INCIDENTAL OTTER CAUGHT AND RELEASED (Count only incidental otters you released alive from your traps.)	NUMBER OF INCIDENTAL OTTER CAUGHT AND REGISTERED (Count incidental otter that were registered including catches that were not returned to you.)

7. Did you place traps for beaver during the 2011-12 season?

¹ Yes ² No, skip to question 14.

8. If you trapped during the 2011-12 beaver season, please complete the following table.
(Do not report trapping done as part of a nuisance control business.)

COUNTY TRAPPED (List each county that you trapped for beaver.)	NUMBER OF DAYS TRAPPED FOR BEAVER	NUMBER OF BEAVER CAUGHT

9. How many of the following traps did you set for beaver in 2011-12?

(For each type, record the average number used per day.)

_____ Foothold
 _____ Conibear
 _____ Snares

10. Did you attempt to trap beavers with snares in open water during the 2011-12 seasons?

¹ Yes ² No (Skip to Question 11)

10a. If you attempted to trap beavers with snares in open water, how many beavers did you harvest with these sets during the 2011-12 seasons?

_____ BEAVER TAKEN

11. Did you attempt to trap beavers during April 2012?

¹ Yes ² No (Skip to Question 12)

11a. If you attempted to trap beavers during April 2012, how many beavers did you harvest in April?

_____ BEAVER TAKEN

12. What is the status of beaver in the county you trapped most often in 2011-12?

¹ Increasing ² Decreasing ³ Stable ⁴ Not present

13. Did you catch any otter in traps that were set for beaver in 2011-12?

¹ Yes ² No (Skip to Question 14)

13a. If you answered yes, report number of otter caught in your beaver sets.

_____ otter caught in beaver sets

14. Do you have any comments or suggestions about otter or beaver management in Michigan?

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