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2013 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 2013, 4,620 furtakers obtained a harvest tag to take otter, which was 11% more than in 2012. About 22% of the tag holders set traps for otter (1,030 trappers) and 37% set traps for beaver (1,706). Trappers that targeted otter spent nearly 19,504 days trapping otter ($\bar{x} = 19$ days/trapper), captured 820 otter (included animals released alive), and registered 768 otter. An additional 162 otter were registered by trappers that were not targeting otter. The total number of otter registered by all trappers combined decreased significantly by 23% between 2012 and 2013. About 49% of trappers targeting otter captured at least one otter. The number of trappers that attempted to catch otter and their trapping effort (days afield) declined significantly by 11% and 28%, respectively, between 2012 and 2013. The mean number of days of effort per registered otter in 2013 (25.4 days) was not significantly different from 2012 (26.7 days). Beaver trappers spent nearly 31,222 days trapping beaver ($\bar{x} = 18$ days/trapper) and captured 12,179 beaver. About 81% of active beaver trappers captured at least one beaver. The number of people trapping beavers was not significantly different between 2012 and 2013; however, the number of days these trappers spent trapping declined significantly by 33%. In addition, the number of beaver harvested decreased significantly by 18% between 2012 and 2013. Changes in estimates between 2012 and 2013 should be viewed cautiously because Michigan experienced unseasonably cold temperatures and above normal snowfall during December 2013 through February 2014. These conditions probably affected trapping opportunities and indices of otter and beaver abundance derived from trappers.



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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 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 2013, 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 5, 2014, but trappers were not required to register beaver. Trappers were not allowed to keep otters that were beyond the legal limit of otters per person and otters taken outside the area open for harvest (incidental catches). 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, 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 2013 (4,620 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 2014, and nonrespondents were mailed

up to two follow-up questionnaires. Although 4,620 people were sent the questionnaire, 196 surveys were undeliverable, resulting in an adjusted sample size of 4,424. Questionnaires were returned by 2,418 people, yielding a 55% 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 2013 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 or harvest by tribal members.

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 2013, 4,620 trappers obtained harvest tags to trap otter, which was 11% more than the 4,159 trappers with tags in 2012. In 2013, most of the harvest tags (4,378) were obtained by men. Harvest tags were obtained by 227 women, and the sex of 15 tag holders was unknown. About 22% of the otter tag holders set traps targeting otter (1,030 trappers, Table 2). These trappers spent 19,504 days trapping otter ($\bar{x} = 18.9 \pm 1.1$ days/trapper), captured 820 otter, and registered 768 otter (Table 3). About 49% of trappers successfully captured at least one otter.

The estimated number of otter registered by trappers that targeted otter declined significantly by 25% between 2012 and 2013 (1,018 versus 768 otter, Table 3). An additional 162 otter were registered by trappers that were not targeting otter. The estimated total number of otter registered by all trappers combined decreased significantly by 23% between 2012 and 2013 (1,203 versus 930 otter, Table 3). About equal numbers of otter were taken in the Upper Peninsula (UP) and Lower Peninsula (LP) management zones (Table 4). Among counties, Ontonagon (82), Gogebic (65), and Iron (65) counties had the highest harvest estimates (Table 5).

The actual number of otter registered (including incidental take but excluding harvest by tribal members) by trappers at registration stations decreased 32% between 2012 and 2013 (1,234 versus 844 otter, Figure 2). In addition, the number of trappers that attempted to catch otter and their effort declined significantly by about the same amount between 2012 and 2013 (Table 3, Figure 2). Among trappers targeting otter, the mean number of days of effort per registered otter was 25.4 days in 2013, which was not significantly different than the 26.7 days in 2012 (Tables 3 and 6, Figure 3).

The number of otter registered in 2013 was 5% below the long-term yearly average since 1950 (\bar{x} = 886 during 1950-2013, Figure 4). Changes in otter harvest during recent years have generally tracked changes in trapping effort (Figure 2) and changes in otter pelt prices (Figures 5 and 6). Effort per registered otter was not significantly different between 2012 and 2013, the 2013 estimate was near the average during 1997-2013 (Figure 3); suggesting otter numbers were stable statewide (Figure 3).

Changes in estimates between 2012 and 2013 should be viewed cautiously because Michigan experienced unseasonably cold temperatures and above normal snowfall during December 2013 through February 2014 (Midwestern Regional Climate Center 2014). Average temperatures were at least 3°F below normal across Michigan during this period. These conditions probably affected trapping opportunities and indices of otter abundance derived from trapper activity.

The number of otter registered was correlated with the mean value of otter pelts during 1989-2013 (Pearson product moment correlation coefficient [r] = 0.80, probability of obtaining this result [P] < 0.01) (Figure 6). The correlation between mean days of effort per registered otter and pelt prices during 1997-2013 (r = 0.78, P < 0.01) was also significant.

Most otter trappers used conibear-type traps to capture otter ($90 \pm 2\%$), although foothold traps also were used frequently ($39 \pm 3\%$). Among trappers using conibear traps, the mean number of conibear traps set was 4.4 ± 0.2 traps. Among trappers using foothold traps, the mean number of foothold traps set was 4.4 ± 0.4 traps.

Twenty-seven percent of otter trappers ($\pm 3\%$) believed otter numbers were increasing in the county where they trapped most often, while $58 \pm 3\%$ thought otter numbers were stable, $8 \pm 2\%$ thought otter were declining, $4 \pm 1\%$ 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 all years.

About 37% of the otter harvest tag holders set traps for beaver (1,706 trappers, Table 2). Trappers spent 31,222 days trapping (18.3 ± 0.9 days/trapper) and captured 12,179 beaver (Table 7). About 81% of active trappers successfully captured at least one beaver. The number of beaver harvested did not differ significantly between the UP and LP (5,977 versus 6,166). Among counties, Ontonagon (875), Marquette (852), Chippewa (808), and Gogebic (520) counties had the highest harvest estimates (Table 9).

The number of people trapping beavers was not significantly different between 2012 and 2013 (Table 7); however, the number of days these trappers spent trapping declined significantly by 33%. In addition, the number of beaver harvested decreased significantly by 18% between 2012 and 2013 (Table 7, Figure 7).

Most beaver trappers used conibear-type traps to capture beaver ($89 \pm 1\%$), although $56 \pm 2\%$ of trappers used foothold traps and $9 \pm 1\%$ used snares. Among trappers using conibear traps, the mean number of conibear traps set was 7.1 ± 0.6 traps. Among trappers using foothold traps, the mean number of foothold traps set was 5.5 ± 0.4 traps, and among trappers using snares, the mean number of snares set was 19.2 ± 7.8 .

Twenty-one percent of beaver trappers ($\pm 2\%$) believed beaver numbers were increasing in the county where they trapped most often, while $54 \pm 2\%$ 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 153 beaver with snares in open water during the 2013 season (Table 7). About 369 trappers caught 2,600 beaver during April 2014. Beaver harvested with snares in open water and taken during April represented about 1% and 21% of the estimated total beaver harvest, respectively. Among trappers that set traps for beaver, $9 \pm 1\%$ caught otter in their beaver sets. These trappers caught 241 ± 52 otter.

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Table 1. Otter and beaver trapping seasons in Michigan, 2013.

Zone	Season	
	Resident	Nonresident
1	October 25 – April 13 ^a	November 15 – April 13
2	November 1 – April 13	November 24 – April 13
3	November 10 – March 31	December 15 – March 31

^aThe season extended through April 30, 2014, 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 2013 season.

Harvest tag holders	%	95% CL ^a	Total	95% CL ^a
Trapped only otter	5	1	245	28
Trapped only beaver	20	1	921	51
Trapped both otter and beaver	17	1	785	48
Trapped either otter or beaver	42	1	1,951	63
Trapped otter ^b	22	1	1,030	53
Trapped beaver ^c	37	1	1,706	61

^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 2010-2013. Estimates presented separately for trappers targeting otter and for trappers that were not targeting otter.

Variable	Year						Change ^a (%)
	2011		2012		2013		
	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL	
Among trappers targeting otter							
Trappers (No)	1,110	45	1,160	52	1,030	53	-11*
Effort (Days)	25,185	1,775	27,200	2,210	19,504	1,506	-28*
Otters captured (No.)	1,232	79	1,060	78	820	73	-23*
Otters released alive (No.)	68	19	43	14	52	18	21
Otters registered (No.)	1,164	73	1,018	74	768	67	-25*
Trappers that captured an otter (%)	64	2	56	3	49	3	-7*
Trappers that released an otter (%)	4	1	3	1	3	1	0
Trappers that registered an otter (%)	63	2	56	3	49	3	-7*
Mean days required to harvest an otter	21.6	1.5	26.7	2.2	25.4	2.2	-5
Among trappers that did not target otter							
Trappers (No.)	203	23	144	21	122	20	-15
Otters captured (No.)	317	43	213	35	182	39	-15
Otters registered (No.)	286	38	185	32	162	33	-12
Among all trappers^b							
Trappers (No.)	1,282	47	1,291	54	1,141	55	-12*
Otters captured (No.)	1,549	90	1,273	85	1,001	82	-21*
Otters registered (No.)	1,450	81	1,203	80	930	73	-23*
Mean days required to harvest an otter	17.4	1.2	22.6	1.9	21.0	1.8	-7

^aThe change between 2012 and 2013 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 2013 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	413	36	7,029	877	397	55	25	12	373	51	52	5
Lower Peninsula	623	43	12,385	1,270	415	49	25	12	390	45	47	4
Zone 2	396	36	7,436	984	283	42	13	10	269	38	47	5
Zone 3	252	29	4,949	811	132	25	11	7	120	22	43	6
Unknown	10	6	90	86	8	6	2	3	6	4	60	30
Statewide	1,030	53	19,504	1,506	820	73	52	18	768	67	49	3
Among trappers that did not target otter												
Upper Peninsula	55	14	NA	NA	94	26	6	6	88	25	NA	NA
Lower Peninsula	63	15	NA	NA	88	29	13	11	75	21	NA	NA
Zone 2	38	12	NA	NA	61	27	11	11	50	19	NA	NA
Zone 3	25	9	NA	NA	27	10	2	3	25	9	NA	NA
Unknown	0	0	NA	NA	0	0	0	0	0	0	NA	NA
Statewide	122	20	NA	NA	182	39	19	13	162	33	NA	NA
Among all trappers combined												
Upper Peninsula	466	38	7,029	877	491	61	31	14	460	57	55	4
Lower Peninsula	684	45	12,385	1,270	503	56	38	17	464	49	51	4
Zone 2	432	37	7,436	984	344	50	25	15	319	42	51	5
Zone 3	277	30	4,949	811	159	27	13	8	145	24	48	6
Unknown	10	6	90	86	8	6	2	3	6	4	60	30
Statewide	1,141	55	19,504	1,506	1,001	82	71	22	930	73	53	3

^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 2013 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	17	8	413	260	15	12	2	3	13	10
Alger	32	11	460	196	31	15	0	0	31	15
Allegan	8	5	210	187	2	3	0	0	2	3
Alpena	19	8	331	193	19	10	0	0	19	10
Antrim	10	6	42	34	11	8	2	3	10	7
Arenac	10	6	178	112	4	4	0	0	4	4
Baraga	31	10	392	204	34	17	2	3	32	16
Barry	15	7	201	129	6	4	0	0	6	4
Bay	6	4	78	65	2	3	0	0	2	3
Benzie	6	4	86	87	8	10	4	5	4	5
Berrien	2	3	0	0	2	3	0	0	2	3
Branch	0	0	0	0	0	0	0	0	0	0
Calhoun	6	4	256	324	6	6	2	3	4	4
Cass	2	3	115	155	0	0	0	0	0	0
Charlevoix	10	6	185	174	8	6	0	0	8	6
Cheboygan	23	9	231	115	8	6	0	0	8	6
Chippewa	44	12	627	272	27	13	0	0	27	13
Clare	32	11	474	234	25	10	0	0	25	10
Clinton	4	4	17	17	2	3	0	0	2	3
Crawford	13	7	203	128	2	3	0	0	2	3
Delta	15	7	145	87	17	10	2	3	15	9
Dickinson	21	9	342	183	21	11	6	6	15	10
Eaton	2	3	2	3	2	3	0	0	2	3
Emmet	11	6	61	52	11	7	0	0	11	7
Genesee	2	3	38	52	0	0	0	0	0	0
Gladwin	19	8	201	181	17	10	0	0	17	10
Gogebic	38	12	667	243	75	29	10	9	65	24
Gd. Traverse	15	7	231	148	11	8	0	0	11	8
Gratiot	10	6	111	93	10	7	2	3	8	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 2013 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	50	13	755	339	38	18	4	5	34	15
Huron	6	4	61	67	0	0	0	0	0	0
Ingham	2	3	57	78	0	0	0	0	0	0
Ionia	11	6	86	67	10	7	2	3	8	5
Iosco	2	3	38	52	0	0	0	0	0	0
Iron	50	13	906	371	67	22	2	3	65	22
Isabella	19	8	325	204	2	3	0	0	2	3
Jackson	8	5	38	30	2	3	0	0	2	3
Kalamazoo	4	4	191	234	0	0	0	0	0	0
Kalkaska	25	9	460	277	27	25	8	10	19	15
Kent	11	6	220	169	4	4	0	0	4	4
Keweenaw	10	6	134	107	8	6	0	0	8	6
Lake ^d	21	9	323	190	6	4	0	0	6	4
Lapeer	0	0	0	0	0	0	0	0	0	0
Leelanau	4	4	2	3	2	3	0	0	2	3
Lenawee	0	0	0	0	0	0	0	0	0	0
Livingston	2	3	13	18	0	0	0	0	0	0
Luce	23	9	159	88	11	8	2	3	10	7
Mackinac	27	10	290	126	15	10	0	0	15	10
Macomb	0	0	0	0	0	0	0	0	0	0
Manistee	32	11	546	217	25	12	0	0	25	12
Marquette	44	12	860	333	34	16	0	0	34	16
Mason	17	8	225	125	15	8	0	0	15	8
Mecosta	31	10	499	251	27	13	4	5	23	12
Menominee	17	8	290	196	13	12	4	5	10	8
Midland	21	9	451	242	13	8	0	0	13	8
Missaukee	29	10	208	108	13	8	0	0	13	8
Monroe	2	3	0	0	2	3	0	0	2	3

^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 2013 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	13	890	340	32	11	2	3	31	10
Montmorency	19	8	239	178	11	8	0	0	11	8
Muskegon	15	7	256	132	4	4	0	0	4	4
Newaygo	17	8	262	150	8	6	0	0	8	6
Oakland	0	0	0	0	0	0	0	0	0	0
Oceana	13	7	267	183	10	8	0	0	10	8
Ogemaw	15	7	147	92	11	6	0	0	11	6
Ontonagon	63	15	655	228	82	25	0	0	82	25
Osceola	17	8	109	110	6	4	0	0	6	4
Oscoda	11	6	573	394	8	7	0	0	8	7
Otsego	11	6	245	162	8	5	0	0	8	5
Ottawa	8	5	76	80	6	4	0	0	6	4
Presque Isle	29	10	525	242	27	13	4	4	23	12
Roscommon	23	9	600	297	21	11	0	0	21	11
Saginaw	11	6	203	148	6	4	0	0	6	4
St. Clair	0	0	0	0	0	0	0	0	0	0
St. Joseph	10	6	88	59	8	5	0	0	8	5
Sanilac	0	0	0	0	0	0	0	0	0	0
Schoolcraft	31	10	348	132	17	11	0	0	17	11
Shiawassee	2	3	10	13	2	3	0	0	2	3
Tuscola	8	5	103	70	0	0	0	0	0	0
Van Buren	8	5	92	86	4	5	2	3	2	3
Washtenaw	0	0	0	0	0	0	0	0	0	0
Wayne	0	0	0	0	0	0	0	0	0	0
Wexford	19	8	292	193	15	14	6	8	10	8
Unknown	10	6	90	86	8	6	2	3	6	4
Statewide ^e	1,141	55	19,504	1,506	1,001	82	71	22	930	73

^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, 1997-2013.

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
2012	19.6	2.5	32.6	4.8	33.5	5.2	26.7	2.2
2013	18.9	2.4	27.6	3.7	41.1	8.7	25.4	2.2
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
2012	16.7	2.1	27.0	3.9	29.1	4.4	22.6	1.9
2013	15.3	2.0	23.3	3.2	34.1	6.9	21.0	1.8

^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 2007-2013.^a

Variable	Year						Change ^c (%)
	2011		2012		2013		
	Estimate	95% CL ^b	Estimate	95% CL ^b	Estimate	95% CL ^b	
Trappers (No.)	1,672	48	1,776	58	1,706	61	-4
Trapping effort (Days)	41,810	2,452	46,909	2,984	31,222	1,884	-33*
Beavers captured (No.)	19,448	1,373	14,936	1,208	12,179	976	-18*
Trappers that captured a beaver (%)	87	1	84	2	81	2	-4*
Trappers using snares in open water (No.)	90	15	74	15	90	18	21
Beaver caught with snares in open water (No.)	194	62	298	249	153	49	-49
Trapped beaver in April (Trappers)	629	37	501	38	369	34	-26*
Beaver caught in April (No.)	5,142	553	2,808	370	2,600	473	-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 2012 and 2013 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 2013 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	739	47	12,981	1,185	5,977	740	85	2
Lower Peninsula	988	52	18,211	1,565	6,166	668	78	2
Zone 2	648	44	11,118	1,251	4,054	517	77	3
Zone 3	384	35	7,092	948	2,111	407	80	4
Unknown	15	7	31	26	36	25	NA	NA
Statewide	1,706	61	31,222	1,884	12,179	976	81	2

^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 2013 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	27	10	527	268	166	104
Alger	32	11	604	247	254	124
Allegan	15	7	151	123	36	26
Alpena	34	11	407	153	124	57
Antrim	13	7	151	86	90	55
Arenac	19	8	283	183	73	50
Baraga	59	14	908	315	491	191
Barry	19	8	363	184	55	29
Bay	11	6	235	168	65	57
Benzie	4	4	57	55	8	8
Berrien	2	3	2	3	2	3
Branch	2	3	38	52	23	31
Calhoun	10	6	374	342	111	105
Cass	10	6	203	144	80	59
Charlevoix	11	6	250	170	46	41
Cheboygan	46	13	470	175	225	103
Chippewa	96	18	1,401	400	808	300
Clare	53	14	1,028	354	371	161
Clinton	8	5	94	76	36	35
Crawford	15	7	405	299	109	96
Delta	40	12	546	199	191	117
Dickinson	42	12	510	192	329	152
Eaton	8	5	53	43	42	45
Emmet	15	7	233	160	84	46
Genesee	13	7	180	106	134	98
Gladwin	36	11	474	216	378	222
Gogebic	42	12	674	227	520	260
Gd. Traverse	23	9	224	127	27	16
Gratiot	10	6	136	123	10	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.

Table 9 (continued). Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2013 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	4	4	38	37	15	21
Houghton	82	17	1,580	439	451	155
Huron	4	4	48	47	15	21
Ingham	0	0	0	0	0	0
Ionia	19	8	289	143	69	36
Iosco	13	7	86	57	25	15
Iron	59	14	1,062	379	306	103
Isabella	21	9	357	209	46	29
Jackson	6	4	80	66	21	17
Kalamazoo	11	6	109	73	36	26
Kalkaska	34	11	430	202	208	109
Kent	17	8	344	195	25	18
Keweenaw	25	9	373	178	170	85
Lake	38	12	439	187	97	40
Lapeer	13	7	172	108	132	89
Leelanau	6	4	15	13	4	4
Lenawee	0	0	0	0	0	0
Livingston	8	5	75	59	25	21
Luce	48	13	615	220	260	86
Mackinac	36	11	483	179	235	97
Macomb	4	4	191	197	46	53
Manistee	31	10	378	163	65	33
Marquette	97	18	2,050	545	852	326
Mason	10	6	65	58	40	27
Mecosta	46	13	621	224	415	191
Menominee	25	9	386	204	48	27
Midland	29	10	590	285	141	74
Missaukee	48	13	499	176	313	167
Monroe	2	3	38	52	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 2013 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	27	10	302	146	92	42
Montmorency	31	10	569	302	191	86
Muskegon	11	6	130	97	13	9
Newaygo	34	11	487	237	130	59
Oakland	15	7	294	191	134	114
Oceana	23	9	382	172	99	68
Ogemaw	25	9	409	267	245	123
Ontonagon	90	18	1,433	340	875	293
Osceola	34	11	514	256	124	69
Oscoda	17	8	376	247	113	63
Otsego	31	10	436	205	153	79
Ottawa	10	6	182	132	13	9
Presque Isle	42	12	967	360	216	112
Roscommon	40	12	768	343	338	139
Saginaw	13	7	241	205	13	10
St. Clair	0	0	0	0	0	0
St. Joseph	10	6	243	160	27	21
Sanilac	4	4	34	38	25	31
Schoolcraft	34	11	355	140	187	83
Shiawassee	2	3	27	36	0	0
Tuscola	15	7	132	92	31	27
Van Buren	8	5	241	194	53	50
Washtenaw	0	0	0	0	0	0
Wayne	0	0	0	0	0	0
Wexford	27	10	275	169	122	107
Unknown	15	7	31	26	36	25
Statewide ^c	1,706	61	31,222	1,884	12,179	976

^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.

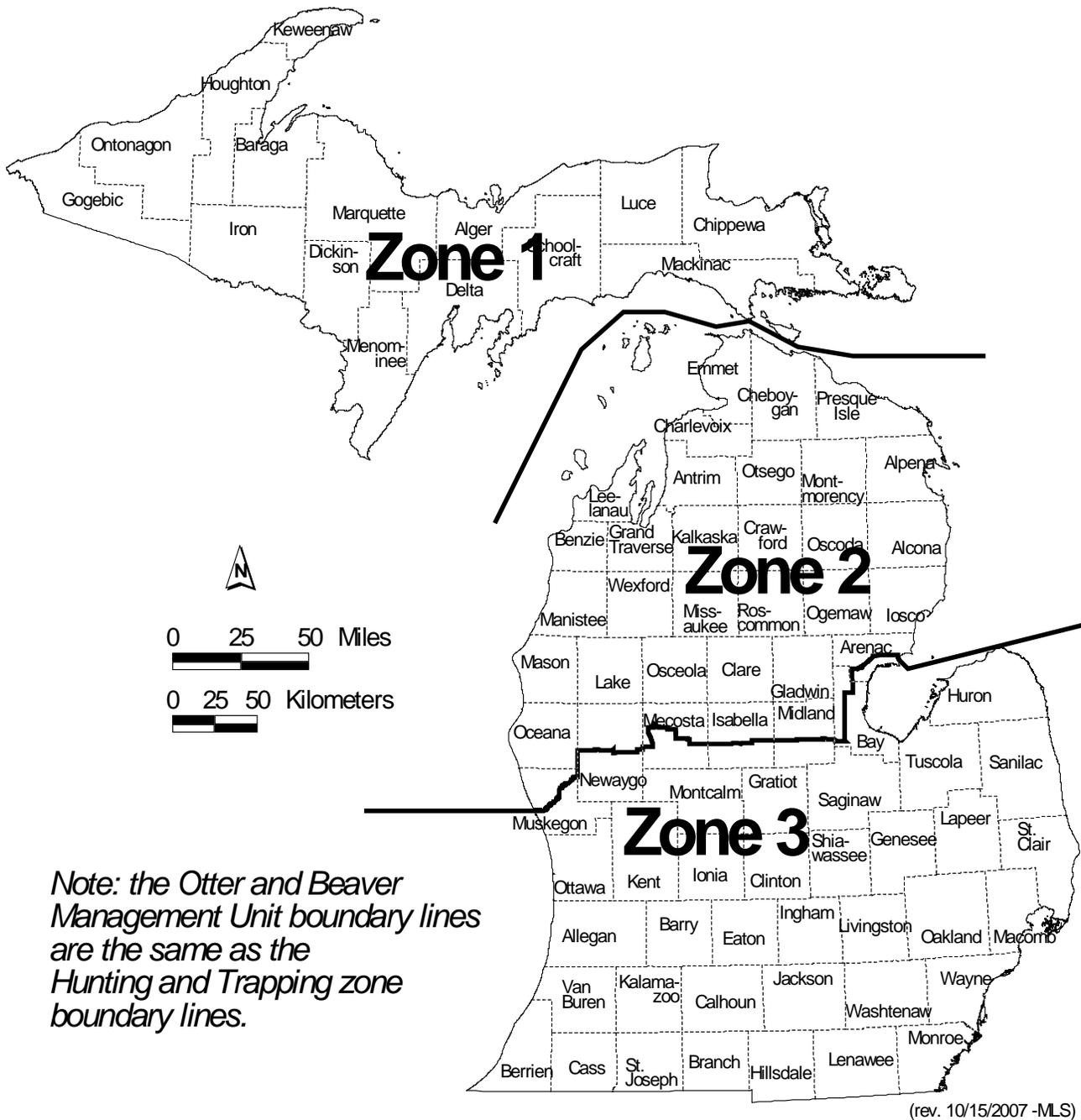


Figure 1. Otter and beaver management zones in Michigan, 2013.

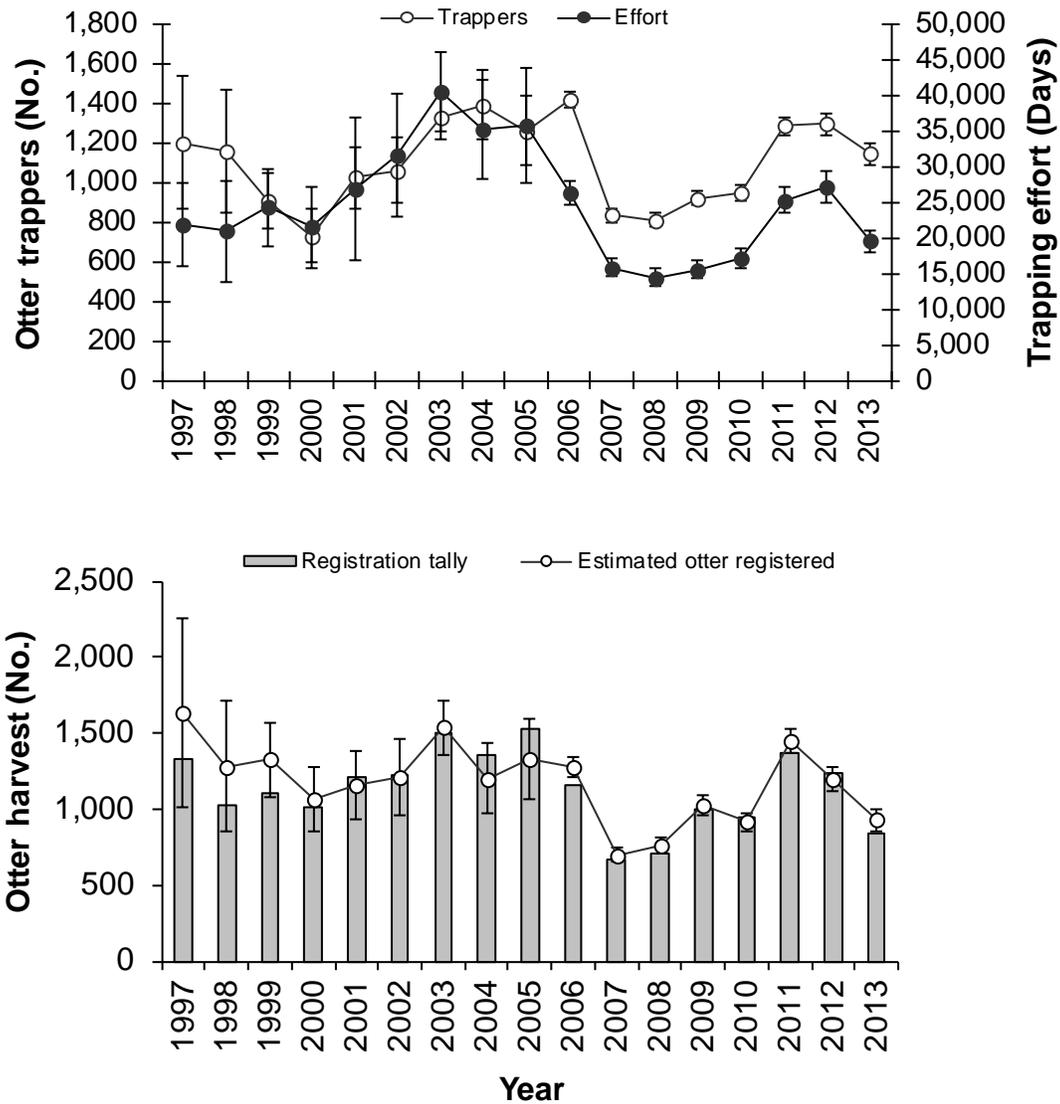


Figure 2. Estimated number of trappers, trapping effort (days), and number of otter captured and registered in Michigan, 1997-2013. Estimates of trapper numbers, trapping effort, and harvest were derived from harvest survey, while registration total was a tally of animals registered by trappers at registration stations (registration total included incidental catches not returned to trappers but excluded non-trapping mortality, and excluded harvest by tribal members). Vertical bars represent the 95% confidence interval.

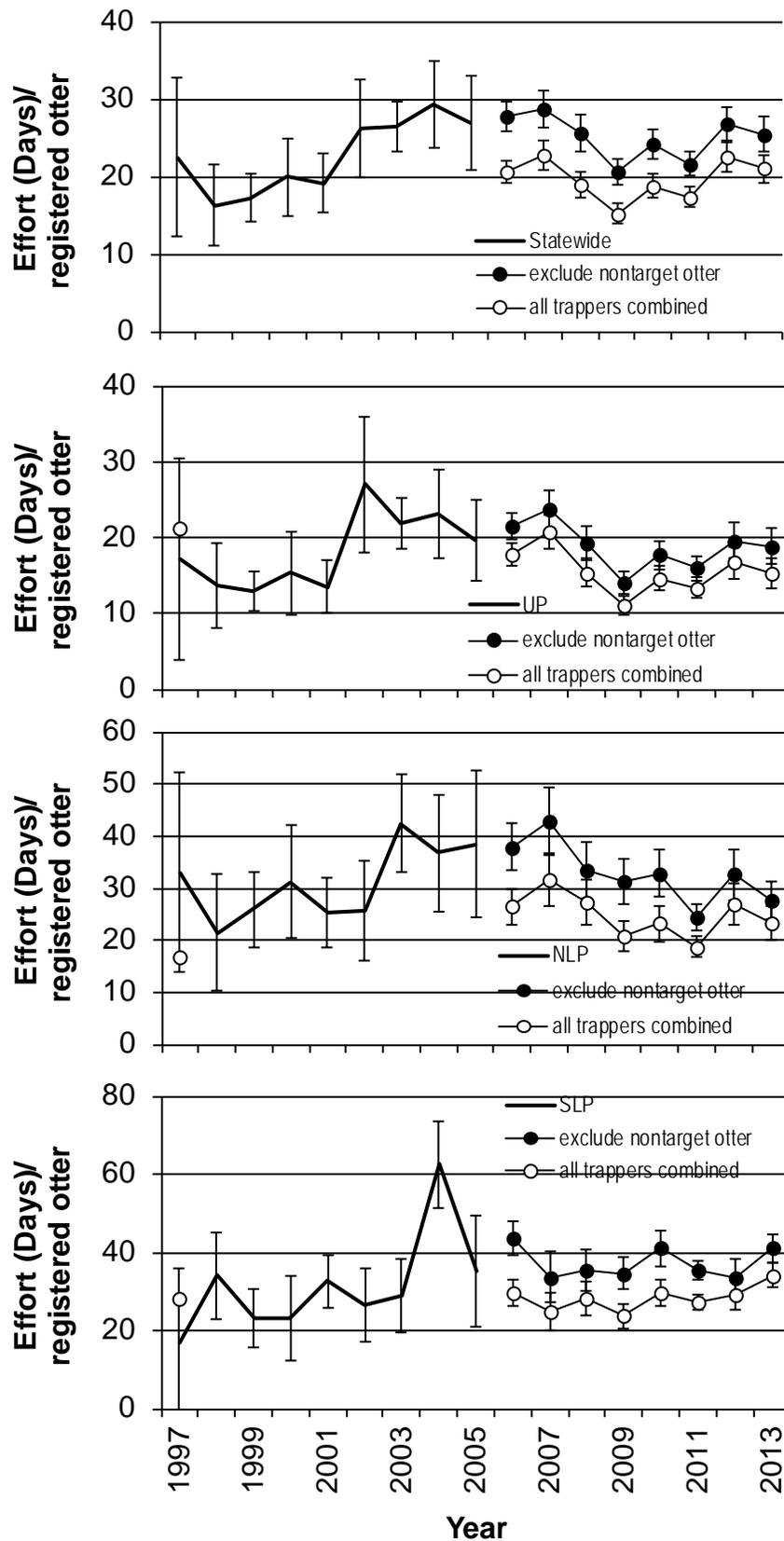


Figure 3. Estimated mean number of days required to harvest an otter in Michigan during 1997-2013, summarized by management zone. Beginning in 2006, two separate estimates were calculated: (1) an estimate excluding the activity of trappers that did not target otter and (2) an estimate of all trappers combined. The latter estimates are more comparable to estimates from previous years.

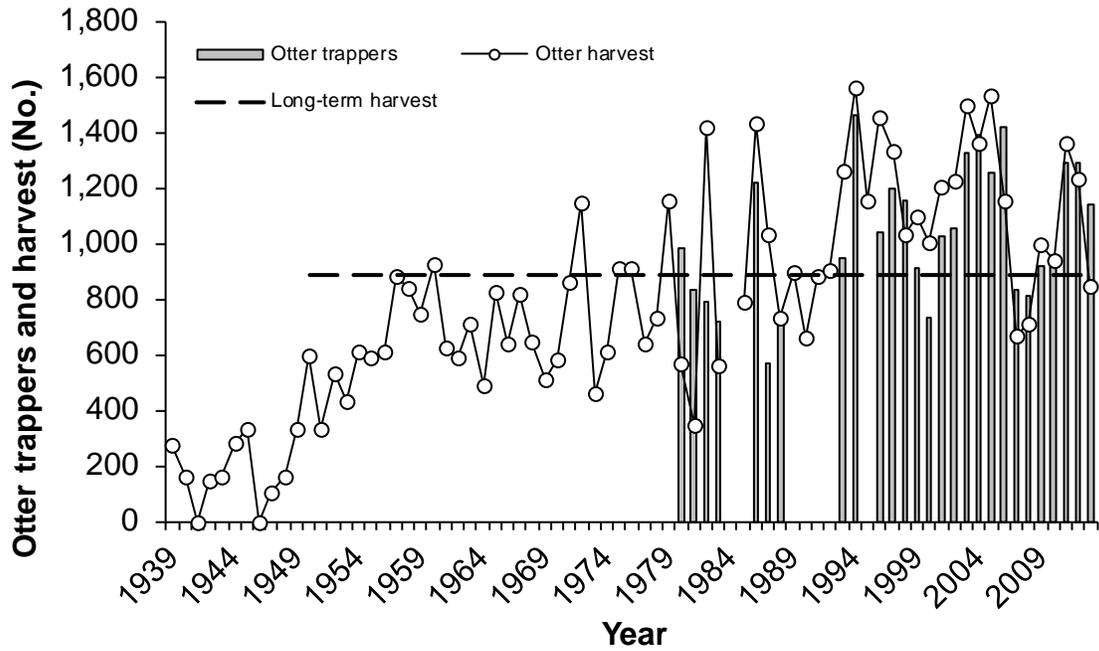


Figure 4. Otter harvest (sealing or registration tally, unpublished data) and estimated number of otter trappers (estimates from harvest survey) in Michigan, 1939-2013. Long-term (1950-2013) average harvest was 886 otter. Estimates were not available for years when values were not plotted.

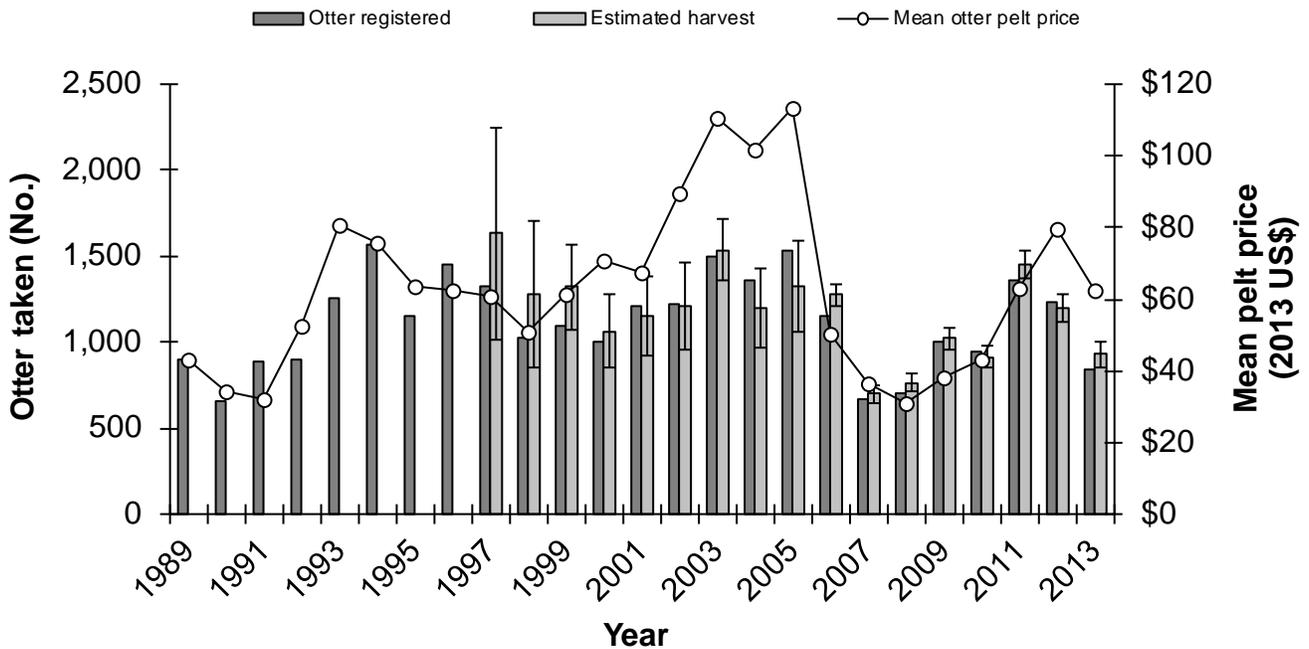


Figure 5. Otter registration totals, estimated otter harvest, and mean otter pelt prices in Michigan during 1989-2013. Mean pelt prices were the average paid in Minnesota and Wisconsin (Abraham and Dexter 2012, Dhuey 2013). Pelt prices were reported in 2013 dollars by adjusting for inflation using the Consumer Price Index (Bureau of Labor Statistics 2014). Vertical bars represent the 95% confidence interval. Estimates were not available for years when values were not plotted.

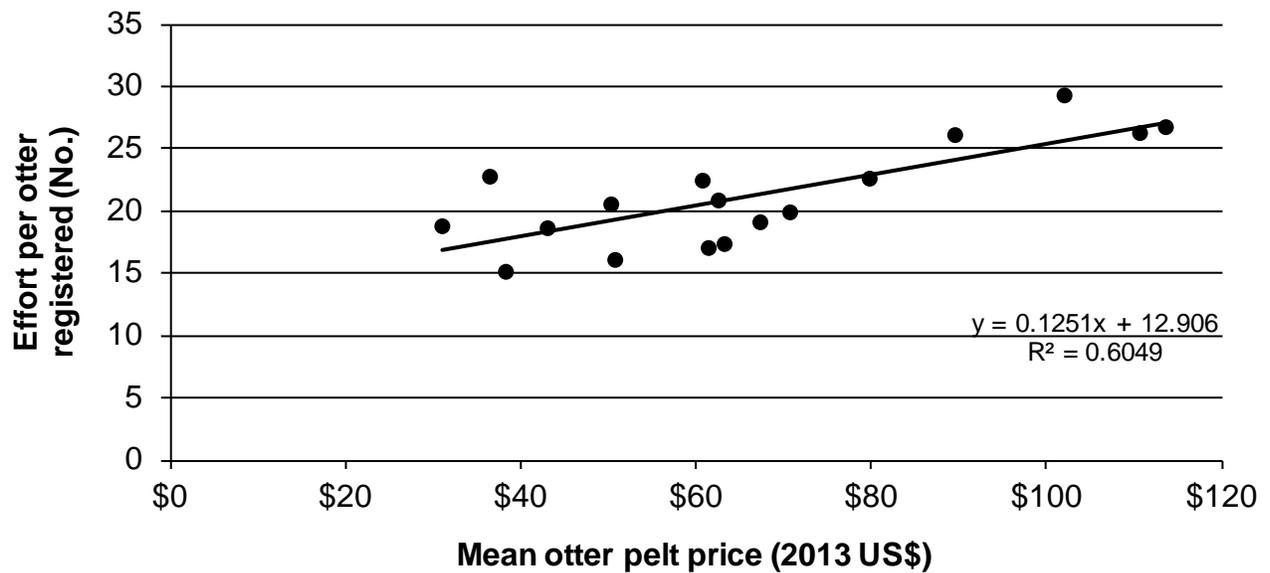
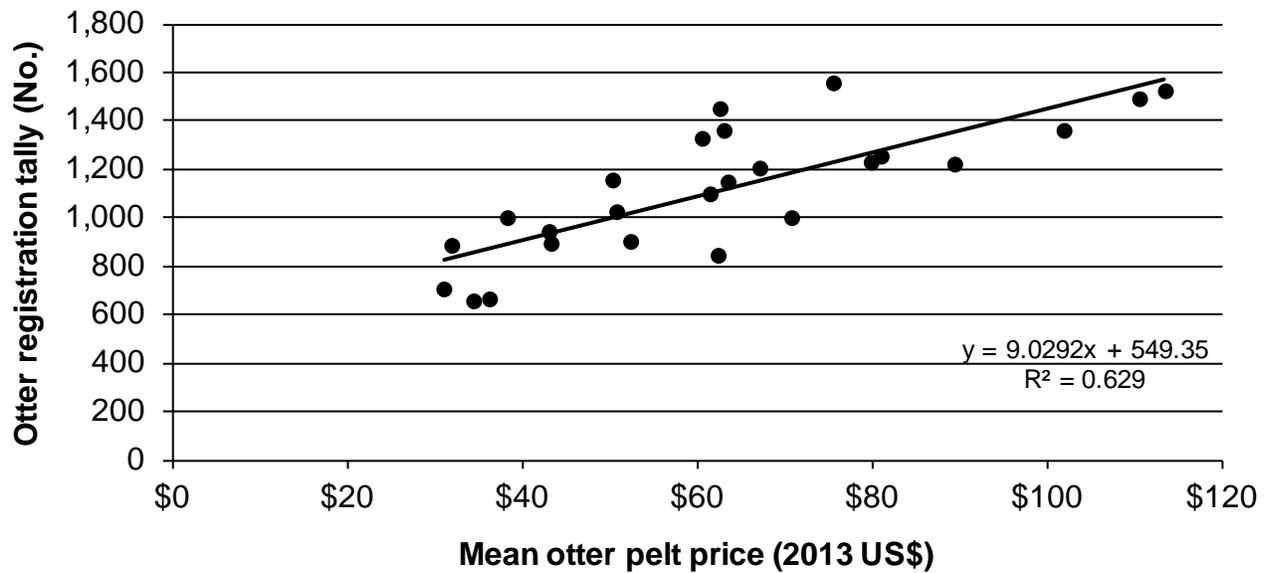


Figure 6. The relationship between the number of otter registered and mean otter pelt prices in Michigan during 1989-2013 (top), and the relationship between trapping effort per otter registered and mean otter pelt prices in Michigan during 1997-2013 (bottom).

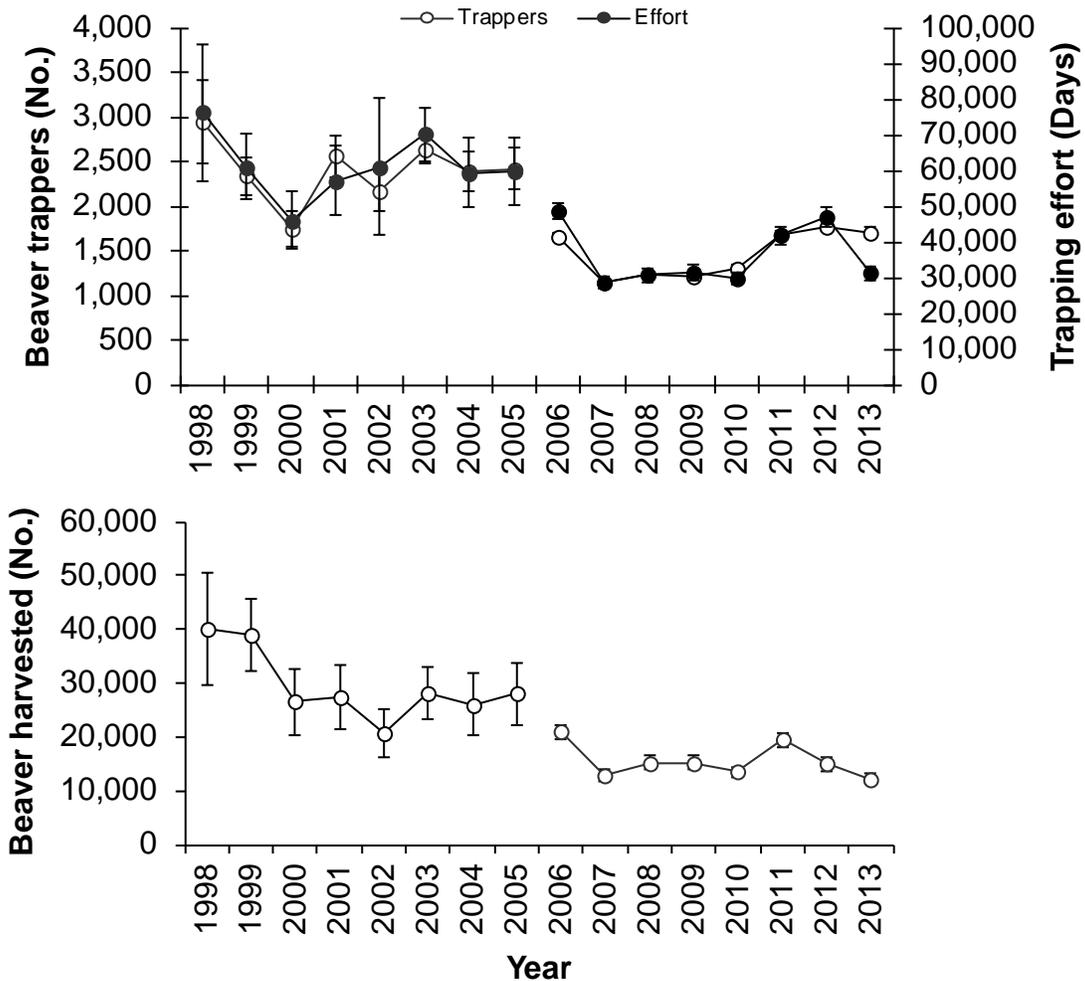


Figure 7. Estimated number of trappers, trapping effort (days), and number of beaver captured in Michigan, 1998-2013. Vertical bars represent the 95% confidence interval. The 2006-2013 estimates were not directly comparable to estimates from previous years because the 2006-2013 estimates only represent 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.

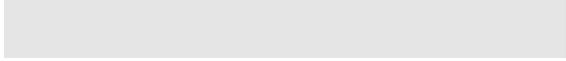
Appendix A. Questionnaire used to collect data for 2013 otter and beaver harvest survey in Michigan.



2013-14 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 2013-14 season?

¹ Yes ² No, Skip to question number 5.

2. If you trapped during the 2013-14 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 2013-14?

(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 2013-14?

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 2013-14 season?

¹ Yes ² No, skip to question 14.

8. If you trapped during the 2013-14 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 2013-14?
 (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 2013-14 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 2013-14 seasons? _____ BEAVER TAKEN

11. Did you attempt to trap beavers during April 2014?

¹ Yes ² No (Skip to Question 12)

11a. If you attempted to trap beavers during April 2014, 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 2013-14?

¹ Increasing ² Decreasing ³ Stable ⁴ Not present

13. Did you catch any otter in traps that were set for beaver in 2013-14?

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!