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2012 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 2012, 4,159 furtakers obtained a harvest tag to take otter, which was 21% more than in 2011. About 28% of the tag holders set traps for otter (1,160 trappers) and 43% set traps for beaver (1,776). Trappers that targeted otter spent nearly 27,200 days trapping otter (\bar{x} = 23 days/trapper), captured 1,060 otter (included animals released alive), and registered 1,018 otter. An additional 185 otter were registered by trappers that were not targeting otter. The total number of otter registered by all trappers combined decreased significantly by 17% between 2011 and 2012. About 56% of trappers targeting otter captured at least one otter. The number of trappers that attempted to catch otter and their trapping effort (days afield) was not significantly different between 2011 and 2012. The mean number of days of effort per registered otter in 2012 (26.7 days) increased significantly from 2011 (21.6 days). Beaver trappers spent nearly 46,909 days trapping beaver (\bar{x} = 26 days/trapper) and captured 14,936 beaver. About 84% of active beaver trappers captured at least one beaver. The number of trappers that attempted to catch beaver and their days spent trapping were not significantly different between 2011 and 2012; however, the number of beaver harvested declined significantly by 23%.

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 2012, 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 one 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 3, 2013, 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, 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 2012 (4,159 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 2013, and nonrespondents were mailed up to two follow-up questionnaires. Although 4,159 people were sent the questionnaire, 192 surveys were undeliverable, resulting in an adjusted sample size of 3,967. Questionnaires were returned by 2,248 people, yielding a 57% 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 2012 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 2012, 4,159 trappers obtained harvest tags to trap otter, which was 21% more than the 3,441 trappers with tags in 2011. In 2012, most of the harvest tags (3,958) were obtained by men. Harvest tags were obtained by 190 women, and the sex of 11 tag holders was unknown. About 28% of the otter tag holders set traps targeting otter (1,160 trappers, Table 2). These trappers spent 27,200 days trapping otter ($\bar{x} = 23.4 \pm 1.6$ days/trapper), captured 1,060 otter, and registered 1,018 otter (Table 3). About 56% of trappers successfully captured at least one otter.

The estimated number of otter registered by trappers that targeted otter did not change significantly between 2011 and 2012 (1,164 versus 1,018 otter, Table 3). An additional 185 otter were registered by trappers that were not targeting otter. The estimated total number of otter registered by all trappers combined decreased significantly by 17% between 2011 and 2012 (1,450 versus 1,203 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, Gogebic (63), Iron (61), Marquette (52), and Chippewa (50) counties had the highest harvest estimates (Table 5).

The number of otter registered (including incidental take but excluding harvest by tribal members) by trappers at registration stations decreased 10% between 2011 and 2012 (1,364 versus 1,234 otter, Figure 2). In contrast, the number of trappers that attempted to catch otter and their effort did not change significantly between 2011 and 2012 (Table 3, Figure 2). Among trappers targeting otter, the mean number of days of effort per registered otter was 26.7 days in 2012, which was significantly greater than the 21.6 days in 2011 (Tables 3 and 6, Figure 3).

The number of otter registered in 2012 was 39% above the long-term yearly average since 1950 (\bar{x} = 886 during 1950-2012, 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). Although effort per registered otter increased between 2011 and 2012, the 2012 estimate was near the average during 1997-2012 (Figure 3); suggesting otter numbers were stable statewide (Figure 3).

The number of otter registered was correlated with the mean value of otter pelts during 1989-2012 (Pearson product moment correlation coefficient [r] = 0.81, probability of obtaining this result [P] < 0.01) (Figure 6). The correlation between mean days of effort per registered otter and pelt prices during 1997-2012 (r = 0.78, P < 0.01) was also significant.

Most otter trappers used conibear-type traps to capture otter ($93 \pm 1\%$), although foothold traps also were used frequently ($40 \pm 3\%$). Among trappers using conibear traps, the mean number of conibear traps set was 4.6 ± 0.2 traps. Among trappers using foothold traps, the mean number of foothold traps set was 4.3 ± 0.3 traps.

Thirty-two percent of otter trappers ($\pm 2\%$) believed otter numbers were increasing in the county where they trapped most often, while $56 \pm 3\%$ thought otter numbers were stable, $8 \pm 1\%$ thought otter were declining, $1 \pm 1\%$ 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 43% of the otter harvest tag holders set traps for beaver (1,776 trappers, Table 2). Trappers spent 46,909 days trapping (26.4 ± 1.4 days/trapper) and captured 14,936 beaver (Table 7). About 84% of active trappers successfully captured at least one beaver. Trappers captured significantly more beaver in the LP than in the UP (9,273 versus 5,600). Among counties, Chippewa (803), Ontonagon (725), Kalkaska (694), and Missaukee (651) counties had the highest harvest estimates (Table 9).

The number of people trapping beavers and the number of days these trappers spent trapping was not significantly different between 2011 and 2012 (Table 7). In contrast, the number of beaver harvested decreased significantly by 23% between 2011 and 2012 (Table 7, Figure 7).

Most beaver trappers used conibear-type traps to capture beaver ($91 \pm 1\%$), although $59 \pm 2\%$ of trappers used foothold traps and $9 \pm 1\%$ used snares. Among trappers using conibear traps, the mean number of conibear traps set was 6.8 ± 0.3 traps. Among trappers using foothold traps, the mean number of foothold traps set was 5.8 ± 0.3 traps, and among trappers using snares, the mean number of snares set was 13.0 ± 5.1 .

Twenty-two percent of beaver trappers ($\pm 2\%$) believed beaver numbers were increasing in the county where they trapped most often, while $52 \pm 2\%$ thought beaver numbers were stable, $23 \pm 2\%$ thought they were declining, and about 3% of trappers either indicated beaver were absent in the area they trapped or did not comment on the status of beaver.

An estimated 74 trappers caught 194 beaver with snares in open water during the 2012 season (Table 7). About 501 trappers caught 2,808 beaver during April 2013. Beaver harvested with snares in open water and taken during April represented about 2% and 19% of the estimated total beaver harvest, respectively. Among trappers that set traps for beaver, $12 \pm 1\%$ caught otter in their beaver sets. These trappers caught 283 ± 38 otter.

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Table 1. Otter and beaver trapping seasons in Michigan, 2012.

Zone	Season	
	Resident	Nonresident
1	October 25 – April 14 ^a	November 15 – April 14
2	November 1 – April 14	November 24 – April 14
3	November 10 – March 31	December 15 – March 31

^aThe season extended through April 30, 2013, 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 2012 season.

Harvest tag holders	%	95% CL ^a	Total	95% CL ^a
Trapped only otter	7	1	279	29
Trapped only beaver	22	1	895	48
Trapped both otter and beaver	21	1	881	48
Trapped either otter or beaver	49	1	2,055	58
Trapped otter ^b	28	1	1,160	52
Trapped beaver ^c	43	1	1,776	58

^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 2010-2012. Estimates presented separately for trappers targeting otter and for trappers that were not targeting otter.

Variable	Year						Change ^a (%)
	2010		2011		2012		
	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL	
Among trappers targeting otter							
Trappers (No)	803	40	1,110	45	1,160	52	5
Effort (Days)	17,130	1,381	25,185	1,775	27,200	2,210	8
Otters captured (No.)	741	59	1,232	79	1,060	78	-14*
Otters released alive (No.)	34	12	68	19	43	14	-38
Otters registered (No.)	707	56	1,164	73	1,018	74	-13
Trappers that captured an otter (%)	58	3	64	2	56	3	-7*
Trappers that released an otter (%)	3	1	4	1	3	1	-1
Trappers that registered an otter (%)	58	3	63	2	56	3	-7*
Mean days required to harvest an otter	24.2	1.9	21.6	1.5	26.7	2.2	24*
Among trappers that did not target otter							
Trappers (No.)	155	20	203	23	144	21	-29*
Otters captured (No.)	248	38	317	43	213	35	-33*
Otters registered (No.)	207	33	286	38	185	32	-35*
Among all trappers ^b							
Trappers (No.)	944	42	1,282	47	1,291	54	1
Otters captured (No.)	989	69	1,549	90	1,273	85	-18*
Otters registered (No.)	914	64	1,450	81	1,203	80	-17*
Mean days required to harvest an otter	18.8	1.5	17.4	1.2	22.6	1.9	30*

^aThe change between 2011 and 2012 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 2012 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	459	37	9,180	1,230	481	59	13	9	468	57	55	4
Lower Peninsula	725	44	17,840	1,888	572	54	30	11	542	51	55	3
Zone 2	448	36	11,387	1,659	366	43	17	8	350	41	57	4
Zone 3	307	30	6,453	936	205	31	13	7	192	29	52	5
Unknown	6	4	179	166	7	8	0	0	7	8	67	36
Statewide	1,160	52	27,200	2,210	1,060	78	43	14	1,018	74	56	3
Among trappers that did not target otter												
Upper Peninsula	52	13	NA	NA	85	24	4	5	81	24	NA	NA
Lower Peninsula	93	17	NA	NA	124	24	22	10	102	21	NA	NA
Zone 2	65	14	NA	NA	87	21	15	8	72	18	NA	NA
Zone 3	30	10	NA	NA	37	13	7	6	30	11	NA	NA
Unknown	2	2	NA	NA	4	5	2	2	2	2	NA	NA
Statewide	144	21	NA	NA	213	35	28	11	185	32	NA	NA
Among all trappers combined												
Upper Peninsula	507	38	9,180	1,230	566	65	17	13	549	62	58	4
Lower Peninsula	810	46	17,840	1,888	696	59	52	15	644	55	58	3
Zone 2	509	38	11,387	1,659	453	49	31	12	422	44	60	4
Zone 3	337	32	6,453	936	242	33	20	10	222	31	55	5
Unknown	7	5	179	166	11	9	2	2	9	8	75	29
Statewide	1,291	54	27,200	2,210	1,273	85	70	20	1,203	80	59	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 2012 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	41	11	807	373	33	13	0	0	33	13
Alger	30	10	457	183	41	17	0	0	41	17
Allegan	15	7	228	131	6	4	0	0	6	4
Alpena	28	9	559	235	19	10	0	0	19	10
Antrim	2	2	37	49	2	2	0	0	2	2
Arenac	11	6	54	43	7	5	0	0	7	5
Baraga	43	12	951	421	41	17	0	0	41	17
Barry	22	8	629	386	15	8	2	2	13	6
Bay	6	4	63	60	2	2	0	0	2	2
Benzie	13	6	155	85	9	10	4	5	6	5
Berrien	4	3	6	7	2	2	0	0	2	2
Branch	0	0	0	0	0	0	0	0	0	0
Calhoun	11	6	157	125	4	3	2	2	2	2
Cass	2	2	167	221	0	0	0	0	0	0
Charlevoix	9	5	215	195	13	9	0	0	13	9
Cheboygan	26	9	427	379	24	11	6	4	19	9
Chippewa	52	13	712	336	50	19	0	0	50	19
Clare	50	13	659	279	31	11	0	0	31	11
Clinton	7	5	39	26	2	2	0	0	2	2
Crawford	13	6	239	145	9	5	0	0	9	5
Delta	22	8	268	146	17	10	0	0	17	10
Dickinson	26	9	583	398	26	13	0	0	26	13
Eaton	7	5	65	61	6	4	2	2	4	3
Emmet	4	3	83	111	2	2	0	0	2	2
Genesee	4	3	26	26	0	0	0	0	0	0
Gladwin	17	7	831	533	9	6	0	0	9	6
Gogebic	46	12	614	192	72	28	9	12	63	22
Gd. Traverse	17	7	178	86	20	11	2	2	19	10
Gratiot	11	6	74	49	9	5	0	0	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 2012 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	43	12	1,038	427	48	18	2	2	46	17
Huron	0	0	0	0	0	0	0	0	0	0
Ingham	0	0	0	0	0	0	0	0	0	0
Ionia	19	8	324	152	4	3	0	0	4	3
Iosco	28	9	418	169	22	11	0	0	22	11
Iron	54	13	918	379	65	21	4	3	61	21
Isabella	15	7	209	122	15	9	0	0	15	9
Jackson	4	3	15	14	0	0	0	0	0	0
Kalamazoo	4	3	93	89	4	5	0	0	4	5
Kalkaska	31	10	831	428	26	10	0	0	26	10
Kent	19	8	329	240	9	5	0	0	9	5
Keweenaw	6	4	124	148	7	8	0	0	7	8
Lake ^d	11	6	316	254	6	5	0	0	6	5
Lapeer	0	0	0	0	0	0	0	0	0	0
Leelanau	6	4	48	51	7	7	0	0	7	7
Lenawee	0	0	0	0	0	0	0	0	0	0
Livingston	6	4	70	54	0	0	0	0	0	0
Luce	26	9	311	168	11	7	0	0	11	7
Mackinac	46	12	696	258	48	19	0	0	48	19
Macomb	0	0	0	0	0	0	0	0	0	0
Manistee	26	9	481	189	20	11	0	0	20	11
Marquette	54	13	1,018	373	52	19	0	0	52	19
Mason	15	7	155	98	11	7	2	2	9	5
Mecosta	46	12	1,038	370	39	16	4	5	35	15
Menominee	17	7	276	143	11	8	2	2	9	6
Midland	20	8	231	119	13	7	2	2	11	7
Missaukee	24	9	233	124	19	9	0	0	19	9
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 2012 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	54	13	1,204	429	43	13	4	3	39	11
Montmorency	20	8	673	383	19	9	0	0	19	9
Muskegon	19	8	191	100	22	10	2	2	20	10
Newaygo	39	11	514	171	24	11	2	2	22	10
Oakland	6	4	126	110	4	3	0	0	4	3
Oceana	17	7	255	176	7	6	2	2	6	5
Ogemaw	20	8	246	131	24	13	4	5	20	10
Ontonagon	56	13	886	368	48	19	0	0	48	19
Osceola	22	8	370	233	13	8	0	0	13	8
Oscoda	13	6	303	241	17	10	6	4	11	6
Otsego	15	7	653	480	6	4	0	0	6	4
Ottawa	4	3	130	150	0	0	0	0	0	0
Presque Isle	39	11	1,234	551	37	17	6	5	31	13
Roscommon	46	12	731	316	33	13	2	2	31	12
Saginaw	11	6	222	164	2	2	0	0	2	2
St. Clair	0	0	0	0	0	0	0	0	0	0
St. Joseph	11	6	83	65	7	6	2	2	6	4
Sanilac	4	3	22	21	2	2	0	0	2	2
Schoolcraft	31	10	329	129	30	13	0	0	30	13
Shiawassee	6	4	52	51	4	3	0	0	4	3
Tuscola	9	5	122	89	7	5	0	0	7	5
Van Buren	0	0	0	0	0	0	0	0	0	0
Washtenaw	2	2	26	34	0	0	0	0	0	0
Wayne	0	0	0	0	0	0	0	0	0	0
Wexford	19	8	196	116	7	6	0	0	7	6
Unknown	7	5	179	166	11	9	2	2	9	8
Statewide ^e	1,291	54	27,200	2,210	1,273	85	70	20	1,203	80

^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, 1997-2012.

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
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

^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 2007-2012.^a

Variable	Year						Change ^c (%)
	2010		2011		2012		
	Estimate	95% CL ^b	Estimate	95% CL ^b	Estimate	95% CL ^b	
Trappers (No.)	1,306	44	1,672	48	1,776	58	6
Trapping effort (Days)	29,736	1,905	41,810	2,452	46,909	2,984	12
Beavers captured (No.)	13,423	1,066	19,448	1,373	14,936	1,208	-23*
Trappers that captured a beaver (%)	88	1	87	1	84	2	-2
Trappers using snares in open water (No.)	75	14	90	15	74	15	-18
Beaver caught with snares in open water (No.)	191	63	194	62	298	249	53
Trapped beaver in April (Trappers)	492	33	629	37	501	38	-20*
Beaver caught in April (No.)	5,551	772	5,142	553	2,808	370	-45*

^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 2011 and 2012 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 2012 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	679	43	13,952	1,483	5,600	664	86	2
Lower Peninsula	1,158	52	32,834	2,706	9,273	1,040	83	2
Zone 2	792	46	22,303	2,373	6,788	917	84	2
Zone 3	448	36	10,531	1,286	2,485	411	82	3
Unknown	9	5	124	153	63	81	NA	NA
Statewide	1,776	58	46,909	2,984	14,936	1,208	84	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 2012 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	63	14	1,323	470	537	244
Alger	39	11	551	177	242	117
Allegan	17	7	181	112	31	17
Alpena	33	10	751	372	200	88
Antrim	15	7	276	204	46	28
Arenac	15	7	357	306	87	51
Baraga	50	13	1,036	493	287	112
Barry	17	7	731	506	31	19
Bay	11	6	239	169	37	32
Benzie	13	6	179	101	48	34
Berrien	9	5	85	62	30	21
Branch	6	4	48	38	43	38
Calhoun	15	7	315	197	48	31
Cass	9	5	187	135	50	36
Charlevoix	17	7	315	209	52	32
Cheboygan	54	13	1,493	552	331	118
Chippewa	98	18	1,859	588	803	294
Clare	68	15	1,630	491	483	212
Clinton	2	2	4	5	0	0
Crawford	22	8	416	221	113	54
Delta	39	11	609	252	281	115
Dickinson	44	12	681	249	335	129
Eaton	11	6	137	93	41	29
Emmet	13	6	248	161	70	53
Genesee	13	6	289	234	91	77
Gladwin	46	12	1,030	426	303	105
Gogebic	41	11	581	187	233	94
Gd. Traverse	19	8	394	231	61	49
Gratiot	7	5	54	37	9	9

^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 2012 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	3	80	99	9	12
Houghton	52	13	1,290	499	512	224
Huron	4	3	67	75	19	19
Ingham	2	2	6	7	2	2
Ionia	26	9	501	225	56	27
Iosco	48	12	738	295	333	167
Iron	63	14	997	296	268	95
Isabella	31	10	620	223	105	42
Jackson	4	3	19	18	7	10
Kalamazoo	9	5	229	172	24	18
Kalkaska	46	12	1,243	475	694	417
Kent	30	10	359	151	70	35
Keweenaw	11	6	139	84	100	68
Lake	26	9	350	157	76	36
Lapeer	9	5	216	138	189	152
Leelanau	4	3	24	23	9	9
Lenawee	0	0	0	0	0	0
Livingston	4	3	43	43	19	25
Luce	44	12	659	294	259	118
Mackinac	52	13	1,204	432	531	187
Macomb	4	3	241	296	37	42
Manistee	33	10	557	208	168	71
Marquette	68	15	1,833	581	544	209
Mason	17	7	170	88	85	44
Mecosta	63	14	1,073	369	474	188
Menominee	24	9	324	144	63	35
Midland	30	10	664	290	113	42
Missaukee	52	13	1,093	418	651	315
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 2012 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	30	10	494	205	74	39
Montmorency	31	10	1,154	534	241	115
Muskegon	20	8	442	238	78	40
Newaygo	65	14	1,419	465	213	69
Oakland	17	7	392	255	159	112
Oceana	30	10	640	286	120	57
Ogemaw	37	11	873	413	359	184
Ontonagon	85	17	1,626	508	725	204
Osceola	57	14	1,291	488	442	170
Oscoda	20	8	633	387	104	54
Otsego	30	10	1,095	583	159	68
Ottawa	17	7	348	201	35	19
Presque Isle	46	12	1,604	618	337	164
Roscommon	67	15	1,632	546	463	158
Saginaw	20	8	309	176	94	48
St. Clair	7	5	67	47	17	14
St. Joseph	20	8	414	213	139	64
Sanilac	4	3	39	38	26	30
Schoolcraft	41	11	562	212	416	176
Shiawassee	7	5	61	43	43	34
Tuscola	4	3	76	71	19	20
Van Buren	4	3	85	89	56	67
Washtenaw	0	0	0	0	0	0
Wayne	0	0	0	0	0	0
Wexford	35	11	792	401	216	115
Unknown	9	5	124	153	63	81
Statewide ^c	1,776	58	46,909	2,984	14,936	1,208

^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.

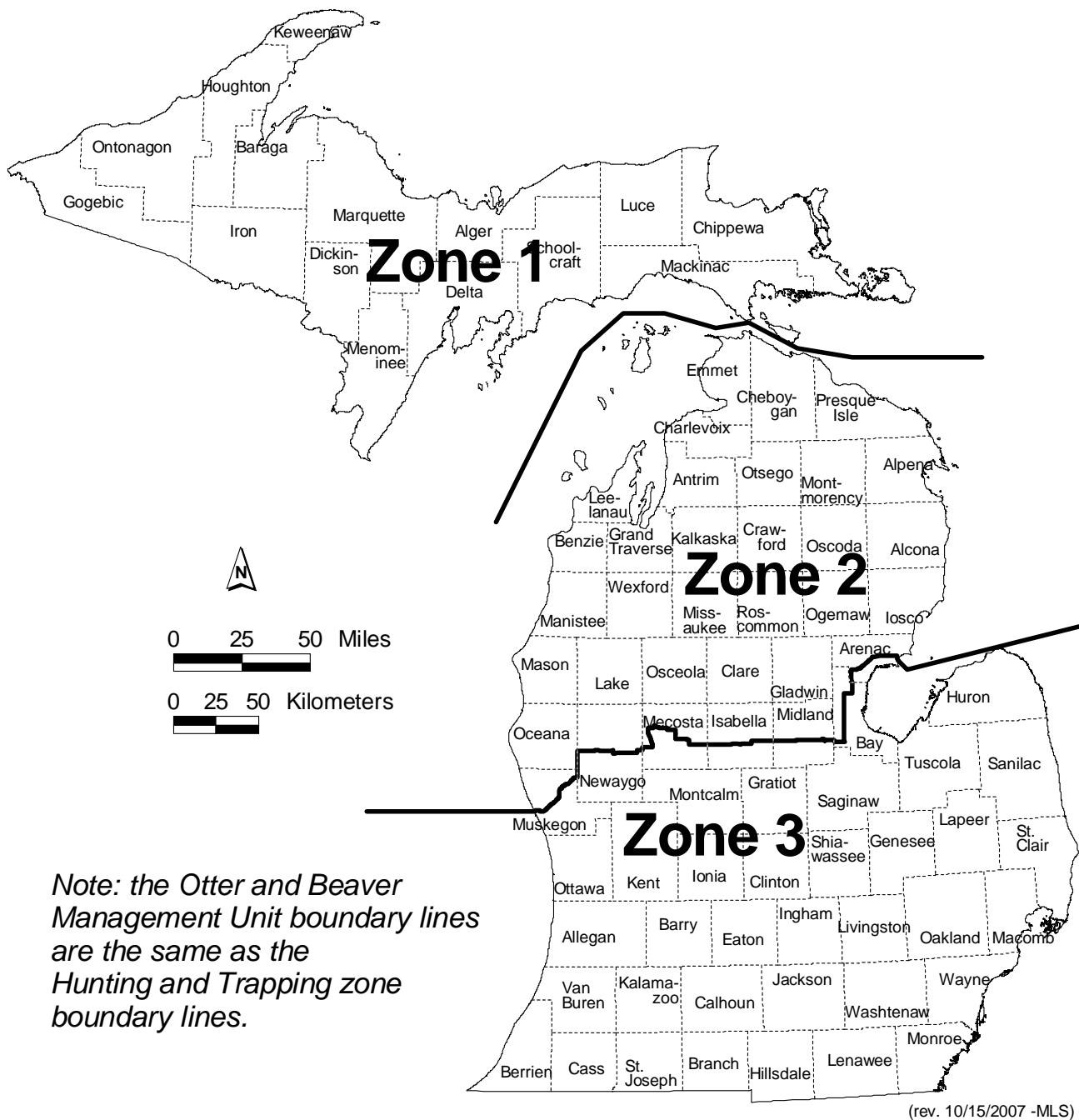


Figure 1. Otter and beaver management zones in Michigan, 2012.

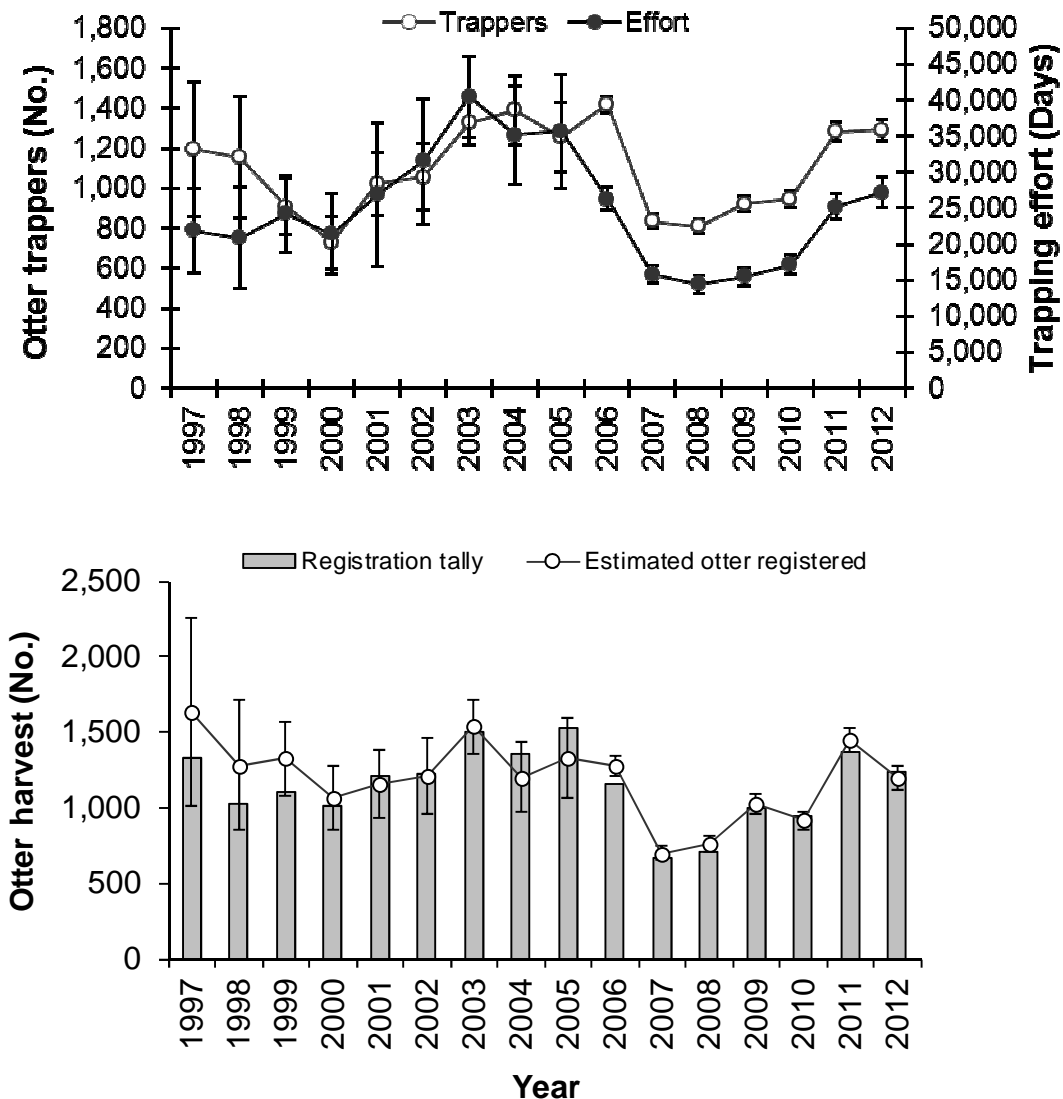


Figure 2. Estimated number of trappers, trapping effort (days), and number of otter captured and registered in Michigan, 1997-2012. Estimates of trapper numbers, trapping effort, and harvest were derived from harvest survey, while registration total was a tally of animals registered by trappers at registration 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.

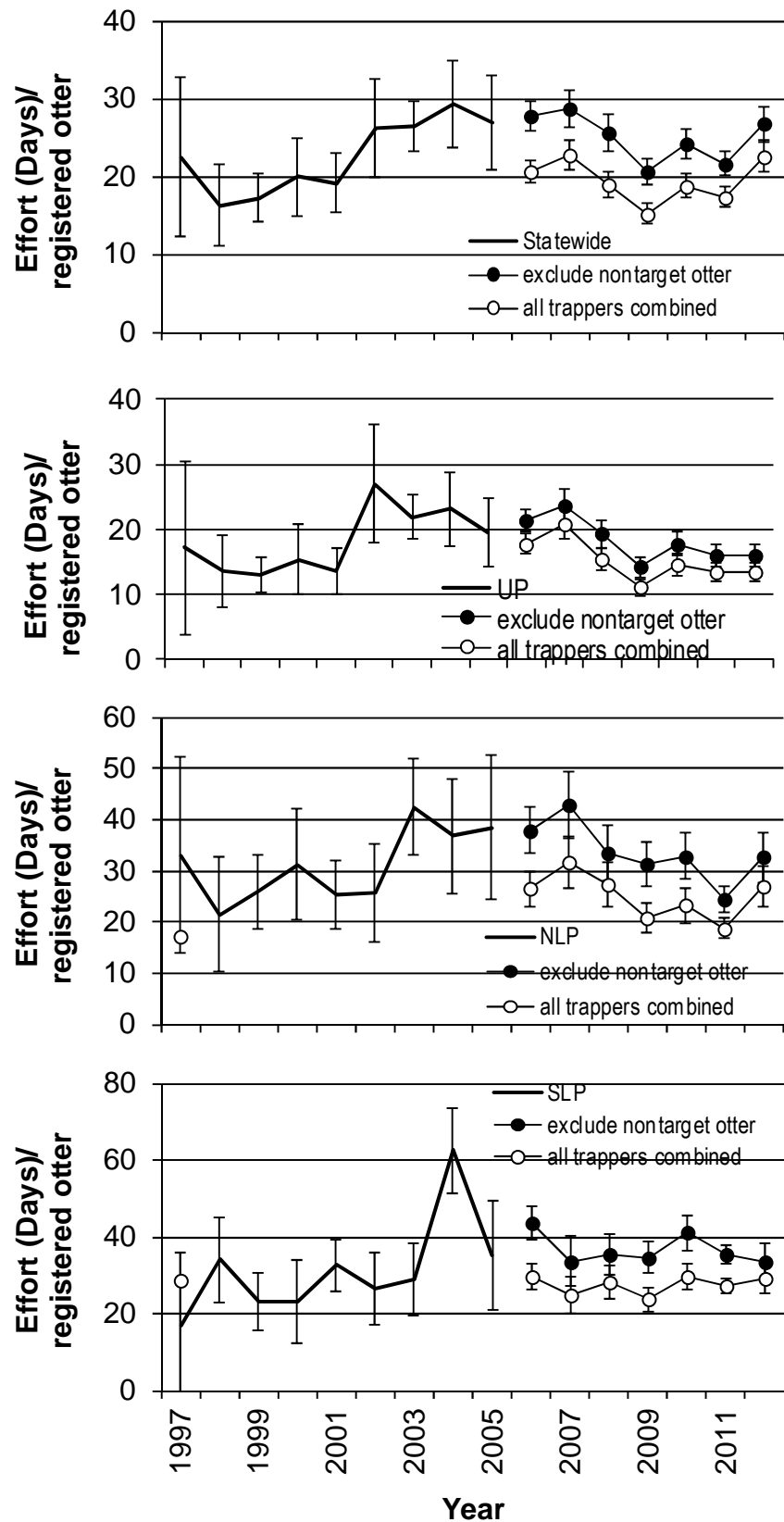


Figure 3. Estimated mean number of days required to harvest an otter in Michigan during 1997-2012, summarized by management zone. Beginning in 2006, two separate estimates were calculated: (1) an estimate excluding the activity of trappers that did not target otter and (2) an estimate of all trappers combined. The latter estimates are more comparable to estimates from previous years.

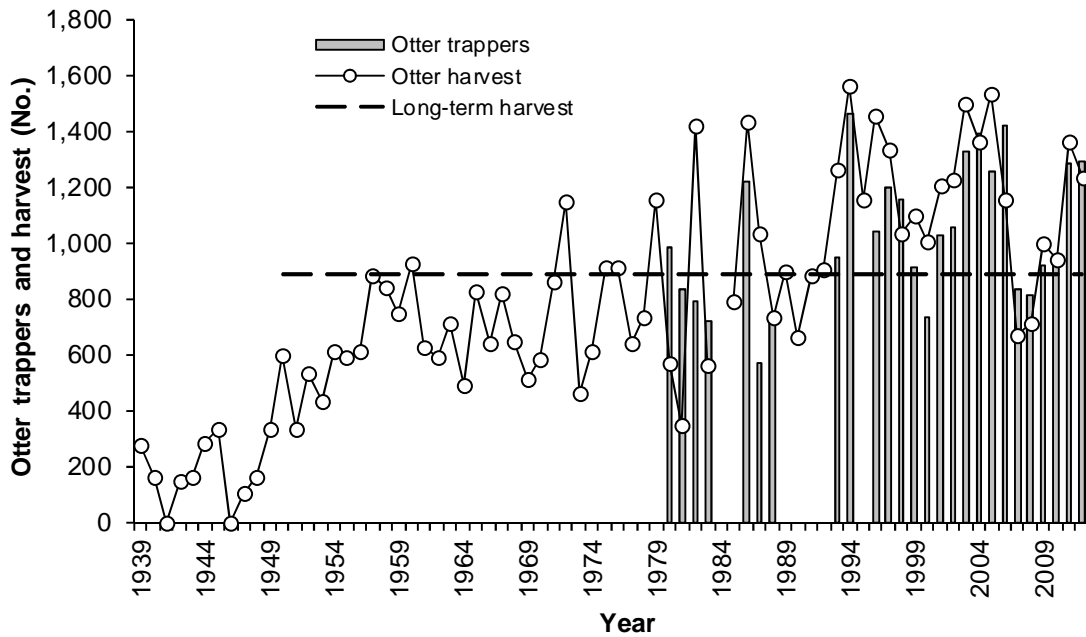


Figure 4. Otter harvest (sealing or registration tally, unpublished data) and estimated number of otter trappers (estimates from harvest survey) in Michigan, 1939-2012. Long-term (1950-2012) average harvest was 886 otter. Estimates were not available for years when values were not plotted.

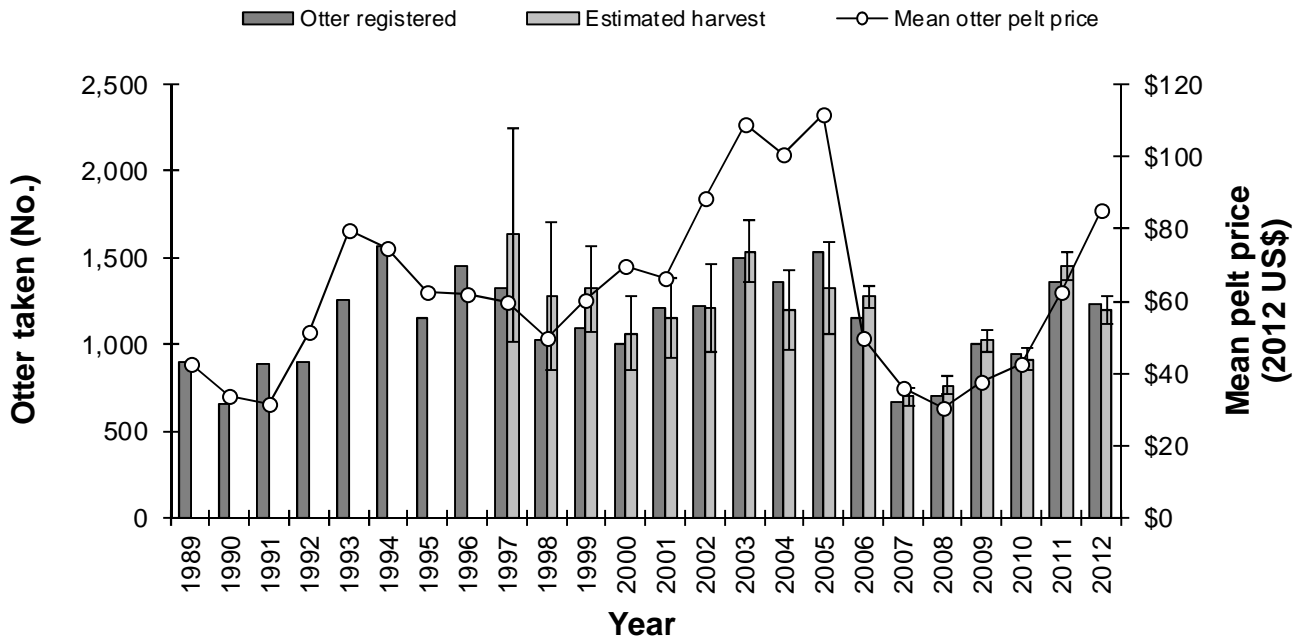


Figure 5. Otter registration totals, estimated otter harvest, and mean otter pelt prices in Michigan during 1989-2012. Mean pelt prices were the average paid in Minnesota and Wisconsin (Abraham and Dexter 2012, Dhuey 2013). Pelt prices were reported in 2012 dollars by adjusting for inflation using the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

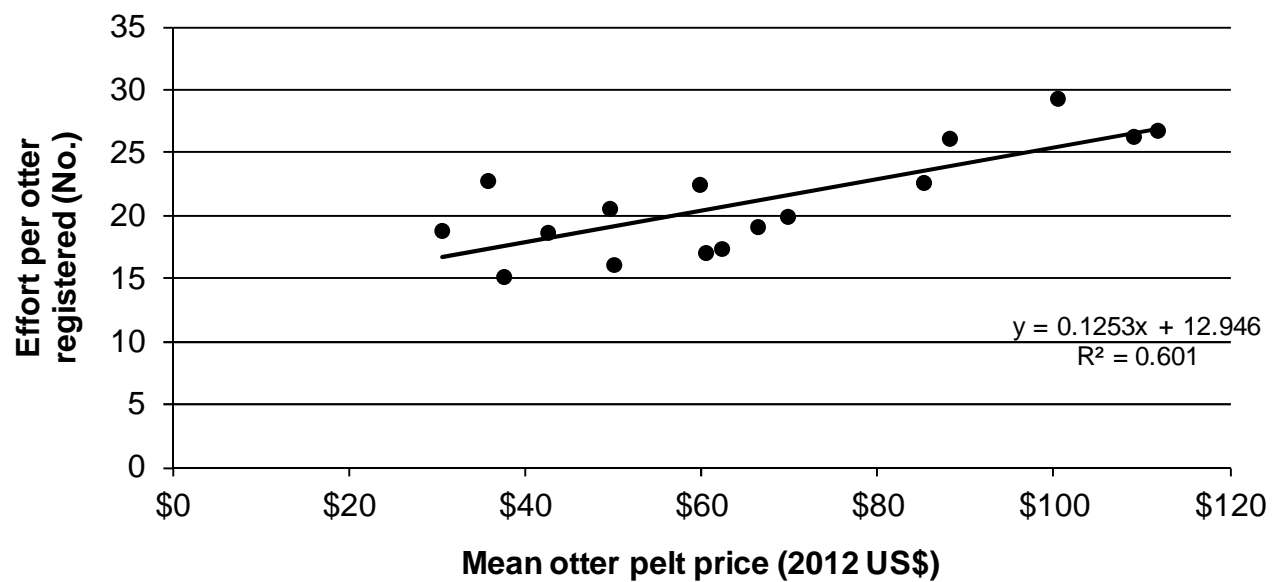
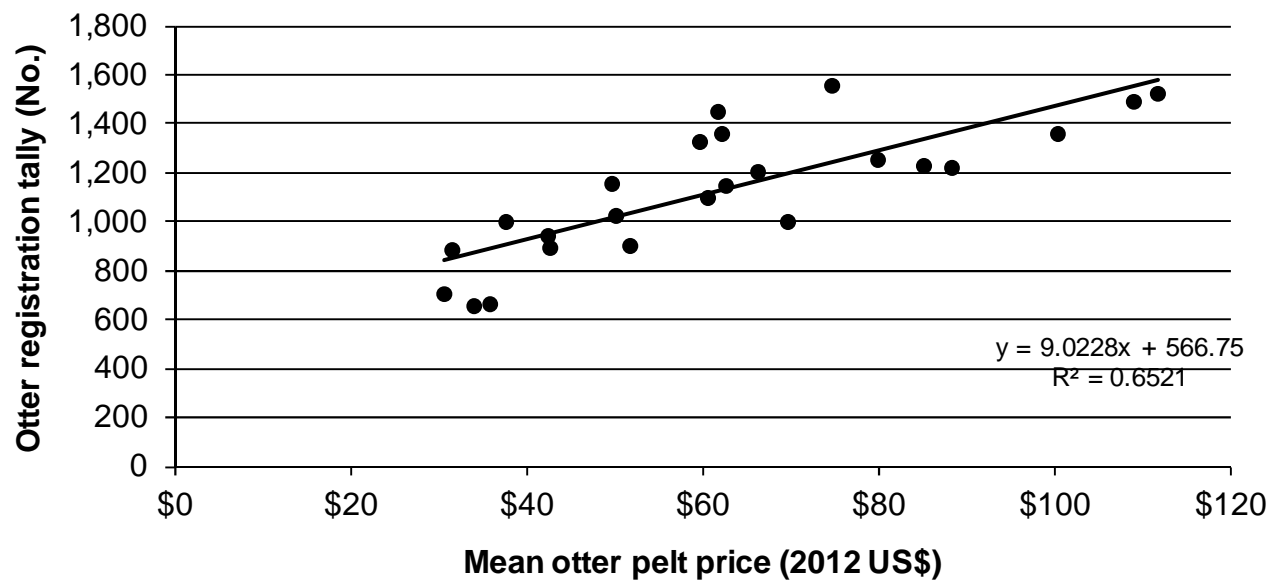


Figure 6. The relationship between the number of otter registered and mean otter pelt prices in Michigan during 1989-2012 (top), and the relationship between trapping effort per otter registered and mean otter pelt prices in Michigan during 1997-2012 (bottom).

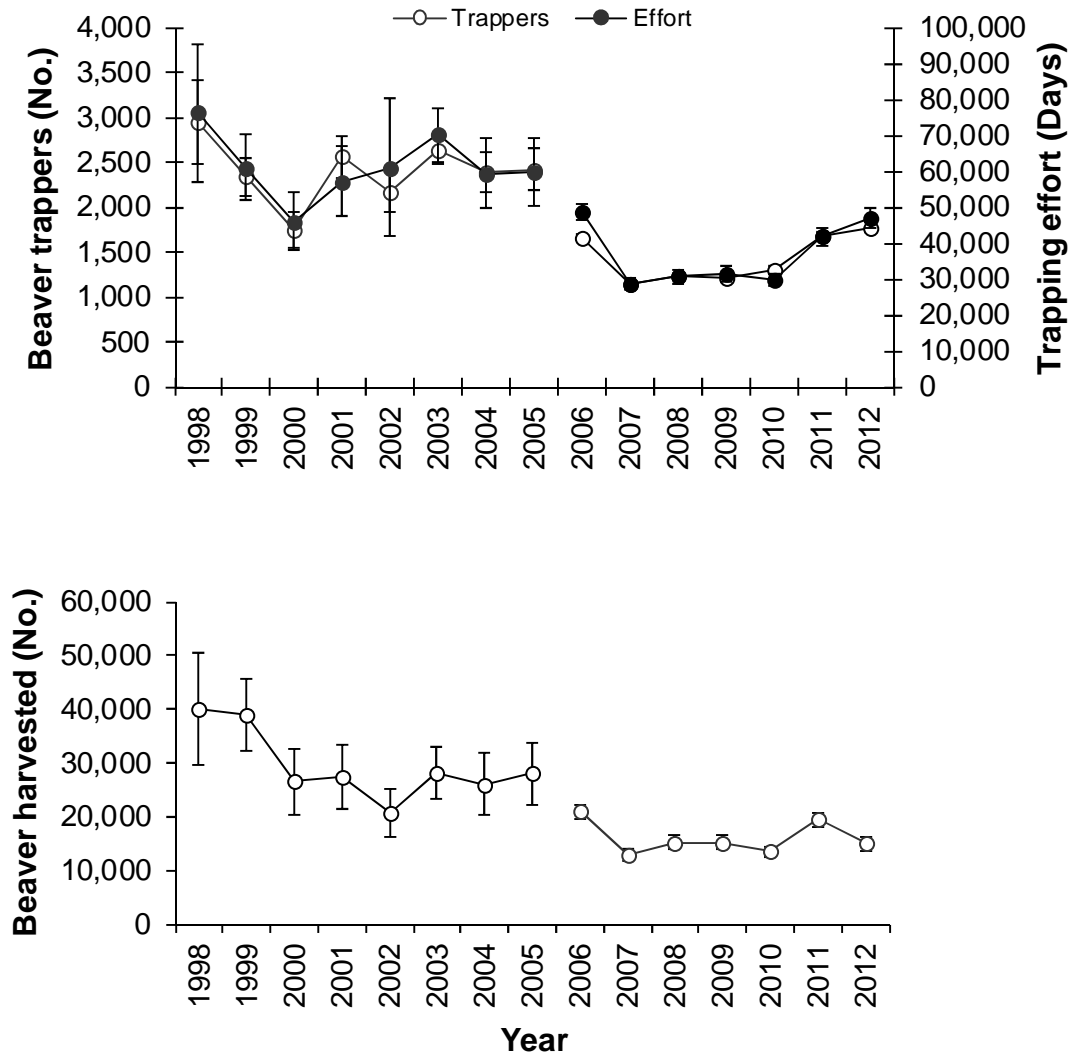


Figure 7. Estimated number of trappers, trapping effort (days), and number of beaver captured in Michigan, 1998-2012. Vertical bars represent the 95% confidence interval. The 2006-2012 estimates were not directly comparable to estimates from previous years because the 2006-2012 estimates only represent 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 2012 otter and beaver harvest survey in Michigan.



2012-13 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 2012-13 season?

¹ ☐ Yes ² ☐ No, Skip to question number 5.

2. If you trapped during the 2012-13 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 2012-13?
(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 2012-13?

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 2012-13 season?

¹ ☐ Yes ² ☐ No, skip to question 14.

8. If you trapped during the 2012-13 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 2012-13?

(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 2012-13 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 2012-13 seasons? _____ BEAVER TAKEN

11. Did you attempt to trap beavers during April 2013?

¹ ☐ Yes ² ☐ No (Skip to Question 12)

11a. If you attempted to trap beavers during April 2013, 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 2012-13?

¹ ☐ Increasing ² ☐ Decreasing ³ ☐ Stable ⁴ ☐ Not present

13. Did you catch any otter in traps that were set for beaver in 2012-13?

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?