



Michigan Department of Natural Resources
Wildlife Division Report No. 3666
January 2019

2016 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 2016, 6,149 furtakers obtained a harvest tag to take otter, which was a 17% increase from the previous year (5,236 trappers in 2015). About 14% of the tag holders set traps for otter (839 trappers) and 27% set traps for beaver (1,686). Trappers that targeted otter spent nearly 17,425 days trapping otter ($\bar{x} = 21$ days/trapper), captured 729 otters (included animals released alive), and registered 688 otters. An additional 221 otter were registered by trappers that were not targeting otter. The total number of otter registered by all trappers combined did not significantly change between 2015 and 2016. About 49% of trappers targeting otter captured at least one otter. The number of trappers that attempted to catch otter in 2016 declined significantly from 2015; however, the number of days that these trappers spent afield was not significantly different. The mean number of days of effort per registered otter in 2016 (25.3 days) was not significantly different from 2015 (26.7 days). Beaver trappers spent 36,214 days trapping beaver ($\bar{x} = 22$ days/trapper) and captured 15,197 beaver. About 86% of active beaver trappers captured at least one beaver. The number of people trapping beavers and the number of days these trappers spent trapping were not significantly different between 2015 and 2016. In addition, the number of beaver harvested did not change significantly between 2015 and 2016.



A contribution of Federal Aid in Wildlife Restoration, Michigan Project W-147-R

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IC2578-200 (12/12/2018)

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 2016, 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. Nonresidents were not permitted to harvest otter. Resident trappers were required to obtain a free otter harvest tag in addition to a fur harvesters license to trap otter. Starting in 2016, otter harvest tags were available from May 1 through April 30. In previous years, harvest tags were available from September 15 through April 30. Resident and nonresident beaver trappers were required to purchase a fur harvesters license but did not need a harvest tag. Trappers were limited to three otters, except no more than two otters 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, 2017, 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 the ice to take beaver. 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 2016 (6,149 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 otters released alive, and number of otters 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). In

addition, successful otter trappers were asked to report what they did with their otter pelts (e.g., sold to a fur buyer).

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 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 significantly. Non-overlapping 95% confidence intervals were equivalent to stating the difference between the means was larger than would be expected 95 out of 100 times ($P < 0.05$), if the study had been repeated (Payton et al. 2003).

RESULTS AND DISCUSSION

Questionnaires were mailed initially during mid-May 2017, and nonrespondents were mailed up to two follow-up questionnaires. Although 6,149 people were sent the questionnaire, 280 surveys were undeliverable, resulting in an adjusted sample size of 5,869. Questionnaires were returned by 2,895 people, yielding a 49% adjusted response rate.

Otter

In 2016, 6,149 trappers obtained harvest tags to trap otter, which was an increase of 17% from the previous year (5,236 trappers in 2015). Furtakers could obtain harvest tags earlier in 2016 than in 2015 (starting on May 1 in 2016 versus September 1 in 2015). The DNR emphasized these changes to furtakers during 2016 which may have contributed to the increase in tags distributed in 2016.

In 2016, most of the harvest tags (5,901) were obtained by men. Harvest tags were obtained by 240 women, and the sex of 8 tag holders was unknown. About 14% of the otter tag holders set traps targeting otter (839 trappers, Table 2). These trappers spent 17,425 days trapping otter ($\bar{x} = 20.8 \pm 1.5$ days/trapper), captured 729 otters, and registered 688 otters (Table 3). About 49% of trappers successfully captured at least one otter.

The estimated number of otter registered by trappers that targeted otter did not significantly change between 2015 and 2016 (765 versus 688 otters, Table 3). An additional 221 otter were registered by trappers that were not targeting otter. The estimated total number of otter registered by all trappers did not significantly change between 2015 and 2016 (985 versus 909 otters, Table 3). Among the three management zones, the largest number of otters was taken in the Upper Peninsula Zone (Table 4). Among counties, Ontonagon (57), Marquette (53), Chippewa (51), and Iron (51) counties had the highest number of otters registered (Table 5).

The actual number of otter registered (including incidental take but excluding harvest by tribal members) by trappers at registration stations declined 18% between 2015 and 2016 (867 versus 711, Figure 2). The number of trappers that attempted to catch otter in 2016 also declined significantly from 2015; however, the number of days that these trappers spent afield was not significantly different (Table 3, Figure 2). Among trappers targeting otter, the mean number of days of effort per registered otter was 25.3 days in 2016, which was not significantly different than the 26.7 days in 2015 (Tables 3 and 6, Figure 3).

Most otter pelts (52%) taken in 2016 were sold to fur buyers; 22% were sold to local fur buyers and 30% were sold at a fur auction (Table 7, Figure 4). About 36% of otter pelts were kept for personal use (e.g., tanned or used for a taxidermy mount). In addition, about 12% of pelts were either sold to a private individual, sold to a taxidermist, or used for some other purpose.

The number of otters registered in 2016 was 19% below the long-term yearly average since 1950 (\bar{x} = 882 during 1950-2016, Figure 5). Changes in otter harvest during recent years have generally tracked changes in trapping effort (Figure 2) and changes in otter pelt prices (Figures 6 and 7). Effort per registered otter was not significantly different between 2015 and 2016, the 2016 estimate was near the average during 1997-2016 (Figure 3); suggesting otter numbers were stable statewide.

The number of otters registered was correlated with the mean value of otter pelts during 1989-2016 (Pearson product moment correlation coefficient [r] = 0.82, the probability of obtaining this result [P] < 0.01) (Figure 7). The correlation between mean days of effort per registered otter and pelt prices during 1997-2016 (r = 0.73, P < 0.01) was also significant.

Most otter trappers used conibear-type traps to capture otter ($92 \pm 2\%$), although foothold traps also were used frequently ($35 \pm 3\%$). Among trappers using conibear traps, the mean number of conibear traps set was 4.9 ± 0.3 traps. Among trappers using foothold traps, the mean number of foothold traps set was 4.8 ± 0.5 traps.

Thirty-one percent of otter trappers ($\pm 3\%$) believed otter numbers were increasing in the county where they trapped most often, while $56 \pm 4\%$ thought otter numbers were stable, $6 \pm 2\%$ thought otter were declining, $3 \pm 1\%$ indicated otter were not present, and $4 \pm 1\%$ 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 27% of the otter harvest tag holders set traps for beaver (1,686 trappers, Table 2). Trappers spent 36,214 days trapping (21.5 ± 1.2 days/trapper) and captured 15,197 beaver, which was not significantly different from the number of beavers captured in 2015 (Table 8). About 86% of active trappers successfully captured at least one beaver. Among the three management zones, the largest number of beaver was taken in the Upper Peninsula Zone (Table 9). Among counties, Ontonagon (1,100), Marquette (971), Chippewa (741), and Mackinac (635) counties had the highest harvest estimates (Table 10).

The number of people trapping beavers and the number of days spent afield were not significantly different between 2015 and 2016 (Table 8). In addition, the number of beaver harvested did not change significantly between 2015 and 2016 (Table 8, Figure 8).

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 6.5 ± 0.4 traps. Among trappers using foothold traps, the mean number of foothold traps set was 5.4 ± 0.5 traps, and among trappers using snares, the mean number of snares set was 4.7 ± 0.7 .

Thirty-four percent of beaver trappers ($\pm 2\%$) believed beaver numbers were increasing in the county where they trapped most often, while $53 \pm 3\%$ thought beaver numbers were stable, $9 \pm 1\%$ 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 117 trappers caught 193 beaver with snares in open water during the 2016 season (Table 8). About 580 trappers caught 4,996 beaver during April 2016. Beaver harvested with snares in open water and taken during April represented about 1% and 33% of the estimated total beaver harvest, respectively. Among trappers that set traps for beaver, $14 \pm 2\%$ caught otter in their beaver sets. These trappers caught 348 ± 53 otters.

ACKNOWLEDGEMENTS

I thank all the trappers that provided information. Theresa Riebow completed data entry, and Marshall Strong prepared Figure 1. Adam Bump, Mike Donovan, and Dwayne Etter reviewed a draft version of this report.

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Table 1. Otter and beaver trapping seasons in Michigan, 2016.

Zone	Season	
	Resident	Nonresident ^a
1	October 25 – April 16 ^b	November 15 – April 16
2	November 1 – April 16	November 24 – April 16
3	November 10 – March 31	December 15 – March 31

^aNonresident season applies to beaver only because nonresidents were not permitted to harvest otter.

^bThe season extended through April 30, 2017, 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 2016 season.

Harvest tag holders	%	95% CL ^a	Total	95% CL ^a
Trapped only for otter	3	0	189	28
Trapped only for beaver	17	1	1,037	61
Trapped for both otter and beaver	11	1	650	50
Trapped for either otter or beaver	31	1	1,875	75
Trapped for otter ^b	14	1	839	56
Trapped for beaver ^c	27	1	1,686	73

^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), the number of otters captured, mean days required to harvest an otter, and trapping success in Michigan during 2014-2016. Estimates presented separately for trappers targeting otter and for trappers that were not targeting otter.

Variable	Year						Change ^a (%)
	2014		2015		2016		
	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL	
Among trappers targeting otter							
Trappers (No)	1,066	60	965	57	839	56	-13*
Effort (Days)	19,890	1,729	20,403	1,804	17,425	1,732	-15
Otters captured (No.)	878	83	825	80	729	82	-12
Otters released alive (No.)	51	21	60	21	40	21	-32
Otters registered (No.)	827	77	765	73	688	76	-10
Trappers that captured an otter (%)	52%	3%	53	3	49	4	-4
Trappers that released an otter (%)	3%	1%	4	1	3	1	-2
Trappers that registered an otter (%)	52%	3%	52	3	49	4	-3
Mean days required to harvest an otter	24.1	2.3	26.7	2.5	25.3	2.5	-5
Among trappers that did not target otter							
Trappers (No.)	144	25	146	24	144	25	-1
Otters captured (No.)	229	49	241	45	244	49	2
Otters registered (No.)	210	41	220	43	221	44	0
Among all trappers^b							
Trappers (No.)	1,187	63	1,100	59	979	60	-11*
Otters captured (No.)	1,107	97	1,065	92	973	94	-9
Otters registered (No.)	1,037	87	985	84	909	86	-8
Mean days required to harvest an otter	19.2	1.8	20.7	1.9	19.2	1.9	-7

^aThe change between 2015 and 2016 for the 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 the 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 2016 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	325	36	6,090	911	384	65	21	15	363	60	57	6
Lower Peninsula	531	46	11,174	1,480	342	50	19	15	323	47	44	4
Zone 2	304	35	5,580	930	178	35	2	3	176	34	41	6
Zone 3	240	32	5,595	1,101	164	35	17	14	147	31	47	7
Unknown	8	6	161	165	2	3	0	0	2	3	25	31
Statewide	839	56	17,425	1,732	729	82	40	21	688	76	49	4
Among trappers that did not target otter												
Upper Peninsula	45	14	NA	NA	102	37	15	12	87	31	NA	NA
Lower Peninsula	98	20	NA	NA	140	32	8	10	132	30	NA	NA
Zone 2	66	17	NA	NA	102	28	8	10	93	26	NA	NA
Zone 3	34	12	NA	NA	38	15	0	0	38	15	NA	NA
Unknown	2	3	NA	NA	2	3	0	0	2	3	NA	NA
Statewide	144	25	NA	NA	244	49	23	16	221	44	NA	NA
Among all trappers combined												
Upper Peninsula	370	39	6,090	911	486	74	36	19	450	67	59	6
Lower Peninsula	622	49	11,174	1,480	482	59	28	17	455	56	49	4
Zone 2	370	39	5,580	930	280	44	11	10	270	43	48	6
Zone 3	268	33	5,595	1,101	202	39	17	14	185	35	52	6
Unknown	11	7	161	165	4	4	0	0	4	4	40	31
Statewide	979	60	17,425	1,732	973	94	64	26	909	86	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 2016 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	9	251	214	2	3	0	0	2	3
Alger	30	11	455	262	42	21	4	6	38	19
Allegan	13	7	238	167	6	5	0	0	6	5
Alpena	8	6	249	280	8	9	0	0	8	9
Antrim	15	8	210	133	13	10	0	0	13	10
Arenac	6	5	38	35	0	0	0	0	0	0
Baraga	21	10	212	122	30	22	11	11	19	14
Barry	13	7	491	342	4	4	0	0	4	4
Bay	0	0	0	0	0	0	0	0	0	0
Benzie	6	5	121	129	6	7	0	0	6	7
Berrien	2	3	21	30	0	0	0	0	0	0
Branch	4	4	64	68	0	0	0	0	0	0
Calhoun	6	5	255	257	4	4	0	0	4	4
Cass	4	4	74	106	4	4	0	0	4	4
Charlevoix	11	7	19	19	13	10	0	0	13	10
Cheboygan	25	10	272	159	15	9	2	3	13	7
Chippewa	36	12	620	308	53	23	2	3	51	22
Clare	13	7	132	106	11	8	0	0	11	8
Clinton	8	6	206	159	6	7	0	0	6	7
Crawford	2	3	15	21	0	0	0	0	0	0
Delta	21	10	278	159	19	12	0	0	19	12
Dickinson	32	12	669	337	49	27	6	9	42	21
Eaton	6	5	72	60	2	3	0	0	2	3
Emmet	6	5	15	21	8	7	0	0	8	7
Genesee	0	0	0	0	0	0	0	0	0	0
Gladwin	13	7	191	273	15	11	0	0	15	11
Gogebic	17	9	268	163	28	16	0	0	28	16
Gd. Traverse	17	9	151	90	8	7	0	0	8	7
Gratiot	4	4	34	35	8	12	8	12	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 2016 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	25	10	297	158	25	15	0	0	25	15
Huron	0	0	0	0	0	0	0	0	0	0
Ingham	0	0	0	0	0	0	0	0	0	0
Ionia	15	8	310	248	6	5	0	0	6	5
Iosco	21	10	416	301	15	10	0	0	15	10
Iron	49	14	692	277	51	22	0	0	51	22
Isabella	17	9	195	129	8	7	0	0	8	7
Jackson	4	4	0	0	4	4	0	0	4	4
Kalamazoo	4	4	157	187	0	0	0	0	0	0
Kalkaska	30	11	480	253	32	16	2	3	30	15
Kent	13	7	142	107	6	5	0	0	6	5
Keweenaw	4	4	81	99	0	0	0	0	0	0
Lake ^d	15	8	316	229	4	4	0	0	4	4
Lapeer	2	3	0	0	2	3	0	0	2	3
Leelanau	0	0	0	0	0	0	0	0	0	0
Lenawee	0	0	0	0	0	0	0	0	0	0
Livingston	2	3	6	9	2	3	0	0	2	3
Luce	17	9	104	54	2	3	0	0	2	3
Mackinac	34	12	552	253	36	19	4	6	32	16
Macomb	0	0	0	0	0	0	0	0	0	0
Manistee	8	6	236	209	0	0	0	0	0	0
Marquette	47	14	799	334	62	28	8	10	53	22
Mason	6	5	127	113	2	3	0	0	2	3
Mecosta	45	14	954	464	40	18	0	0	40	18
Menominee	17	9	423	261	21	15	0	0	21	15
Midland	17	9	149	123	11	9	0	0	11	9
Missaukee	19	9	176	118	21	13	0	0	21	13
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 2016 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	32	12	387	173	19	10	2	3	17	9
Montmorency	23	10	170	80	8	7	0	0	8	7
Muskegon	6	5	138	129	6	5	0	0	6	5
Newaygo	28	11	881	478	30	16	2	3	28	15
Oakland	4	4	49	61	0	0	0	0	0	0
Oceana	13	7	74	71	11	8	0	0	11	8
Ogemaw	19	9	523	360	13	9	0	0	13	9
Ontonagon	34	12	508	250	57	24	0	0	57	24
Osceola	17	9	308	178	15	9	0	0	15	9
Oscoda	28	11	406	211	13	10	0	0	13	10
Otsego	13	7	236	201	8	7	0	0	8	7
Ottawa	2	3	74	106	0	0	0	0	0	0
Presque Isle	19	9	157	104	17	13	6	9	11	9
Roscommon	17	9	174	126	11	9	0	0	11	9
Saginaw	13	7	329	368	8	6	0	0	8	6
St. Clair	4	4	64	68	0	0	0	0	0	0
St. Joseph	19	9	176	97	21	12	4	6	17	9
Sanilac	0	0	0	0	0	0	0	0	0	0
Schoolcraft	15	8	132	76	11	11	0	0	11	11
Shiawassee	4	4	68	71	0	0	0	0	0	0
Tuscola	6	5	59	53	0	0	0	0	0	0
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	11	7	117	110	11	8	0	0	11	8
Unknown	11	7	161	165	4	4	0	0	4	4
Statewide ^e	979	60	17,425	1,732	973	94	64	26	909	86

^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, 1997-2016.

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
2014	18.8	2.7	23.6	3.1	40.8	10.3	24.1	2.3
2015	23.6	3.5	27.1	4.1	31.0	5.7	26.7	2.5
2016	16.8	2.0	31.7	6.1	38.2	7.1	25.3	2.5
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
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
2014	15.3	2.2	18.3	2.5	32.6	7.7	19.2	1.8
2015	18.4	2.8	21.2	3.3	23.5	4.3	20.7	1.9
2016	13.5	1.7	20.7	3.9	30.3	5.6	19.2	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. The fate of otter pelts registered by trappers in Michigan, 2016.

Fate of pelt	Otter pelts	
	Total	95% CL
Sold to fur buyer	198	42
Sold at fur auction	276	51
Sold to taxidermist	28	15
Sold to a private individual	19	12
Kept for personal use	327	47
Other ^a	55	20
Unknown	6	9

^aExamples included animals held for future sales, animals given away, and incidental animals turned over to the DNR.

Table 8. Estimated number of beaver trappers, their trapping effort (days), the number of beaver captured, and trapping success in Michigan during 2014-2016.^a

Variable	Year						Change ^c (%)
	2014		2015		2016		
	Estimate	95% CL ^b	Estimate	95% CL ^b	Estimate	95% CL ^b	
Trappers (No.)	1,832	72	1,715	68	1,686	73	-2
Trapping effort (Days)	34,307	2,262	38,283	2,526	36,214	2,507	-5
Beavers captured (No.)	15,321	1,436	15,068	1,388	15,197	1,531	1
Trappers that captured a beaver (%)	83	2	86	2	86	2	0
Trappers using snares in open water (No.)	91	20	101	20	117	22	16
Beaver caught with snares in open water (No.)	246	120	142	55	193	67	36
Trapped beaver in April (Trappers)	515	45	469	42	580	48	24*
Beaver caught in April (No.)	4,558	840	3,918	755	4,996	837	28

^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 2015 and 2016 for the proportion of trappers catching beaver is reported as the difference between years rather than the proportional change.

*P<0.005.

Table 9. Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2016 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	667	51	11,652	1,271	6,667	1,148	86	3
Lower Peninsula	1,054	61	24,237	2,214	8,180	995	85	2
Zone 2	627	49	12,209	1,469	4,855	824	85	3
Zone 3	478	44	12,028	1,662	3,324	561	85	3
Unknown	21	10	325	217	350	297	NA	NA
Statewide	1,686	73	36,214	2,507	15,197	1,531	86	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 10. Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2016 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	13	7	151	114	98	73
Alger	36	12	523	226	191	79
Allegan	17	9	229	145	36	30
Alpena	19	9	495	469	91	62
Antrim	19	9	374	218	138	86
Arenac	19	9	217	126	68	54
Baraga	34	12	314	133	244	123
Barry	38	13	956	461	149	61
Bay	21	10	503	288	185	184
Benzie	8	6	202	166	8	7
Berrien	2	3	6	9	2	3
Branch	11	7	319	266	74	61
Calhoun	19	9	516	307	157	119
Cass	17	9	752	439	338	225
Charlevoix	23	10	355	184	121	64
Cheboygan	40	13	569	209	138	57
Chippewa	91	20	1,680	502	741	279
Clare	42	13	639	242	395	211
Clinton	6	5	87	94	4	6
Crawford	8	6	232	203	74	59
Delta	59	16	892	304	427	203
Dickinson	51	15	962	347	510	274
Eaton	6	5	89	78	4	6
Emmet	11	7	93	96	51	35
Genesee	11	7	70	53	45	33
Gladwin	28	11	595	334	595	371
Gogebic	36	12	450	206	399	187
Gd. Traverse	23	10	280	144	74	43
Gratiot	11	7	96	86	15	16

^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 10 (continued). Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2016 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	0	0	0	0	0	0
Houghton	32	12	455	209	348	194
Huron	0	0	0	0	0	0
Ingham	2	3	15	21	0	0
Ionia	13	7	236	236	83	78
Iosco	32	12	582	329	151	81
Iron	72	18	1,130	367	363	151
Isabella	23	10	285	150	49	39
Jackson	19	9	435	369	79	47
Kalamazoo	17	9	427	264	87	54
Kalkaska	40	13	654	279	285	142
Kent	19	9	346	294	36	22
Keweenaw	8	6	64	53	49	59
Lake	28	11	480	260	76	56
Lapeer	13	7	217	141	161	126
Leelanau	2	3	11	15	11	15
Lenawee	0	0	0	0	0	0
Livingston	11	7	91	67	28	21
Luce	42	13	306	112	164	95
Mackinac	55	15	1,026	387	635	313
Macomb	4	4	45	61	28	36
Manistee	13	7	367	276	62	44
Marquette	85	19	1,657	465	971	610
Mason	11	7	217	154	47	36
Mecosta	62	16	1,495	530	607	238
Menominee	19	9	542	315	83	53
Midland	32	12	782	369	157	72
Missaukee	30	11	427	233	486	432
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 10 (continued). Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2016 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	40	13	633	258	193	108
Montmorency	40	13	474	195	263	121
Muskegon	8	6	74	59	25	25
Newaygo	36	12	1,009	535	312	154
Oakland	17	9	327	221	93	72
Oceana	17	9	480	355	85	57
Ogemaw	40	13	773	398	183	100
Ontonagon	68	17	1,045	360	1,100	475
Osceola	53	15	952	354	336	162
Oscoda	32	12	476	229	176	117
Otsego	23	10	499	244	217	127
Ottawa	17	9	389	277	32	22
Presque Isle	28	11	559	283	172	117
Roscommon	42	13	531	246	310	164
Saginaw	21	10	480	386	45	28
St. Clair	13	7	100	73	6	5
St. Joseph	30	11	671	357	234	128
Sanilac	0	0	0	0	0	0
Schoolcraft	45	14	607	232	442	230
Shiawassee	0	0	0	0	0	0
Tuscola	19	9	302	187	32	28
Van Buren	4	4	40	45	19	22
Washtenaw	2	3	6	9	8	12
Wayne	0	0	0	0	0	0
Wexford	28	11	527	274	144	126
Unknown	21	10	325	217	350	297
Statewide ^c	1,686	73	36,214	2,507	15,197	1,531

^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.

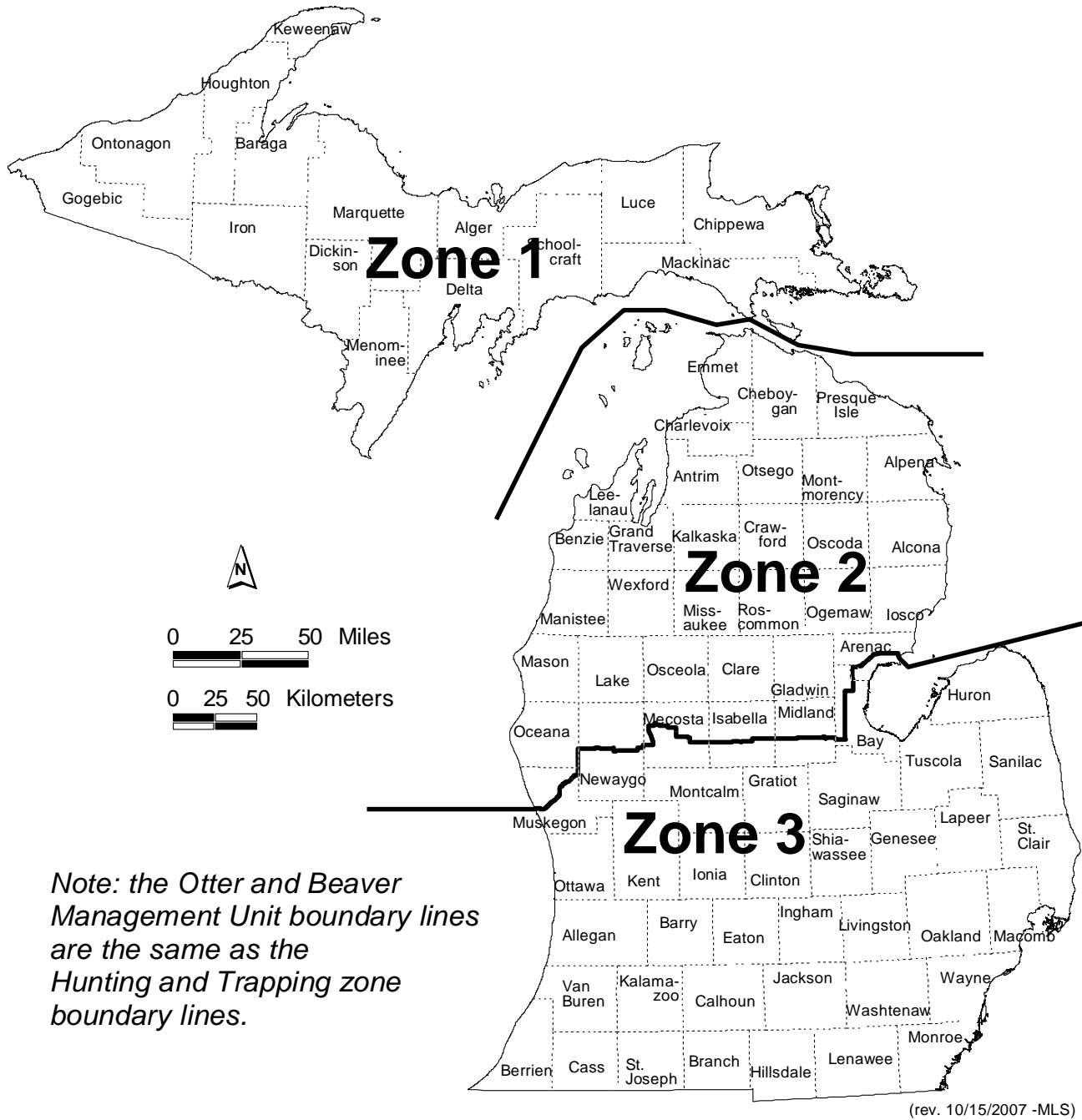


Figure 1. Otter and beaver management zones in Michigan, 2016.

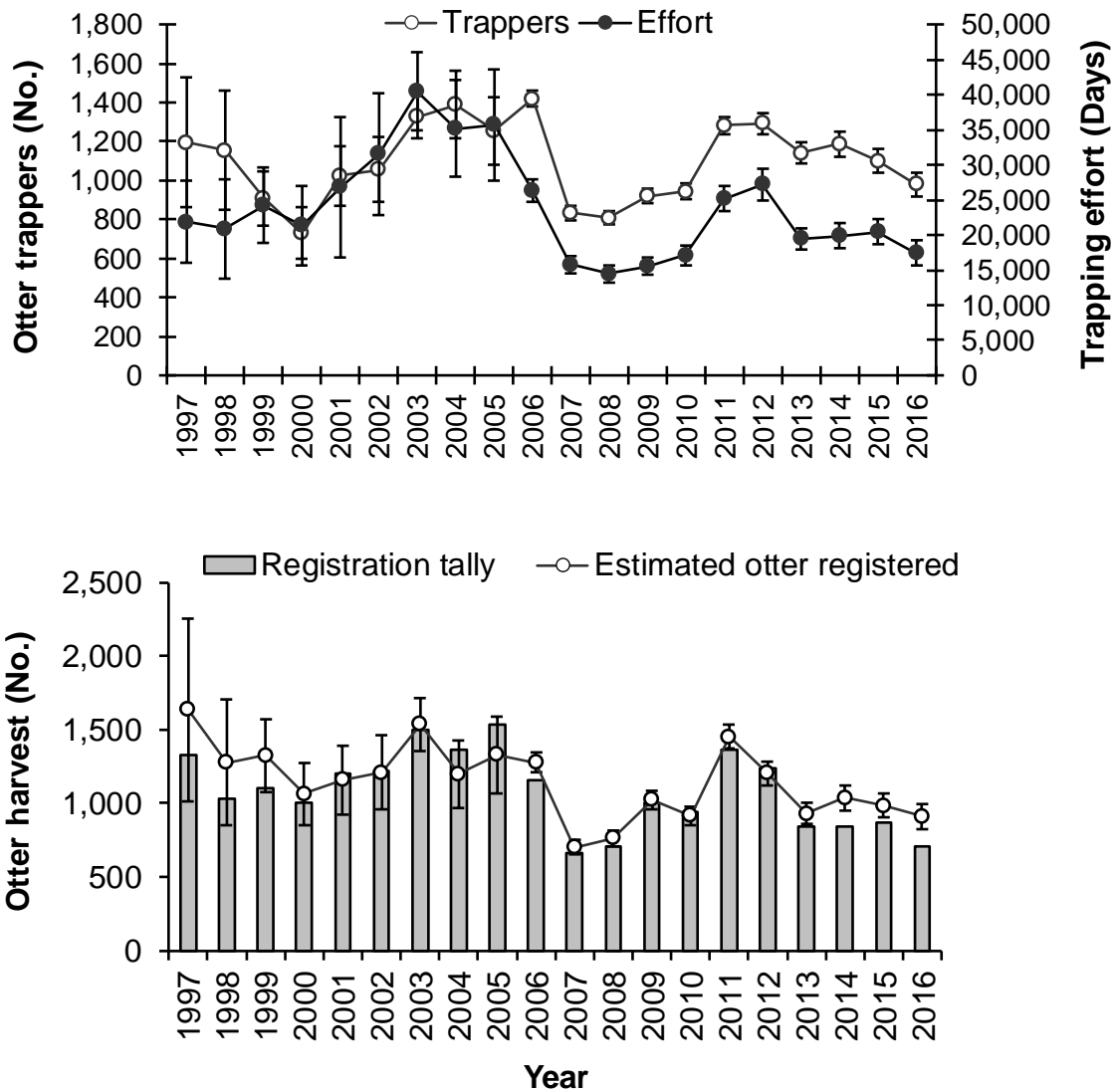


Figure 2. Estimated number of trappers, trapping effort (days), and number of otter captured and registered in Michigan, 1997-2016. Estimates of trapper numbers, trapping effort, and harvest were derived from harvest survey, while registration total was a tally of animals registered by trappers at registration 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.

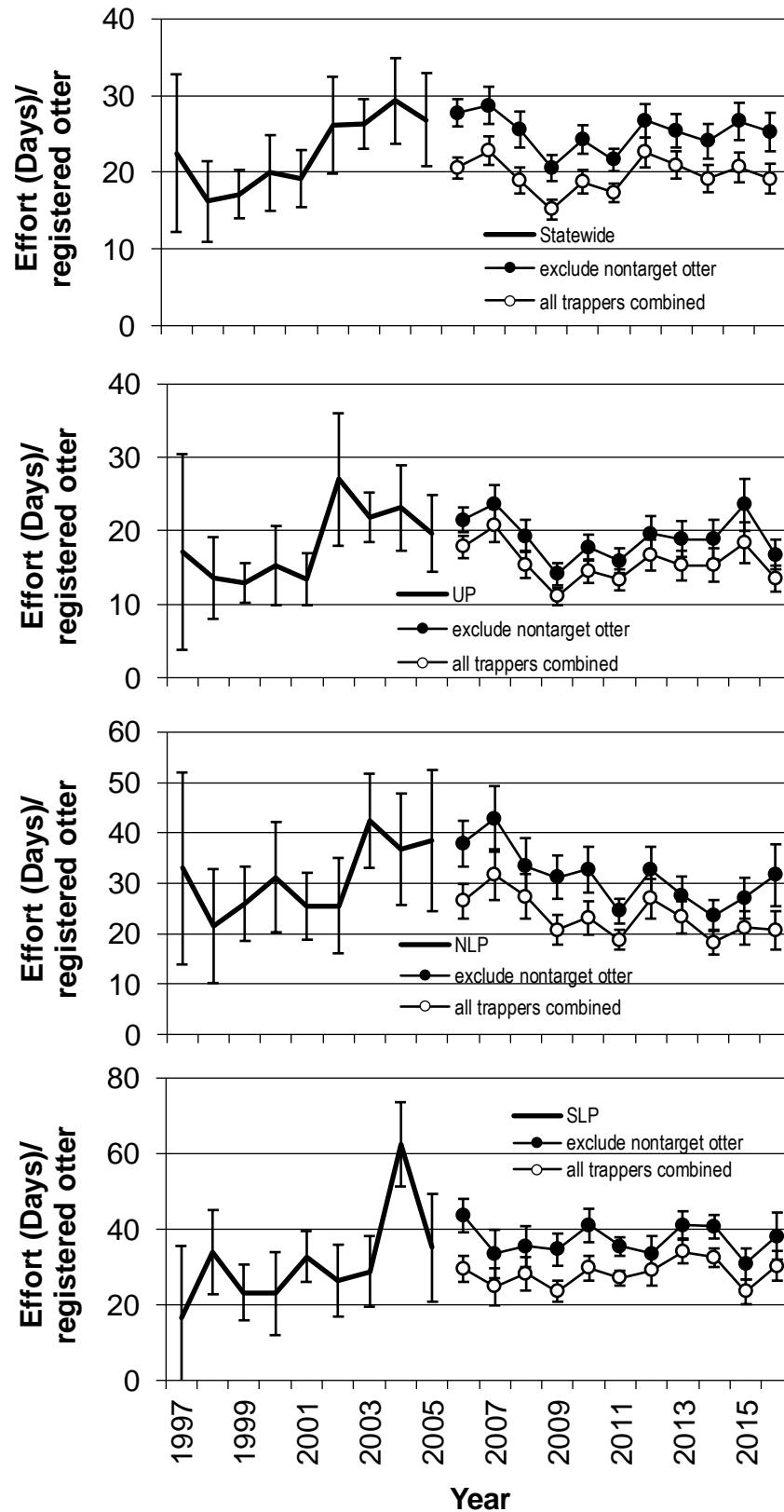


Figure 3. Estimated mean number of days required to harvest an otter in Michigan during 1997-2016, summarized by management zone. Beginning in 2006, two separate estimates were calculated: (1) an estimate excluding the activity of trappers that did not target otter and (2) an estimate of all trappers combined. The latter estimates are more comparable to estimates from previous years.

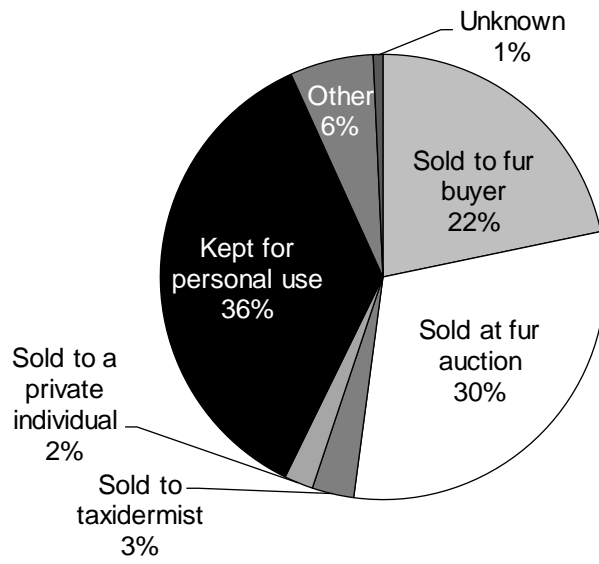


Figure 4. The proportion of otter pelts used for various purposes in Michigan, 2016.

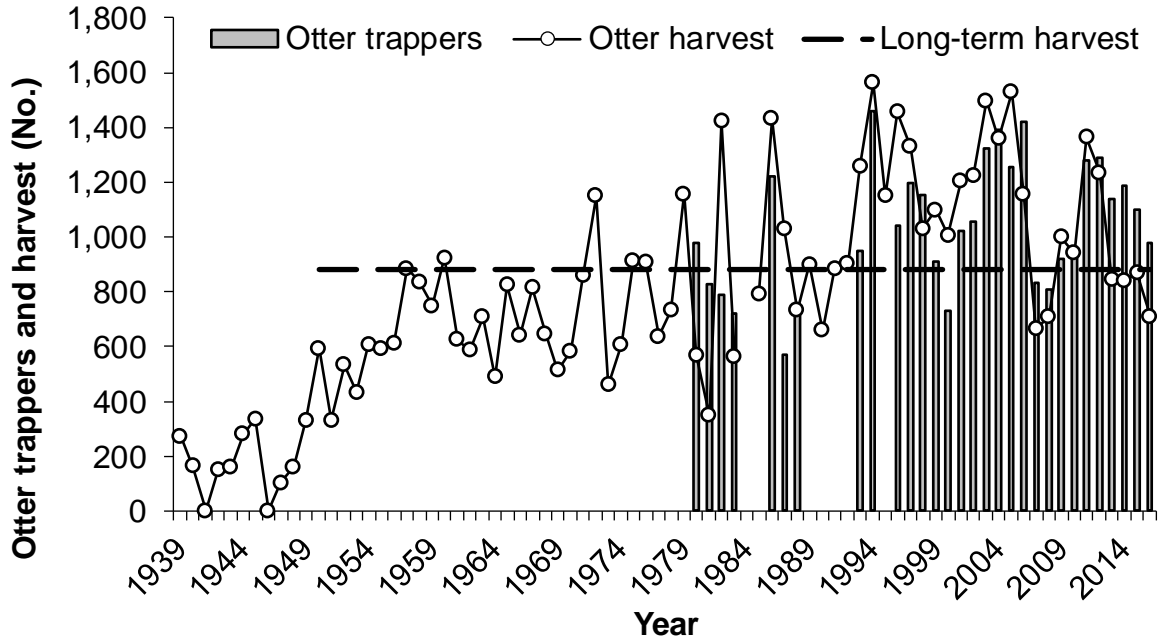


Figure 5. Otter harvest (sealing or registration tally, unpublished data) and estimated number of otter trappers (estimates from harvest survey) in Michigan, 1939-2016. Long-term (1950-2016) average harvest was 886 otter. Estimates were not available for years when values were not plotted.

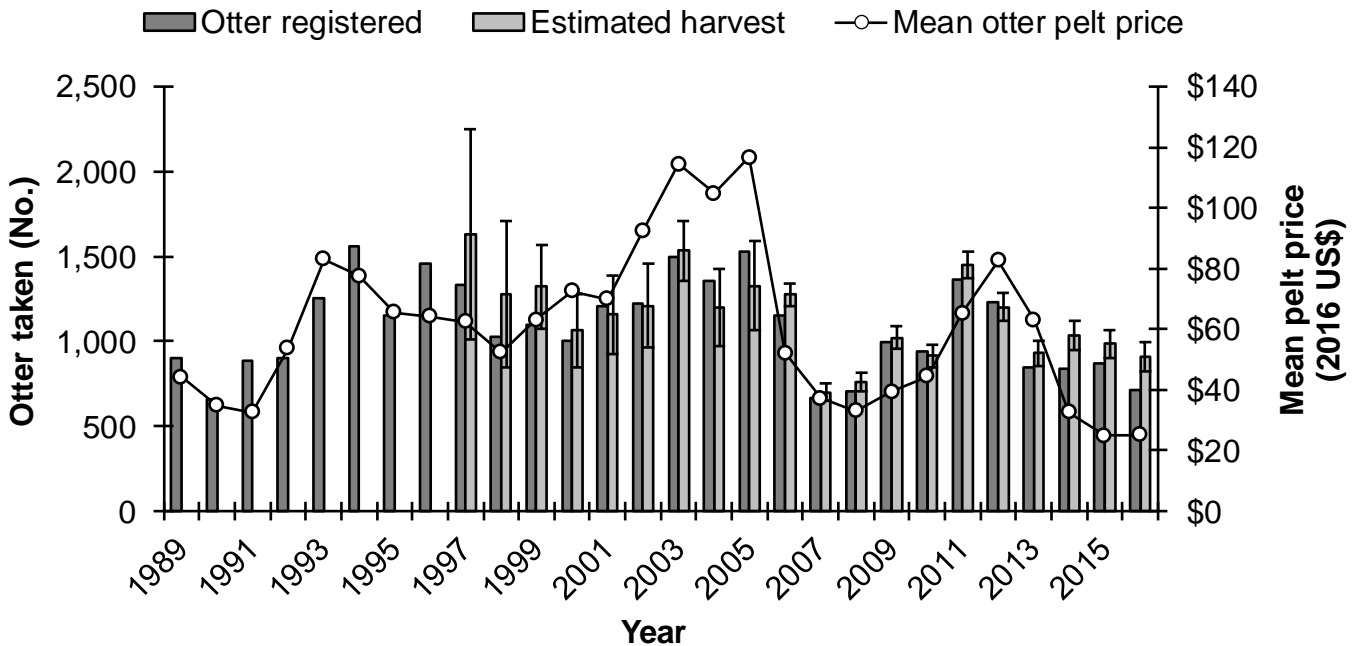


Figure 6. Otter registration totals, estimated otter harvest, and mean otter pelt prices in Michigan during 1989-2016. Mean pelt prices were the average paid in Minnesota and Wisconsin (e.g., Abraham and Dexter 2016, Lohr 2016). Pelt prices were reported in 2016 dollars by adjusting for inflation using 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.

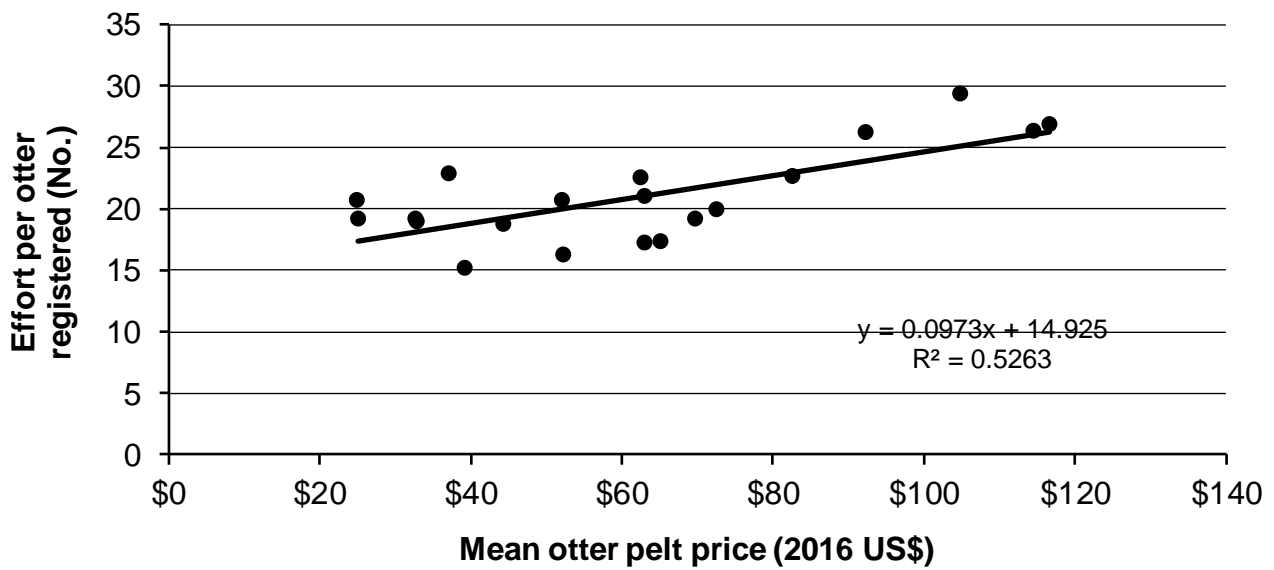
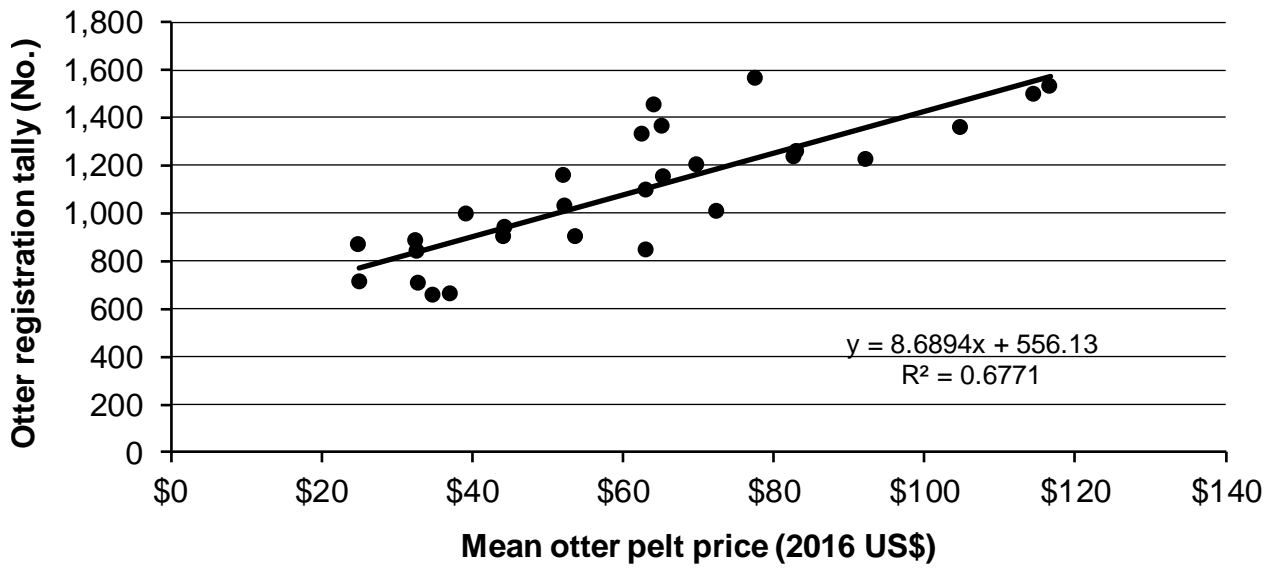


Figure 7. The relationship between the number of otter registered and mean otter pelt prices in Michigan during 1989-2016 (top), and the relationship between trapping effort per otter registered and mean otter pelt prices in Michigan during 1997-2016 (bottom).

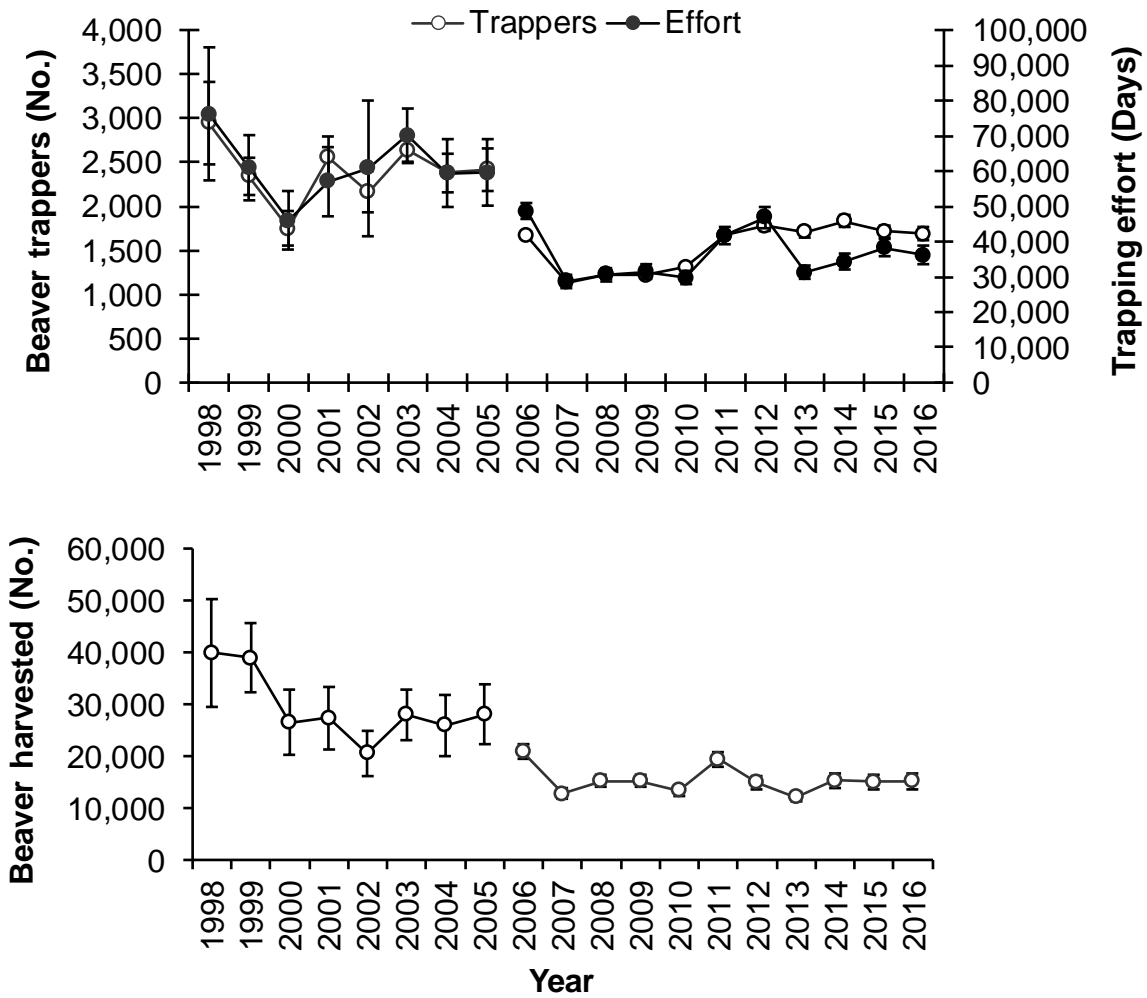


Figure 8. Estimated number of trappers, trapping effort (days), and number of beaver captured in Michigan, 1998-2016. Vertical bars represent the 95% confidence interval. The 2006-2016 estimates were not directly comparable to estimates from previous years because the 2006-2016 estimates only represent the participation, effort, and harvest of trappers that obtained an otter harvest tag. Also beginning in 2004, 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 2016 otter and beaver harvest survey in Michigan.



MICHIGAN DEPARTMENT OF NATURAL RESOURCES, WILDLIFE DIVISION
2016-17 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 2016-17 season?

¹ Yes ² No, Skip to question number 5.

2. If you trapped during the 2016-17 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 2016-17?

(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 2016-17?

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.)

Questions continued on reverse side.

7. If you captured an otter, please describe how you used (or plan to use) the otter?
Please record the number of otter used for each category.

- _____ Number sold to local fur buyer
- _____ Number sold at fur auction
- _____ Number sold to taxidermist
- _____ Number sold to a private individual
- _____ Number kept for personal use (for example, tanned hide or used for taxidermy mount)
- _____ Other: Please describe: _____

8. Did you place traps for beaver during the 2016-17 season?

- ¹ Yes ² No, skip to question 15.

9. If you trapped during the 2016-17 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

10. How many of the following traps did you set for beaver in 2016-17?

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

- _____ Foothold
- _____ Conibear
- _____ Snares

11. Did you attempt to trap beavers with snares in open water during the 2016-17 seasons?

- ¹ Yes ² No (Skip to Question 12)

10a. If you attempted to trap beavers with snares in open water, how many beavers did you harvest with these sets during the 2016-17 seasons?

_____ BEAVER TAKEN

12. Did you attempt to trap beavers during April 2017?

- ¹ Yes ² No (Skip to Question 13)

12a. If you attempted to trap beavers during April 2017, how many beavers did you harvest in April?

_____ BEAVER TAKEN

13. What is the status of beaver in the county you trapped most often in 2016-17?

- ¹ Increasing ² Decreasing ³ Stable ⁴ Not present

14. Did you catch any otter in traps that were set for beaver in 2016-17?

- ¹ Yes ² No (Skip to Question 15)

14a. If you answered yes, report number of otter caught in your beaver sets.

_____ otter caught in beaver sets

15. 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!