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2017 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 2017, 7,574 furtakers obtained a harvest tag to take otter, which was a 23% increase from the previous year (*6,149 trappers in 2016*). About 11% of the tag holders set traps for otter (797 trappers) and 21% set traps for beaver (1,611). Trappers that targeted otter spent nearly 16,003 days trapping otter ($\bar{x}$ = 20 days/trapper), captured 721 otters (included animals released alive), and registered 659 otters. An additional 234 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 2016 and 2017. About 55% of trappers targeting otter captured at least one otter. The number of trappers that attempted to catch otter in 2017 and the number of days that these trappers spent afield was not significantly different from 2016. The mean number of days of effort per registered otter in 2017 (24.3 days) was not significantly different from 2016 (25.3 days). Beaver trappers spent 33,066 days trapping beaver ($\bar{x}$ = 21 days/trapper) and captured 11,428 beaver. About 84% of active beaver trappers captured at least one beaver. The number of people trapping beavers and the number of days spent afield were not significantly different between 2016 and 2017. In contrast, the number of beaver caught declined significantly by 25% between 2016 and 2017 (15,197 versus 11,428).*

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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 2017, 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. Otter harvest tags were available from May 1 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, 2018, 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 2017 (7,574 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 early May 2018, and nonrespondents were mailed up to two follow-up questionnaires. Although 7,574 people were sent the questionnaire, 226 surveys were undeliverable, resulting in an adjusted sample size of 7,348. Questionnaires were returned by 3,563 people, yielding a 48% adjusted response rate.

Otter

In 2017, 7,574 trappers obtained harvest tags to trap otter, which was an increase of 23% from the previous year (6,149 trappers in 2016). In 2017, most of the harvest tags (7,261) were obtained by men. Harvest tags were obtained by 303 women, and the sex of 10 tag holders was unknown. About 11% of the otter tag holders set traps targeting otter (797 trappers, Table 2). These trappers spent 16,003 days trapping otter ($\bar{x}$ = 20.1 ± 1.6 days/trapper), captured 721 otters, and registered 659 otters (Table 3). About 55% of active trappers successfully captured at least one otter.

The estimated number of otter registered by trappers that targeted otter did not significantly change between 2016 and 2017 (688 versus 659 otters, Table 3). An additional 234 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 2016 and 2017 (909 versus 893 otters, Table 3). Among the three management zones, the largest number of otters was taken in the Upper Peninsula zone (Table 4). Among counties, Clare (43), Marquette (40), Mecosta (38), Newaygo (38), and Mackinac (36) 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 5% between 2016 and 2017 (711 versus 678, Figure 2). The number of trappers that attempted to catch otter in 2017 and the number of days that these trappers spent afield was not significantly different from 2016 (Table 3, Figure 2). Among trappers targeting otter, the mean number of days of effort per registered otter was 24.3 days in 2017, which was not significantly different than the 25.3 days in 2016 (Tables 3 and 6, Figure 3).

About 49% of otter pelts taken in 2017 were sold to fur buyers; 27% were sold to local fur buyers and 22% were sold at a fur auction (Table 7, Figure 4). About 37% of otter pelts were kept for personal use (e.g., tanned or used for a taxidermy mount). In addition, about 14% 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 2017 was 23% below the long-term average since 1950 ($\bar{x}$ = 879 during 1950-2017, 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 2016 and 2017, the 2017 estimate was near the average during 1997-2017 (Figure 3); suggesting otter numbers were stable statewide.

The number of otters registered was correlated with the mean value of otter pelts during 1989-2017 (Pearson product moment correlation coefficient [r] = 0.83, 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 1997-2017 ($r = 0.74$, $P < 0.01$) was also significant.

Most otter trappers used conibear-type traps to capture otter (92 ± 2%), although foothold traps also were used frequently (32 ± 3%). Among trappers using conibear traps, the mean number of conibear traps set was 4.7 ± 0.3 traps. Among trappers using foothold traps, the mean number of foothold traps set was 4.0 ± 0.5 traps.

Twenty-nine percent of otter trappers (±3%) believed otter numbers were increasing in the county where they trapped most often, while 58 ± 4% thought otter numbers were stable, 6 ± 2% thought otter were declining, 4 ± 1% indicated otter were not present, and 3 ± 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 21% of the otter harvest tag holders set traps for beaver in 2017 (1,611 trappers, Table 2). Trappers spent 33,066 days trapping (20.5 ± 1.4 days/trapper) and captured 11,428 beaver. The number of people trapping beavers and the number of days spent afield were not significantly different between 2016 and 2017 (Table 8). In contrast, the number of beaver caught declined significantly by 25% between 2016 and 2017 (15,197 versus 11,428, Table 8, Figure 8). In addition, harvest in 2017 was 24% lower than the average harvest during 2006-2017 ($\bar{x}$ = 15,106).

About 84% of active trappers successfully captured at least one beaver. Among the three management zones, the largest number of beaver was taken in the northern Lower Peninsula zone (Table 9). Among counties, Marquette (625), Clare (591), Chippewa (487), Osceola (455), and Gladwin (400) counties had the highest harvest estimates (Table 10).

Most beaver trappers used conibear-type traps to capture beaver (92 ± 1%), although 52 ± 3% of trappers used foothold traps and 10 ± 2% used snares. Among trappers using conibear traps, the mean number of conibear traps set was 5.9 ± 0.3 traps. Among trappers using foothold traps, the mean number of foothold traps set was 4.6 ± 0.4 traps, and among trappers using snares, the mean number of snares set was 6.0 ± 1.3.

Thirty-seven percent of beaver trappers (±2%) believed beaver numbers were increasing in the county where they trapped most often, while 48 ± 3% thought beaver numbers were stable, 10 ± 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 98 trappers caught 219 beaver with snares in open water during the 2017 season (Table 8). About 470 trappers caught 2,865 beaver during April 2017. The number of trappers pursuing beaver in April and the number of beaver taken in April declined significantly from 2016 (Table 8). Beaver harvested with snares in open water and taken during April represented about 2% and 25% of the estimated total beaver harvest, respectively. Among trappers that set traps for beaver, 12 ± 2% caught otter in their beaver sets. These trappers caught 291 ± 50 otters.

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Table 1. Otter and beaver trapping seasons in Michigan, 2017.

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

[a]Nonresident season applies to beaver only because nonresidents were not permitted to harvest otter.
[b]The season extended through April 30, 2018, 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 2017 season.

Harvest tag holders	%	95% CL[a]	Total	95% CL[a]
Trapped only for otter	3	0	232	31
Trapped only for beaver	14	1	1,046	62
Trapped for both otter and beaver	7	1	565	48
Trapped for either otter or beaver	24	1	1,843	78
Trapped for otter[b]	11	1	797	56
Trapped for beaver[c]	21	1	1,611	74

[a]95% confidence limits.
[b]Sum of trappers that trapped only otter and trappers that trapped both otter and beaver.
[c]Sum 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 2015-2017. Estimates presented separately for trappers targeting otter and for trappers that were not targeting otter.

	Year						
	2015		2016		2017		Change[a]
Variable	Estimate	95% CL	Estimate	95% CL	Estimate	95% CL	(%)
Among trappers targeting otter							
Trappers (No)	965	57	839	56	797	56	-5
Effort (Days)	20,403	1,804	17,425	1,732	16,003	1,705	-8
Otters captured (No.)	825	80	729	82	721	78	-1
Otters released alive (No.)	60	21	40	21	62	21	53
Otters registered (No.)	765	73	688	76	659	70	-4
Trappers that captured an otter (%)	53	3	49	4	55	4	6
Trappers that released an otter (%)	4	1	3	1	5	2	3*
Trappers that registered an otter (%)	52	3	49	4	54	4	6
Mean days required to harvest an otter	26.7	2.5	25.3	2.5	24.3	2.5	-4
Among trappers that did not target otter							
Trappers (No.)	146	24	144	25	151	25	4
Otters captured (No.)	241	45	244	49	255	51	4
Otters registered (No.)	220	43	221	44	234	43	6
Among all trappers[b]							
Trappers (No.)	1,100	59	979	60	942	60	-4
Otters captured (No.)	1,065	92	973	94	976	92	0
Otters registered (No.)	985	84	909	86	893	82	-2
Mean days required to harvest an otter	20.7	1.9	19.2	1.9	17.9	1.9	-6

[a]The change between 2016 and 2017 for the proportion of trappers catching otters and registering otters is reported as the difference between years rather than the proportional change.
[b]Totals 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 2017 Michigan trapping season, summarized by area.

	Trappers		Trapping effort (days)		Otter captured[a]		Otter released alive		Otter registered[b]		Trapper success	
Area	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	236	31	3,996	774	236	50	23	13	213	44	50	7
Lower Peninsula	574	48	12,000	1,528	485	61	38	17	446	56	55	4
Zone 2	342	38	6,643	1,076	289	47	21	11	268	44	52	6
Zone 3	257	33	5,357	1,059	196	38	17	12	179	33	57	6
Unknown	2	3	6	9	0	0	0	0	0	0	0	0
Statewide	797	56	16,003	1,705	721	78	62	21	659	70	54	4
Among trappers that did not target otter												
Upper Peninsula	47	14	NA	NA	72	25	0	0	72	25	NA	NA
Lower Peninsula	104	21	NA	NA	183	44	21	16	162	36	NA	NA
Zone 2	60	16	NA	NA	115	38	15	15	100	29	NA	NA
Zone 3	47	14	NA	NA	68	22	6	5	62	21	NA	NA
Unknown	0	0	NA	NA	0	0	0	0	0	0	NA	NA
Statewide	151	25	NA	NA	255	51	21	16	234	43	NA	NA
Among all trappers combined												
Upper Peninsula	283	34	3,996	774	308	55	23	13	285	50	56	6
Lower Peninsula	674	52	12,000	1,528	667	75	60	23	608	66	59	4
Zone 2	400	40	6,643	1,076	404	61	36	19	368	52	56	5
Zone 3	302	35	5,357	1,059	264	45	23	13	240	39	61	6
Unknown	2	3	6	9	0	0	0	0	0	0	0	0
Statewide	942	60	16,003	1,705	976	92	83	27	893	82	59	3

[a]All otter removed from traps, including all incidental catches and releases.
[b]Included incidentally caught otter that were not returned to the trapper.
[c]95% 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 2017 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Otter captured[b]		Otter released alive		Otter registered[c]	
County	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]
Alcona	15	8	125	101	9	7	2	3	6	5
Alger	26	10	270	129	11	8	2	3	9	6
Allegan	9	6	36	37	6	7	0	0	6	7
Alpena	15	8	327	225	17	12	2	3	15	10
Antrim	11	7	234	183	9	7	0	0	9	7
Arenac	4	4	36	37	6	7	0	0	6	7
Baraga	13	7	108	80	17	13	0	0	17	13
Barry	21	10	587	341	11	7	0	0	11	7
Bay	2	3	9	12	2	3	0	0	2	3
Benzie	6	5	94	97	4	6	0	0	4	6
Berrien	0	0	0	0	0	0	0	0	0	0
Branch	0	0	0	0	0	0	0	0	0	0
Calhoun	9	6	366	378	0	0	0	0	0	0
Cass	11	7	306	366	4	4	0	0	4	4
Charlevoix	15	8	155	133	15	9	0	0	15	9
Cheboygan	11	7	98	76	13	11	4	6	9	10
Chippewa	28	11	162	108	26	15	0	0	26	15
Clare	34	12	208	158	51	25	9	10	43	19
Clinton	13	7	234	157	4	4	0	0	4	4
Crawford	11	7	83	66	6	7	0	0	6	7
Delta	17	9	159	119	17	10	2	3	15	9
Dickinson	13	7	189	125	17	10	0	0	17	10
Eaton	6	5	191	194	2	3	0	0	2	3
Emmet	11	7	83	62	4	6	0	0	4	6
Genesee	0	0	0	0	0	0	0	0	0	0
Gladwin	19	9	142	111	19	12	0	0	19	12
Gogebic	2	3	85	121	6	9	0	0	6	9
Gd. Traverse	4	4	298	327	4	4	0	0	4	4
Gratiot	11	7	102	80	11	7	0	0	11	7

[a]Included activity of trappers targeting otter and trappers not targeting otter combined.
[b]All otter removed from traps, including all incidental catches and releases.
[c]Included incidentally caught otter that were not returned to the trapper.
[d]95% 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 2017 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Otter captured[b]		Otter released alive		Otter registered[c]	
County	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]
Hillsdale	2	3	0	0	2	3	0	0	2	3
Houghton	21	10	372	239	23	14	0	0	23	14
Huron	2	3	11	15	0	0	0	0	0	0
Ingham	2	3	32	45	0	0	0	0	0	0
Ionia	15	8	317	201	11	9	6	7	4	4
Iosco	23	10	500	271	23	13	2	3	21	12
Iron	26	10	638	352	30	19	0	0	30	19
Isabella	6	5	74	92	4	6	0	0	4	6
Jackson	6	5	6	9	9	7	0	0	9	7
Kalamazoo	2	3	13	18	0	0	0	0	0	0
Kalkaska	19	9	459	320	36	25	9	12	28	16
Kent	19	9	172	113	15	9	4	4	11	7
Keweenaw	6	5	47	40	2	3	0	0	2	3
Lake[d]	17	9	476	418	6	5	0	0	6	5
Lapeer	4	4	32	32	0	0	0	0	0	0
Leelanau	2	3	21	30	2	3	0	0	2	3
Lenawee	0	0	0	0	0	0	0	0	0	0
Livingston	4	4	0	0	4	4	0	0	4	4
Luce	17	9	149	108	6	5	0	0	6	5
Mackinac	26	10	483	391	43	23	6	7	36	19
Macomb	0	0	0	0	0	0	0	0	0	0
Manistee	17	9	208	135	15	10	0	0	15	10
Marquette	49	14	614	253	40	17	0	0	40	17
Mason	15	8	244	172	17	11	0	0	17	11
Mecosta	34	12	582	331	47	25	9	10	38	19
Menominee	23	10	329	191	26	17	4	6	21	14
Midland	21	10	238	207	23	15	0	0	23	15
Missaukee	15	8	60	46	21	16	4	6	17	12
Monroe	0	0	0	0	0	0	0	0	0	0

[a]Included activity of trappers targeting otter and trappers not targeting otter combined.
[b]All otter removed from traps, including all incidental catches and releases.
[c]Included incidentally caught otter that were not returned to the trapper.
[d]95% 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 2017 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Otter captured[b]		Otter released alive		Otter registered[c]	
County	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]	Total	95% CL[d]
Montcalm	26	10	381	201	17	10	2	3	15	8
Montmorency	17	9	191	108	9	7	0	0	9	7
Muskegon	11	7	393	318	11	8	0	0	11	8
Newaygo	40	13	495	223	38	17	0	0	38	17
Oakland	0	0	0	0	0	0	0	0	0	0
Oceana	13	7	138	114	9	6	0	0	9	6
Ogemaw	30	11	502	278	36	17	2	3	34	16
Ontonagon	15	8	145	95	26	18	4	6	21	14
Osceola	30	11	536	389	17	10	0	0	17	10
Oscoda	13	7	238	156	0	0	0	0	0	0
Otsego	17	9	451	294	9	7	0	0	9	7
Ottawa	2	3	32	45	0	0	0	0	0	0
Presque Isle	15	8	174	120	15	11	2	3	13	10
Roscommon	23	10	244	121	15	10	0	0	15	10
Saginaw	15	8	151	112	9	6	0	0	9	6
St. Clair	2	3	43	61	0	0	0	0	0	0
St. Joseph	15	8	338	294	13	7	0	0	13	7
Sanilac	0	0	0	0	0	0	0	0	0	0
Schoolcraft	19	9	247	142	19	15	4	6	15	11
Shiawassee	9	6	153	151	11	8	2	3	9	6
Tuscola	9	6	21	30	9	6	0	0	9	6
Van Buren	2	3	43	61	2	3	0	0	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	9	317	223	17	12	0	0	17	12
Unknown	2	3	6	9	0	0	0	0	0	0
Statewide[e]	942	60	16,003	1,705	976	92	83	27	893	82

[a]Included activity of trappers targeting otter and trappers not targeting otter combined.
[b]All otter removed from traps, including all incidental catches and releases.
[c]Included incidentally caught otter that were not returned to the trapper.
[d]95% confidence limits.
[e]Number 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, 1997-2017.

	Region							
	Upper Peninsula		Northern Lower Peninsula		Southern Lower Peninsula		Statewide	
Year	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
2017	18.8	3.4	24.8	3.9	30.0	6.1	24.3	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
2017	14.0	2.5	18.1	2.9	22.3	4.6	17.9	1.9

[a]95% confidence limits.

[b]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.

Table 7. The fate of otter pelts registered by trappers in Michigan during 2016 and 2017.

	Year				
	2016		2017		
Fate of pelt	Total	95% CL	Total	95% CL	Change[a] (%)
Sold to fur buyer	198	42	236	44	19
Sold at fur auction	276	51	196	39	-29
Sold to taxidermist	28	15	19	12	-31
Sold to a private individual	19	12	36	15	89
Kept for personal use	327	47	332	45	1
Other[a]	55	20	55	20	0
Unknown	6	9	19	12	200

[a]Examples 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 2015-2017.[a]

	Year						
	2015		2016		2017		Change[c]
Variable	Estimate	95% CL[b]	Estimate	95% CL[b]	Estimate	95% CL[b]	(%)
Trappers (No.)	1,715	68	1,686	73	1,611	74	-4
Trapping effort (Days)	38,283	2,526	36,214	2,507	33,066	2,761	-9
Beavers captured (No.)	15,068	1,388	15,197	1,531	11,428	1,127	-25*
Trappers that captured a beaver (%)	86	2	86	2	84	2	-2
Trappers using snares in open water (No.)	101	20	117	22	98	20	-16
Beaver caught with snares in open water (No.)	142	55	193	67	219	121	13
Trapped beaver in April (Trappers)	469	42	580	48	470	44	-19*
Beaver caught in April (No.)	3,918	755	4,996	837	2,865	600	-43*

[a]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. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.
[b]95% confidence limits.
[c]The change between 2016 and 2017 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 2017 Michigan trapping season, summarized by area.[a]

	Trappers		Trapping effort (days)		Beaver captured[a]		Trapper success	
Area	Total	95% CL[b]	Total	95% CL[b]	Total	95% CL[b]	%	95% CL[b]
Upper Peninsula	517	46	8,562	1,147	3,586	635	84	3
Lower Peninsula	1,101	64	24,193	2,525	7,780	945	85	2
Zone 2	684	52	14,255	1,989	5,002	793	84	3
Zone 3	470	44	9,938	1,550	2,778	506	85	3
Unknown	26	10	310	285	62	46	NA	NA
Statewide	1,611	74	33,066	2,761	11,428	1,127	84	2

[a]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. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.
[b]95% confidence limits.

Table 10. Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2017 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Beaver captured	
County	Total	95% CL[b]	Total	95% CL[b]	Total	95% CL[b]
Alcona	28	11	349	221	255	195
Alger	38	13	349	139	94	45
Allegan	17	9	255	168	47	38
Alpena	32	12	370	193	151	91
Antrim	15	8	563	429	151	92
Arenac	9	6	106	81	34	35
Baraga	34	12	349	143	204	105
Barry	36	12	982	483	293	146
Bay	17	9	183	126	60	47
Benzie	6	5	94	97	6	7
Berrien	2	3	17	24	6	9
Branch	2	3	85	121	66	94
Calhoun	15	8	548	409	132	139
Cass	11	7	527	482	191	216
Charlevoix	19	9	289	308	70	46
Cheboygan	40	13	585	267	125	53
Chippewa	66	17	1,071	423	487	173
Clare	64	17	1,924	783	591	257
Clinton	6	5	62	66	15	12
Crawford	32	12	587	324	140	74
Delta	47	14	565	203	162	89
Dickinson	34	12	398	174	283	169
Eaton	9	6	149	119	19	22
Emmet	17	9	147	86	94	56
Genesee	13	7	108	97	26	19
Gladwin	32	12	534	238	400	234
Gogebic	15	8	287	173	98	69
Gd. Traverse	23	10	455	360	77	48
Gratiot	2	3	21	30	0	0

[a]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. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.
[b]95% confidence limits.

Table 10 (continued). Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2017 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Beaver captured	
County	Total	95% CL[b]	Total	95% CL[b]	Total	95% CL[b]
Hillsdale	9	6	106	99	43	33
Houghton	43	14	546	209	300	204
Huron	4	4	43	46	4	6
Ingham	2	3	64	91	15	21
Ionia	15	8	257	180	36	27
Iosco	43	14	661	262	223	115
Iron	49	14	1,182	491	327	167
Isabella	13	7	138	95	45	37
Jackson	23	10	381	195	87	45
Kalamazoo	17	9	310	178	47	29
Kalkaska	40	13	1,027	480	387	203
Kent	21	10	302	164	55	41
Keweenaw	13	7	142	85	70	57
Lake	43	14	327	154	115	61
Lapeer	13	7	204	191	64	46
Leelanau	4	4	60	62	30	33
Lenawee	2	3	15	21	0	0
Livingston	13	7	168	133	62	54
Luce	15	8	236	138	102	67
Mackinac	43	14	1,029	525	191	85
Macomb	6	5	85	94	34	35
Manistee	13	7	115	69	43	29
Marquette	83	19	1,176	346	625	292
Mason	15	8	247	198	30	20
Mecosta	51	15	959	377	325	146
Menominee	21	10	266	142	49	34
Midland	28	11	429	215	142	71
Missaukee	40	13	487	211	240	150
Monroe	0	0	0	0	0	0

[a]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. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.
[b]95% confidence limits.

Table 10 (continued). Estimated number of beaver trappers, trapping effort, and beaver captured by otter harvest tag holders during the 2017 Michigan trapping season, summarized by county.[a]

	Trappers		Trapping effort (days)		Beaver captured	
County	Total	95% CL[b]	Total	95% CL[b]	Total	95% CL[b]
Montcalm	36	12	389	176	79	39
Montmorency	36	12	585	300	230	160
Muskegon	9	6	102	80	28	25
Newaygo	43	14	925	397	238	106
Oakland	15	8	344	296	53	35
Oceana	19	9	270	158	85	54
Ogemaw	36	12	791	355	217	113
Ontonagon	47	14	461	200	289	196
Osceola	64	17	1,171	487	455	225
Oscoda	15	8	381	257	140	134
Otsego	28	11	680	430	193	95
Ottawa	19	9	295	173	70	45
Presque Isle	30	11	442	229	196	112
Roscommon	28	11	298	132	81	45
Saginaw	15	8	210	143	74	60
St. Clair	11	7	113	98	43	34
St. Joseph	13	7	559	460	159	137
Sanilac	4	4	21	22	6	7
Schoolcraft	28	11	506	259	306	219
Shiawassee	11	7	128	105	38	30
Tuscola	13	7	206	191	91	85
Van Buren	15	8	225	137	79	51
Washtenaw	4	4	21	23	6	7
Wayne	0	0	0	0	0	0
Wexford	23	10	714	464	244	166
Unknown	26	10	310	285	62	46
Statewide[c]	1,611	74	33,066	2,761	11,428	1,127

[a]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. These estimates only represent the participation, effort, or harvest of trappers that obtained an otter harvest tag.
[b]95% confidence limits.
[c]Number 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.

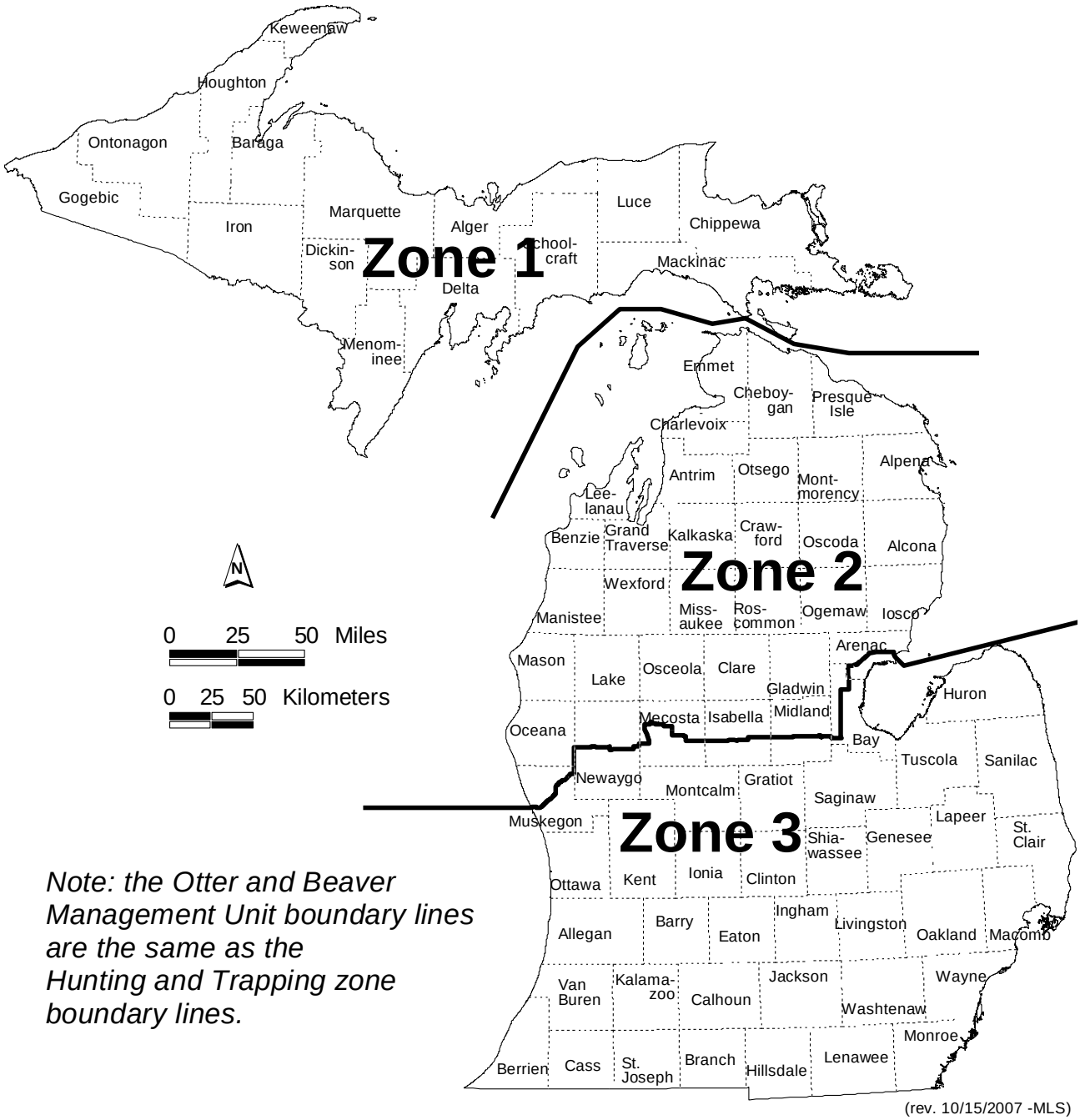

Figure 1. Otter and beaver management zones in Michigan, 2017.

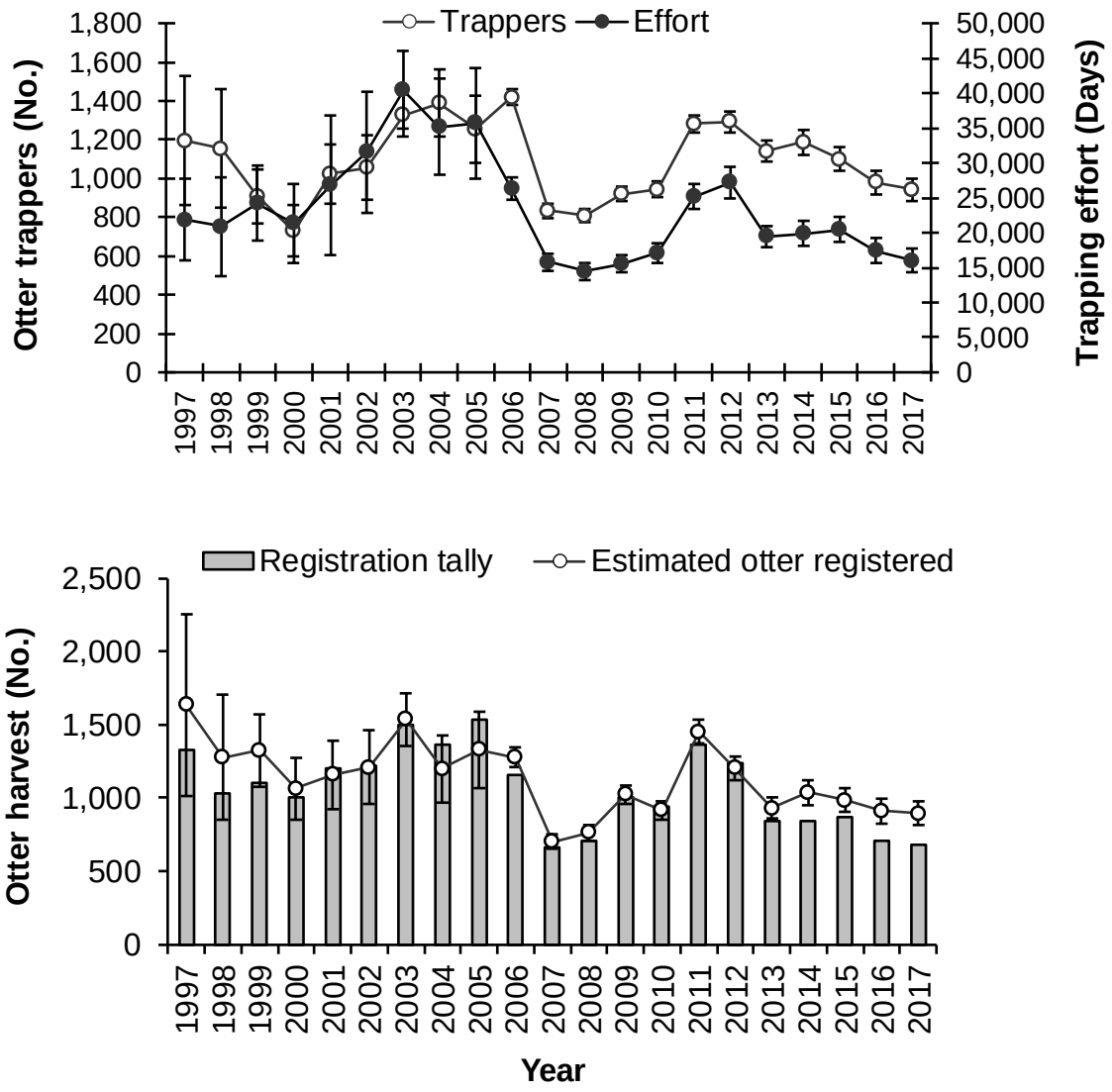

Figure 2. Estimated number of trappers, trapping effort (days), and number of otter captured and registered in Michigan, 1997-2017. Estimates of trapper numbers, trapping effort, and harvest were derived from harvest survey, while registration total was a tally of animals registered by trappers at registration 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.

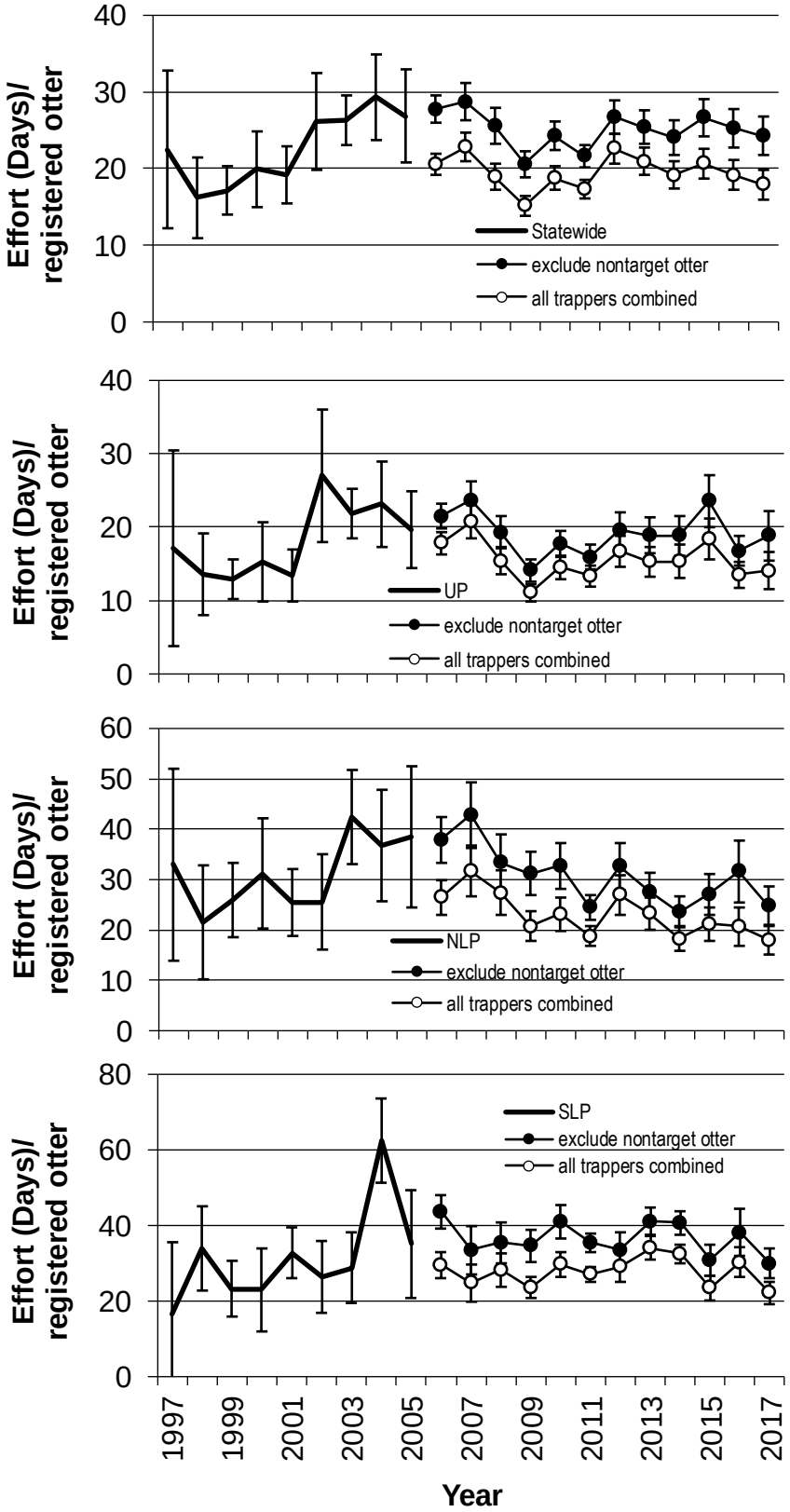

Figure 3. Estimated mean number of days required to harvest an otter in Michigan during 1997-2017, summarized by management zone. Beginning in 2006, two separate estimates were calculated: (1) an estimate excluding the activity of trappers that did not target otter and (2) an estimate of all trappers combined. The latter estimates are more comparable to estimates from previous years.

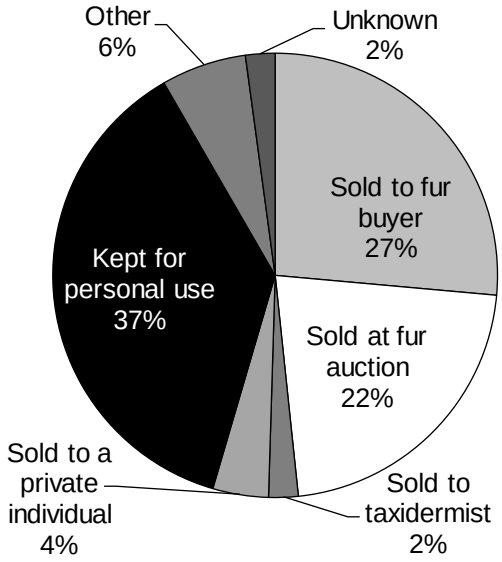

Figure 4. The proportion of otter pelts used for various purposes in Michigan, 2017.

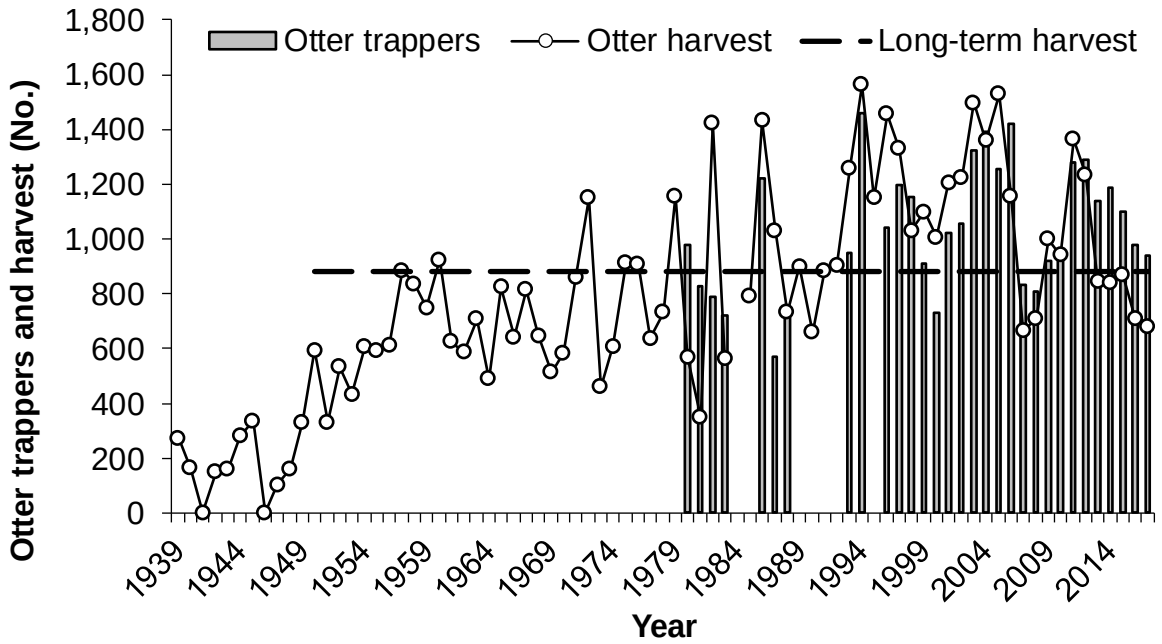

Figure 5. Otter harvest (sealing or registration tally, unpublished data) and estimated number of otter trappers (estimates from harvest survey) in Michigan, 1939-2017. Long-term (1950-2017) average harvest was 879 otter. Estimates were not available for years when values were not plotted.

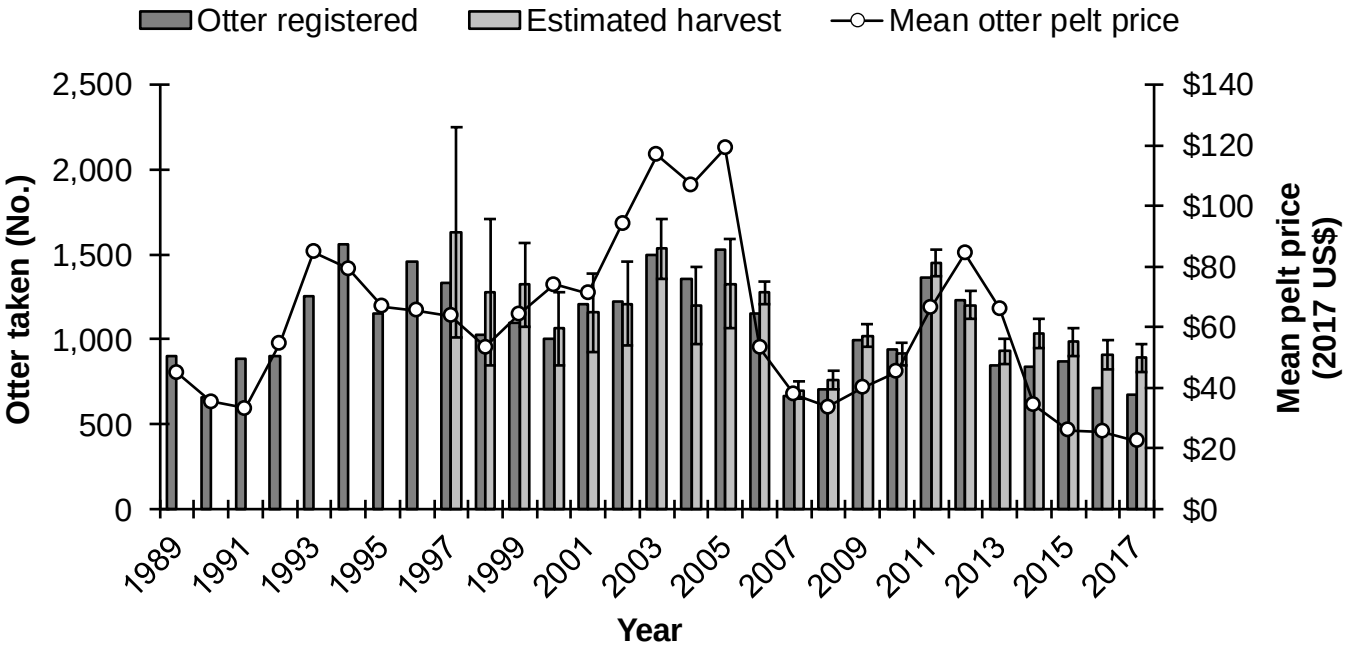

Figure 6. Otter registration totals, estimated otter harvest, and mean otter pelt prices in Michigan during 1989-2017. Mean pelt prices were the average paid in Minnesota and Wisconsin (e.g., Abraham and Dexter 2016, Lohr 2016). Pelt prices were reported in 2017 dollars by adjusting for inflation using the Consumer Price Index (Bureau of Labor Statistics 2018). Vertical bars represent the 95% confidence interval. Estimates were not available for years when values were not plotted.

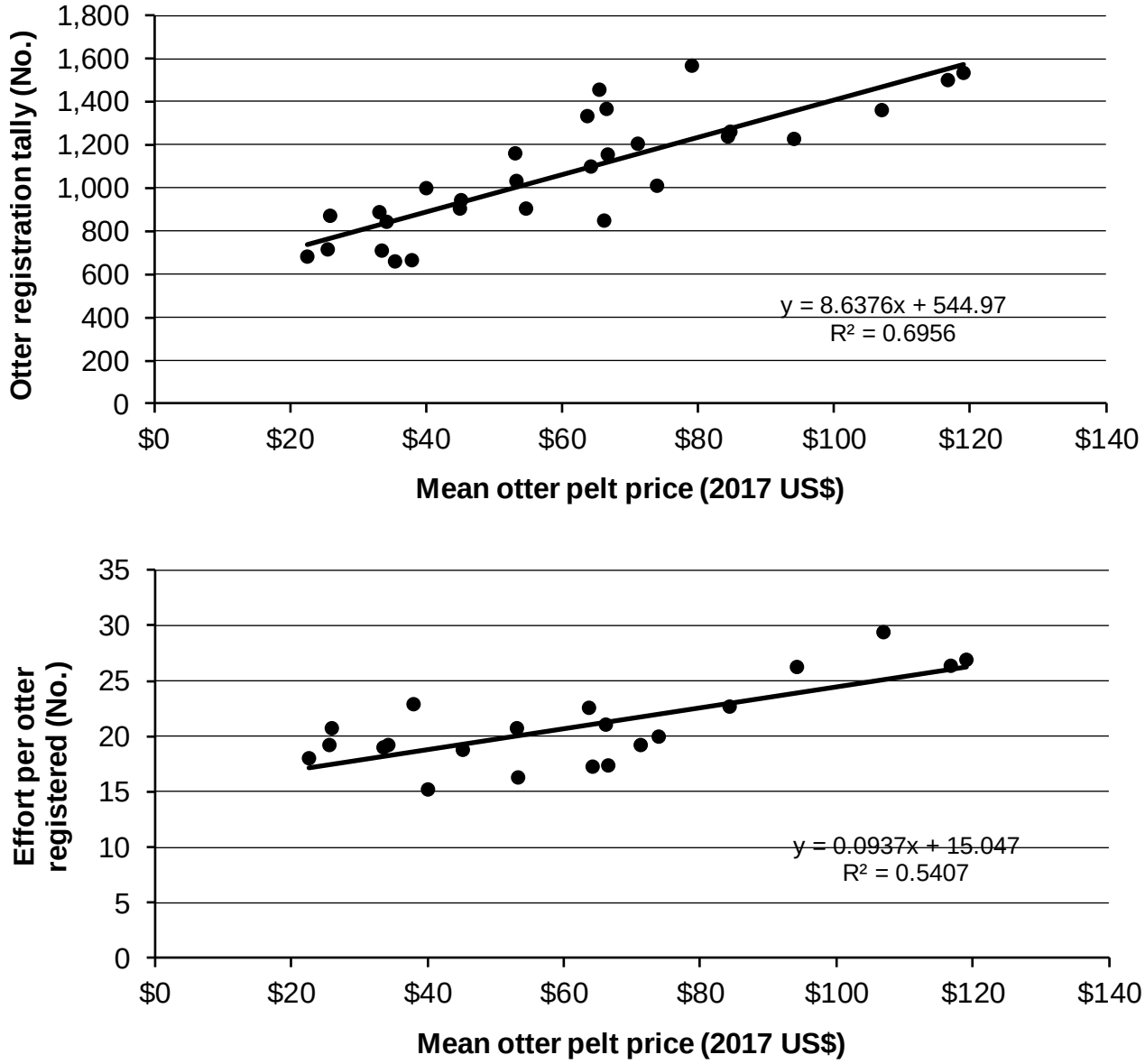

Figure 7. The relationship between the number of otter registered and mean otter pelt prices in Michigan during 1989-2017 (top), and the relationship between trapping effort per otter registered and mean otter pelt prices in Michigan during 1997-2017 (bottom).

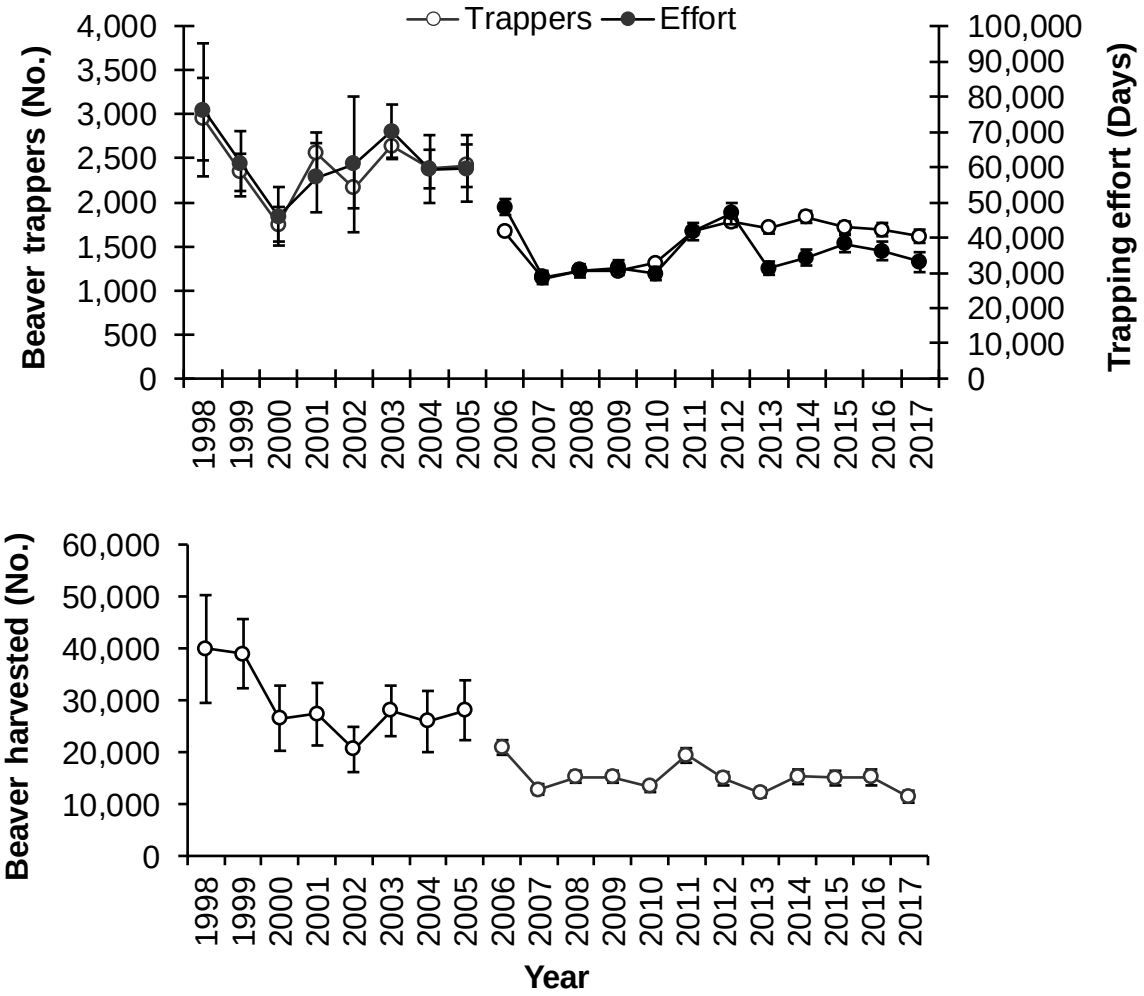

Figure 8. Estimated number of trappers, trapping effort (days), and number of beaver captured in Michigan, 1998-2017. Vertical bars represent the 95% confidence interval. The 2006-2017 estimates were not directly comparable to estimates from previous years because the 2006-2017 estimates only represent 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 2017 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!