

## STATUS OF THE MINK AND MUSKRAT IN TENNESSEE

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This paper is one of a series on the distribution of Tennessee mammals which have been appearing in the *Journal of the Tennessee Academy of Science* and is concerned with the status of the mink (*Mustela vison*) and the muskrat (*Ondatra zibethicus*). Although the mink and muskrat are common residents throughout Tennessee, the scarcity of museum specimens and lack of references to these animals in the literature justifies a report of this general nature.

The University of Tennessee Museum of Zoology contains only one muskrat specimen, collected in Knox County and one mounted mink specimen without reference to locality of its collection. The United States Fish and Wildlife Service and National Museum collections do not contain specimens of mink collected in Tennessee, but do contain ten muskrat specimens collected as follows: 3 — Indian Mound; 5 — Highcliff; 1 — Roan Mountain; 1 — Watauga Valley.

The literature contains only minor remarks on the status of these furbearers in Tennessee and only conjectures on the subspecies occurring in the State. Miller and Kellogg (1955) imply that the subspecies occurring in Tennessee are *Mustela vison mink* Peale and Palisot de Beauvois and *Ondatra zibethicus zibethicus* (Linnaeus). The most recent literature on the distribution of Tennessee mammals, primarily that of Hamilton (1943) and Burt and Grossenheider (1952) relies either directly or indirectly upon the reports of Rhoads (1896), Howell (1909), Hollister (1911) and Kellogg (1939). Rhoads (1896) mentions only that he observed numerous muskrat signs, consisting of shell mounds, and a mink skull from Open Lake in Lauderdale County. Howell (1909) made no comment on the mink, but was apparently the first to report on collected specimens of the muskrat. He collected four specimens at High Cliff, Campbell County, and one specimen from the Watauga Valley, remarking that the muskrat was common at High Cliff and reported as numerous in the vicinity of Briceville. Hollister (1911) in a report on the muskrats of North America apparently inspected these specimens, but did not make a specific comment on the status of the muskrat in Tennessee. He inspected five specimens from High Cliff, and one from Watauga Valley and one from Roan Mountain Station. In his synopsis on the mink of North America (Hollister, 1913) he makes no reference to Tennessee.

Kellogg remarked that the common muskrat [*Ondatra z. zibethicus* (Linnaeus)] formerly occurred in most of the streams and ponds in Tennessee. He inspected the five specimens from Campbell County, two from Carter County and three from Stewart County in the National Museum collection. Apparently some of these specimens were those inspected by Howell and Hollister. Kellogg lists two subspecies of mink occurring in the State, *Mustela vison vison* Schreber and *Mustela v. mink* Peale and Beauvois. Concerning the former, which he calls the "mountain or black mink," he states, "The early records seem to indicate that the dark-colored mink was formerly common in the mountainous portion of eastern Tennessee." The later subspecies he calls the "common or brown mink" and remarks that "in many localities they are now rather scarce. . . ." Specimens of these subspecies were not available for examination by Kellogg.

Since these writers do not present distribution maps of the mink and muskrat in Tennessee it is necessary that we rely upon maps and conclusions of Hamilton (1943) and Burt and Grossenheider (1952) for the latest material available. Burt and Grossenheider are not concerned with subspecies but do present maps showing the range of *Mustela vison* and *Ondatra zibethicus* as being throughout Tennessee. On the basis of the critical examination of museum specimens, correspondence with members of game commissions and other persons, Hamilton, reporting on the mammals of eastern United States, has presented maps outlining the range of a species, its subspecies and related forms with the comment that he has used his own judgement in drawing boundaries. He reports only that the subspecies *Mustela v. mink* (Peale and Beauvois) and *Ondatra z. zibethica* (Linnaeus) occur in Tennessee. Their distribution is given as statewide.

Other than these references the literature contains only limited information on the status of the mink and muskrat in Tennessee. Although they do imply that Tennessee is in the range of the mink and muskrat, Coues (1877) and Coues and Allen (1877) make no specific reference to their distribution in Tennessee. Ganiel (1928) remarks that the mink and muskrat are generally distributed throughout the State. Wing (1940) reporting on a game survey encompassing an area roughly between the Holston River and the Tennessee-Kentucky state line, remarked that mink and muskrat were present in this area. He specifically stated, "Some muskrats are still found but in small numbers." Caldwell *et al.* (1947), in a publication for school children, referring to mink stated, "There are two species found in the State, similar in size and habits but one being almost black while the other is brown." Although they discussed the muskrat, remarks were not made on its distribution. Goodpaster and Hoffmeister (1952) reporting on the mammals in the vicini-

ty of Reelfoot Lake remarked only that "Very few mink tracks were noted" and that the muskrat was common. Conaway and Howell (1953) working in Johnson and Carter counties, as determined from comments of residents of these counties, reported that the mink was generally distributed and the muskrat uncommon. In regard to the Cumberland Plateau (Howell and Conaway, 1952) they made no mention of the muskrat and remarked that the mink was uncommon.

It is of interest to note that the distribution and taxonomy of the mink and muskrat in Tennessee is based on the inspection of only a very limited number of specimens and other information. There is no need to emphasize the need for an adequate series of specimens as the paucity of data makes this obvious.

Lack of specific information concerning the distribution of the furbearers and other fauna of Tennessee resulted in the Tennessee Game and Fish Commission conducting a statewide wildlife survey. Primary field work on this project was begun in September, 1950, and was completed approximately thirteen months later. The survey procedure (Schultz, 1952; 1954) included a method of sampling known as "area sampling" which permitted computation of sampling errors. In brief, the sampling scheme consisted of a proportionate stratified random sample of 1,000 "sampling areas" in Tennessee which averaged five dwellings per area as indicated on state highway maps. This was a sampling rate of 1 in 51. Heads of farm households dwelling upon these areas were interviewed concerning mink and muskrats utilizing their farms and "sampling areas." Data collected on these furbearers are presented in this paper and Schultz *et al.* (1954). The relative sampling errors (R.S.E.) indicate the adequacy of sampling for all interviewees and also all respondents reporting these animals on their farms. Ninety-five per cent confidence limits on an estimated total (obtained by multiplying the number of respondents by the sampling rate) of either all heads of farm households or all such persons with the animal utilizing their farm in a farming-type are obtained as follows:

$$\pm (\text{Estimated Total}) (\text{R.S.E.}) (2)$$

Farmer hunters were requested to furnish information on animals hunted, and trapped with the intent that such information would assist in delineation of the range of the animal and possibly population densities.

Data obtained by personal interview have been tabulated on a farming-type basis (Tables 1, 2). The farming-types (revised from Luebke *et al.*, 1947) or strata represent physiographic regions as follows: Mississippi Bottoms, 1; Plateau Slope of West Tennessee, 2, 3, 4, 5, 6; Highland Rim, 7, 8, 9, 11; Central Basin, 10; Cumberland Plateau, 12; Valley of East Tennessee, 13, 14; Sequatchie Valley, 14A; Unaka Range, 15.

Table 1. Status of the mink in Tennessee as determined by personal interview of heads of farm households.

	Farming-type															Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
<b>FARM:</b>																
Number of Respondents	27	97	489	69	131	261	200	139	116	538	306	137	57	862	131	3560
Number reporting mink on farm	13	27	178	16	25	96	58	67	18	165	91	49	14	135	33	985
Per cent reporting mink on farm	48	28	36	23	19	37	29	48	16	31	30	36	25	16	25	28
R.S.E. <sup>1</sup> for estimated total of: All heads of farm households	16.4	7.6	5.0	6.7	6.8	4.6	5.9	6.7	8.8	3.2	5.7	7.7	10.2	3.0	6.5	1.5
Heads of farm households with mink on farm	25.5	19.9	8.7	27.0	29.7	11.6	14.2	13.4	24.2	8.3	13.0	19.2	35.0	9.5	19.1	3.7
<b>SAMPLING AREA:</b>																
Number of respondents <sup>2</sup>	16	78	341	58	94	184	158	120	95	417	239	116	45	724	122	2807
Number reporting mink on sampling area	10	34	197	24	27	135	79	80	27	217	113	74	16	215	52	1300
Per cent reporting mink on sampling area	63	44	58	41	29	73	50	67	28	52	47	64	36	30	43	46

<sup>1</sup>Relative sampling errors (R.S.E.) computed by use of analysis of variance, with computations by the Iowa State College Statistical Laboratory.

<sup>2</sup>Includes only respondents who have lived on area, or not over 2 miles from area, during the last five years.

Table 2. Status of the muskrat in Tennessee as determined by personal interview of heads of farm households.

	Farming-type															Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
<b>FARM:</b>																
Number of Respondents	27	97	489	69	131	261	200	139	116	538	306	137	57	862	131	3560
Number reporting muskrat on farm	11	49	168	16	34	97	54	72	28	166	85	43	24	359	51	1257
Per cent reporting muskrat on farm	41	54	34	23	26	37	27	52	24	31	28	31	42	42	39	35
<b>R.S.E.<sup>1</sup> for estimated total of:</b>																
All heads of farm households	16.4	7.6	5.0	6.7	6.8	4.6	5.9	6.7	8.8	3.2	5.7	7.7	10.2	3.0	6.5	1.5
Heads of farm households with muskrat on farm	29.2	10.3	9.3	22.7	22.3	12.4	14.6	12.2	18.2	8.1	12.3	21.1	21.9	6.1	13.5	3.2
<b>SAMPLING AREA:</b>																
Number of respondents <sup>2</sup>	16	78	341	58	94	184	158	120	95	417	239	116	45	724	122	2807
Number reporting muskrat on sampling area	8	50	190	30	44	142	76	81	44	226	134	69	28	454	72	1648
Per cent reporting muskrat on sampling area	50	64	56	52	47	77	48	68	46	54	56	59	62	63	59	59

<sup>1</sup>Relative sampling errors (R.S.E.) computed by use of analysis of variance, with computations by the Iowa State College Statistical Laboratory.

<sup>2</sup>Includes only respondents who have lived on area, or not over 2 miles from area, during the last five years.

Although the data collected do not permit delineation of ranges of subspecies, it is believed that they do establish the present range of the mink and muskrat in Tennessee.

*Mink.* The range of the mink (*Mustela vison*) is throughout the entire State of Tennessee. On the basis of the data available, it is difficult to speculate correctly on the relative density of this furbearer throughout the State. On the basis of farmer reports (Table 1) it appears that the mink is more common in the Mississippi Bottoms and the western Highland Rim than in other portions of the State. The habitat characteristics of these regions support this statement. The mink was reported as occurring on farms of 985 of the 3,560 respondents (Table 1). An inspection of the percentage of farmers reporting the mink on the sampling area shows the lowest percentages in farming types 5, 9, 13 and 14 (Table 1). As the mink is distributed widely throughout the State the distribution of these 985 respondents is not presented. Interested readers will find this information in the final report of the statewide survey (Schultz *et al.*, 1954).

Mink population trends on the sampling areas during the five year period preceding the survey were reported as up, 8 per cent; down, 8 per cent; no change, 25 per cent; unknown, 59 per cent. Reported trends on a basis of farming-types are presented in Schultz *et al.*, 1954.

Mink hunters are comparatively rare; however, some do occur in West Tennessee. Eight farmer mink hunters averaged 11.9 trips with an average take of 5.9 mink. The average number of trips ranged from 1.0 to 50.0 in the farming-types while the average take ranged from 1.0 to 28.0. The success ratio of farmer hunters was .49 mink per trip, ranging from .36 to 1.50; non-farmer, .63, of whom only one was interviewed. Farmer mink hunters killed an estimate of 3,627 mink on 7,339 trips.

Thirty-seven per cent, 79, of the trappers interviewed trapped mink. Mink trappers averaged 3.22 mink, ranging from 1 to 6 in the farming types. Of the total animals reported trapped (4,060), 254, or 6 per cent, were mink with an estimated total catch of 6,477 mink for all trappers dwelling in the country.

*Muskrat.* The range of muskrat (*Ondatra zibethicus*) is throughout the entire State of Tennessee. This furbearer was reported as occurring on 1,257, or 35 per cent, of the farms with the per cent of occurrence ranging from 23 to 54 (Table 2). The higher percentages were from farming types 2 (north-western Tennessee), 8 (western Highland Rim), 13 (southern East Tennessee Valley) and 14 (East Tennessee Valley). On the basis of the sampling areas the largest percentages were from farming types 2, 6, 8, 13 and 14. (Table 2). On the basis of these data conclusions concerning relative population densities are only speculative in nature. Respondent distribution maps are presented by Schultz *et al.*, 1954.

Muskrat population trends on the sampling areas during the five year period preceding the survey were reported as up, 15 per cent; down 7 per cent; no change, 25 per cent; unknown, 53 per cent. These reported trends which are similar to those for the mink, indicate that farmers are unfamiliar with the density of these animals.

Sixty-six per cent, 139, of the trappers trapped muskrats. Muskrat trappers averaged 17.96 muskrats, ranging from 4 to 75. Of the total animals reported trapped (4,060), 2,496, or 61 per cent, were muskrats with an estimated total catch of 63,648 muskrats for all trappers dwelling in the country. Detailed data on trapping success are available in Schultz *et al.*, (1954).

It is evident from this report and others in this series that taxonomic and life history studies of the fauna of Tennessee are for all practical purposes non-existent, and should be instigated as soon as possible.

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