

Estimating Fall Whole-body Weights of Muskrats, *Ondatra zibethicus*, from Skinned Weights

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Proulx, Gilbert. 1997. Estimating fall whole-body weights of Muskrats, *Ondatra zibethicus*, from skinned weights. *Canadian Field-Naturalist* 111(4): 643-645.

While mean body weights are useful in comparing the sizes of animals of different samples, a conversion factor to estimate whole-body weights from skinned weights has yet to be determined for Muskrats (*Ondatra zibethicus*) captured in fall by fur trappers. At Luther Marsh, Ontario, the mean ratio of skinned weight to whole-body weight was 0.76 in juvenile males, and 0.75 in all other age-sex classes. There was a significant difference ($P < 0.05$) between the mean whole-body weights, and between the mean skinned weights, of Muskrats of different age-sex classes. A linear regression of whole-body to skinned weights was determined for each age-sex class.

Key Words: Muskrat, *Ondatra zibethicus*, body weight, skinned weight, Ontario.

Large numbers of skinned Muskrats (*Ondatra zibethicus*) are commonly available from trappers in the fall (see Proulx and Buckland 1985, 1986) and mean body weights may be useful to assess the animals' condition and the suitability of their habitats (Kuehn 1985). However, a conversion factor to estimate whole-body weights from skinned weights has yet to be determined for fall-captured Muskrats. Such information would be useful to compare trapped animals of different sex and age classes, and to compare fur-trapped populations to protected ones for which only whole body-weights are available

through live-trapping. The objective of this study was to determine the relationship between whole-body and skinned weights.

This study involved 233 Muskrats (19 male and 24 female adults, and 109 male and 81 female juveniles) captured at Luther Marsh, 65 km north of Guelph, Ontario, from 26 October to 24 November 1979. All Muskrats were weighed to the nearest 25 g before and after skinning, and were aged by the dentition method (Sather 1954; Proulx and Gilbert 1988). Comparisons between age and sex classes of mean whole-body and skinned weights were done with an

TABLE 1. Whole-body and skinned weights (g) of adult and juvenile Muskrats captured at Luther Marsh, Ontario, in fall 1979.

Age	Sex	Number of animals	Weights					Ratio of skinned to whole-body weights $\bar{x} \pm E$
			Whole-body		Skinned			
			Actual	Calculated from regressions				
			$\bar{x} \pm SE$	Range	$\bar{x} \pm SE$	$\bar{x} \pm SE$	Range	
Adult	Male	19	1496 \pm 29	1225 - 1775	1497 \pm 21	1120 \pm 25	950 - 1325	0.75 \pm 0.01
	Female	24	1389 \pm 27	1125 - 1650	1389 \pm 26	1036 \pm 21	825 - 1275	0.75 \pm 0.01
Juvenile	Male	109	1034 \pm 16	650 - 1500	1030 \pm 16	779 \pm 11	500 - 1125	0.76 \pm 0.003
	Female	81	980 \pm 15	650 - 1250	981 \pm 14	735 \pm 11	500 - 950	0.75 \pm 0.004

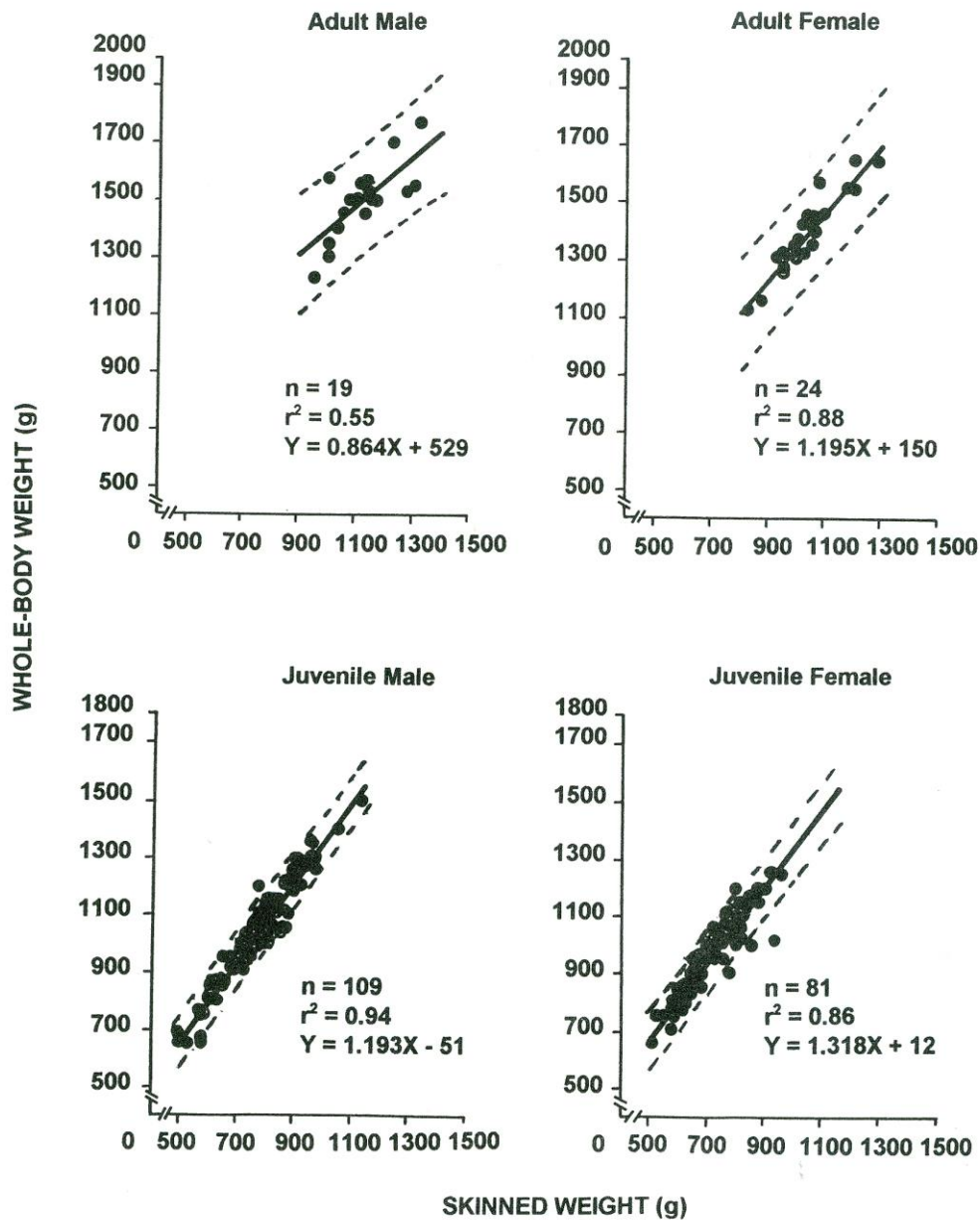


Figure 1. Relationship between whole-body and skinned weights, and 95% confidence limits of the Y value (dashed lines), of Muskrats captured in fall 1979 at Luther Marsh, Ontario.

analysis of variance and Student *t*-tests (Dixon and Massey 1969). A simple linear regression model was used to determine the relationship between whole-body and skinned weights (Kuehn 1985). A 0.05 level of significance was used for all tests.

There was a significant difference between the mean whole-body ($F = 93.885$; 3, 229 df; $P < 0.005$) weights of Muskrats of different age-sex classes (Table 1). The mean skinned weights were also different ($F = 100.914$; 3, 299 df; $P < 0.005$) among the

classes. The mean whole-body and skinned weights of adult males was significantly greater than any other class ($t = 2.677$, $P < 0.01$). Adult females were heavier than juveniles ($t = 9.585$, $P < 0.005$), and juvenile males were heavier than juvenile females ($t = 2.342$, $P < 0.01$) (Table 1). The mean whole-body weights were significantly ($P < 0.005$) greater than the mean skinned weights for all age-sex classes (Table 1).

The mean ratio of skinned weight to whole-body weight was 0.76 in juvenile males and 0.75 in all other age-sex classes (Table 1). There was no difference ($P > 0.05$) between the mean ratios. However, because of the difference in the mean weights of the age-sex classes, data were not pooled for the regressions of whole-body to skinned weights. The regression of whole-body to skinned weights for male adults was $Y = 0.864 X + 529$ ($r = 0.74$, $P < 0.001$), and for female adults, $Y = 1.195 X + 150$ ($r = 0.94$, $P < 0.001$) where Y = whole-body weight in grams and X = skinned weight (Figure 1). The regression of whole-body to skinned weights for male juveniles was $Y = 1.393 X - 51$ ($r = 0.97$, $P < 0.001$) and for female juveniles, $Y = 1.318 X + 12$ ($r = 0.93$, $P < 0.001$) (Figure 1). The mean difference between actual and calculated weights was 66 (SE = 12) g and 53 (± 16) g in male and female adults, respectively, and 35 (± 3) g and 38 (± 4) g in male and female juveniles, respectively. These differences corresponded to 3.4 to 4.4 % of the actual mean whole-body weights of age-sex classes. The calculated mean whole-body weights did not differ ($P > 0.05$) from the actual ones for all age-sex classes (Table 1).

This study showed that a mean ratio of skinned to whole-body weight of approximately 0.75 may be used for all age-sex classes in comparative studies involving live-captured Muskrats and carcasses originating from habitats similar to those of Luther Marsh (see Proulx and Gilbert 1983). This ratio was similar to the 0.78 and 0.79 estimated by Dozier (1945) for winter-captured males and females, respectively, and 0.76 to 0.79 reported by Piérard and Bisailon (1982) for spring-captured Muskrats of different age and sex classes. This ratio probably varies among seasons as the leather becomes light and papery later in the trapping season (Anonymous 1983), and fat reserves may be depleted over winter (Piérard and Bisailon 1982). The regressions devel-

oped for fall-captured animals should be applied cautiously in other seasons. The mean differences observed between calculated and actual whole-body weights were small and similar to those reported in a study of Fisher (*Martes pennanti*) carcasses (Kuehn 1985). Overall, the regressions resulted in estimated mean whole-body weights that were representative of the real world.

Acknowledgments

I thank Ray Wong for statistical advice. I am grateful to Pauline Feldstein and two anonymous reviewers for their helpful comments.

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Received 29 August 1996
Accepted 10 February 1997