

Aerial Wildlife Survey Report

Wildlife Management Unit 210 Aerial Ungulate Survey (2019)

Background

Lonepine Wildlife Management Unit 210 (WMU 210), in the Red Deer-North Saskatchewan Region, covers an area of 3,492.1 km². The WMU also has several drainages including Rosebud River and Carstairs, Kneehills, Three Hills, and Spruce Creek. The central parkland subregion covers northern portions of the WMU, with Foothills Fescue in the south. The WMU is dominated by agriculture and is primarily deeded land with limited Crown parcels. No First Nations reserves are present in WMU 210.

No previous aerial surveys for ungulates (mule deer, white-tailed deer, and moose) have been conducted in WMU 210.

The objective of the 2019 survey was to assess the status of the ungulate population in WMU 210 by determining estimates for abundance, density and age-sex composition (Table 1). We also recorded observations of additional species of game management or conservation concern including elk, carnivores, game birds, and sensitive or At Risk species.

Survey Method

The transect survey was conducted flying 41 north-south lines at 1.6 kilometre intervals, with 50% coverage (800 metre wide survey strip) from Jan 7 to 9, 2019 for a total survey effort of 2,067 kilometres. At each observation point, ungulates were classified by species, and when possible, sex and age were recorded. Antler size for deer was classified as:

- 'small' (spike or two points on one or both antlers)
- 'medium' (antlers with 3 or more points; antlers inside ears)
- 'large' (antlers with ≥ 4 points, antlers outside of ears).

Because transects varied in length (see Krebs 2014, Jolly 1969), the average density (R ; #/km²) of mule deer, white-tailed deer, and moose was calculated by summing the total animals counted per transect ($\sum x$) by total area searched (length of transects multiplied by 800 metre survey strip [$\sum z$]).

For a population estimate (unequal sized units, sampling without replacement), the average density (R) was multiplied by the overall area of the WMU (Z). The width of the 90% confidence interval was calculated by multiplying the t statistic for the left-tailed inverse of the Student's t -distribution, ($t_{0.05, df=n-1}$) by standard error (SE; without replacement) of the abundance estimate where $SE = \sqrt{\text{variance}}$, and $\text{variance} = N(N-n)/(n(n-1)) * (\sum x^2 + R^2 \sum z^2 - 2R \sum xz)$ with N as the total number of possible transects given 100% coverage, and n as the number of transects sampled.

Results

Mule Deer

A total of 869 mule deer were observed in 108 groups. The estimated density was 0.50 deer/km² (90% CI 0.41 – 0.59) and the estimated abundance was 1,756 individuals (90% CI 1,445 – 2,068). The coefficient of variation for both density and abundance was 0.11 (Table 2). A total of 559 mule deer were successfully classified and the buck:doe:fawn ratio was estimated to be 35:100:59. That results in an estimated 2018/2019 early winter mule deer population of 317 buck, 905 doe, and 534 fawn.

Of the 146 mule deer bucks classified:

- 38 (26%) were 'small'
- 66 (45%) were 'medium'
- 42 (29%) were 'large'.

White-tailed Deer

A total of 423 white-tailed deer were observed in 51 groups. The estimated density was 0.25 deer/km² (90% CI 0.18 – 0.31) and the estimated abundance was 857 individuals (90% CI 630 – 1,083). The coefficient of variation for both density and abundance was 0.16 (Table 2). A total of 313 white-tailed deer were successfully classified and the buck:doe:fawn ratio was estimated to be 17:100:33. That results in an estimated 2018/2019 early winter white-tailed deer population of 148 buck, 430 doe, and 279 fawn.

Of the 54 white-tailed deer bucks classified:

- 27 (50%) were 'small'
- 23 (43%) were 'medium'
- 4 (7%) were 'large'.

Moose

A total of 17 moose were observed in eight groups. The estimated density was 0.01 moose/km² (90% CI 0.005 – 0.015) and the estimated abundance was 36 individuals (90% CI 17 – 55). The coefficient of variation for both density and abundance was 0.32 (Table 2). All moose were successfully classified and the bull:cow:calf ratio was estimated to be 25:100:75. That results in an estimated 2018/2019 early winter moose population of 5 bull, 18 cow, and 14 calf.

Elk

Elk were observed in one group of eight (one bull, four cow, three calf).

Table 1. Transect analysis results for the 2019 aerial ungulate survey in WMU 210 (n = number of groups, D = estimated # individuals/km², N = estimated abundance, CI = 90% confidence interval, SE = standard error, CV = coefficient of variation).

Species	n	Mean Group Size	D (90% CI)	SE _D	CV _D	N (90% CI)	SE _N	CV _D
Mule Deer	108	8.0	0.50 (0.41-0.59)	0.053	0.105	1,756 (1,445-2,068)	185.18	0.105
White-tailed Deer	51	8.3	0.25 (0.18-0.31)	0.038	0.157	857 (630-1,083)	134.5	0.157
Moose	8	2.1	0.01 (0.005-0.015)	0.003	0.318	36 (17-55)	11.1	0.318

Literature

Krebs, C.J. 2014 Ecological Methodology, 3rd Edition. Chapter 4, Estimating Abundance: Quadrat Counts [online] http://www.zoology.ubc.ca/~krebs/downloads/krebs_chapter_04_2013.pdf .

Jolly, G.M. 1969. Sampling methods for aerial census of wildlife populations. E. Afr. Agric. For. J. 34:46-49.