Aerial Wildlife Survey Report

Wildlife Management Unit 204 Aerial Ungulate Survey (2019)

Background

Paintearth Wildlife Management Unit 204 (WMU 204), in the Red Deer-North Saskatchewan Region, covers an area of 1,723.8 km^2, and includes Big Knife Provincial Park (244 ha). The WMU also has substantial badland formations throughout the Battle River, Bigknife Creek, and Paintearth Creek drainages. The central parkland is the predominant subregion in the WMU, with a smaller portion of northern fescue occurring in the southeast. The WMU is dominated by agriculture and is primarily deeded land with limited Crown parcels. No First Nations reserves are present in WMU 204.

A survey for ungulates (mule deer, white-tailed deer, and moose) was last conducted for WMU 204 in 2003 using the random stratified block methodology (Random Block). See Table 1 for previous ungulate survey estimates for WMU 204.

The objective of the December 2018 survey was to assess the status of the ungulate population in WMU 204 by determining estimates for abundance, density and age-sex composition. We also recorded observations of additional species of game management or conservation concern including carnivores, game birds, and sensitive or At Risk species.

Survey Method

The transect survey was conducted flying 33 north-south lines at 1.6 kilometre intervals, with 50% coverage (800 metre wide survey strip) from Dec 19 to 21, 2018 for a total survey effort of 1082.2 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; #/km^2) 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).

A correction factor for detectability (estimated at 83%; Habib et al. 2012) can be applied to white-tailed deer and mule deer population estimates in the Parkland for strip widths of 400 metres; since strip widths were double that of Habib et al. (2012), a correction factor for detectability was applied at 66% and estimates adjusted accordingly. No correction factor was applied for moose population estimates. 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=sq root variance, and variance=$N*(N-n)/(n*(n-1))*(\sum x^2+R^2*\sum z^2-2*R*\sum xz)$ 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 480 mule deer were observed in 86 groups. The estimated density was 0.74 deer/km^2 (90% CI 0.58 – 0.90) and the estimated abundance was 1,286 individuals (90% CI 1,008 – 1,564). The coefficient of variation for both density and abundance was 0.13 (Table 2). A total of 477 mule deer were successfully classified and the buck:doe:fawn ratio was estimated to be 42:100:61. That results in an estimated 2018/2019 early winter mule deer population of 266 buck, 634 doe, and 386 fawn. Of the 98 mule deer bucks classified:

- 26 (27%) were classified ‘small’
- 39 (40%) were classified ‘medium’
- 33 (33%) were classified ‘large’.

White-tailed Deer

A total of 260 white-tailed deer were observed in 68 groups. The estimated density was 0.37 deer/km^2 (90% CI 0.28 – 0.46) and the estimated abundance was 637 individuals (90% CI 486 – 788). The coefficient of variation for both density and abundance was 0.14 (Table 2). A total of 237 white-tailed deer were successfully classified and the buck:doe:fawn ratio was estimated to be 26:100:52. That results in an estimated 2018/2019 early winter white-tailed deer population of 93 buck, 358 doe, and 186 fawn. Of the 35 white-tailed deer bucks classified:

- 17 (49%) were classified ‘small’
- 15 (43%) were classified ‘medium’
- 3 (9%) were classified ‘large’.

Moose

A total of 116 moose were observed in 49 groups. The estimated density was 0.13 moose/km^2 (90% CI 0.095 – 0.17) and the estimated abundance was 232 individuals (90% CI 164 – 299). The coefficient of variation for both density and abundance was 0.17 (Table 2). A total of 116 moose were successfully classified and the bull:cow:calf ratio was estimated to be 67:100:85. That results in an estimated 2018/2019 early winter moose population of 61 bull, 92 cow, and 78 calf.

Elk were not observed in WMU 204 during the survey.

Table 1. Historical ungulate survey estimates for WMU 204. Estimates include number of individual ungulates, density and age-sex composition ratios. Trend, Random Block, and Transect methods have been used. Ranges in parentheses represent 90% confidence limits.

Species	Survey Year	Survey Method	Abundance Estimate	Density	Ratio to 100 females	
			Mean (90% CI)	Sq. km	Males	Young
Mule Deer	**2018**	**Transect**	**1,286 (1,007-1,564)**	**0.74**	**42**	**61**
	2003	Random Block	1,376 (1,002-1,750)	0.8	27	42
	1998	Random Block	1,577 (1,028-2,126)	0.91	NA	NA
	1991	Trend	480	0.28	NA	NA
White-tailed Deer	**2018**	**Transect**	**637 (486-788)**	**0.37**	**26**	**52**
	2003	Random Block	2,005 (1,498-2,512	1.16	26	57
	1998	Random Block	2,069 (1,607-2,532)	1.20	NA	NA
	1991	Trend	970	0.58	NA	NA
Moose	**2018**	**Transect**	**232 (164-299)**	**0.13**	**67**	**87**
	2003	Random Block	72 (23-121)	0.04	26	42

Table 2. Transect analysis results for the December 2018 aerial ungulate survey in WMU 204 (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	86	5.6	0.74 (0.58-0.90)	0.095	0.129	1,286 (1,007-1,564)	165.30	0.129
White-tailed Deer	68	3.8	0.37 (0.28-0.46)	0.052	0.141	637 (486-788)	89.73	0.141
Moose	49	2.4	0.13 (0.09-0.17)	0.023	0.174	232 (164-299)	40.23	0.174

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 .

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