Aerial Wildlife Survey Report

Wildlife Management Unit 216 Aerial Ungulate Survey (2019)

Background

Dickson Wildlife Management Unit 216 (WMU 216), in the Red Deer-North Saskatchewan Region, covers an area of 1,090 km^2, and includes Glennifer Reservoir and Red Lodge Provincial Park. The WMU has portions of the Little Red Deer and Red Deer River and adjoining creeks (e.g. Eagle creek), is located primarily within the Central Parkland subregion of the province, and primarily comprises deeded land. No First Nations reserves are present in WMU 216.

A survey for ungulates was last conducted for WMU 216 in 1995 using the random stratified block methodology (Random Block). See Table 1 for previous ungulate survey estimates for WMU 216.

The objective of the February 2019 survey was to assess the status of the ungulate population in WMU 216 by determining estimates for abundance, density and age-sex composition for mule deer, white-tailed deer and moose as well as minimum total count for elk. 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 20 east-west lines at 1.6 kilometre intervals, with 25% coverage (400 metre wide survey strip) on February 5, 2019 for a total survey effort of 668 kilometres. At each observation point, ungulates were classified by species, and when possible, determined sex and age was 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 400 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=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. A minimum total count for elk was recorded.

Results

Mule Deer

A total of 90 mule deer were observed in 15 groups. The estimated density was 0.34 mule deer/km^2 (90% CI 0.18 – 0.5) and the estimated abundance was 367 individuals (90% CI 189 – 545). The coefficient of variation for density and abundance was 0.28 (Table 2). All mule deer were classified, although due to date of survey some males may have shed antlers, and the buck:doe:fawn ratio was estimated to be 74:100:63.

Of the 28 mule deer bucks classified:

- 5 (18%) were classified ‘small’
- 14 (50%) were classified ‘medium’
- 9 (32%) were classified ‘large’

White-tailed Deer

A total of 213 white-tailed deer were observed in 38 groups. The estimated density was 0.80 white-tailed deer/km^2 (90% CI 0.5 – 0.11) and the estimated abundance was 868 individuals (90% CI 545 – 1,192). The coefficient of variation for density and abundance was 0.22 (Table 2). A total of 193 white-tailed deer were successfully classified, although due to date of survey some males may have shed antlers, and the buck:doe:fawn ratio was estimated to be 9:100:59.

Of the 10 white-tailed deer bucks classified:

- 3 (30%) were classified ‘small’
- 7 (70%) were classified ‘medium’

Moose

A total of 39 moose were observed in 22 groups. The estimated density was 0.15 moose/km^2 (90% CI 0.07 – 0.23) and the estimated abundance was 159 individuals (90% CI 80 – 238). The coefficient of variation for density and abundance was 0.29 (Table 2). A total of 35 moose were successfully classified and the bull:cow:calf ratio was estimated to be 85:100:85.

Elk

A total of 24 elk were observed in three groups (four bull, 15 cow, five calf).

Table 1. Historical ungulate survey estimates for WMU 216. Estimates include number of individual ungulates, density and age-sex composition ratios. 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	**2019**	**Transect**	**367 (189-545)**	**0.34**	**74**	**63**
	1995	Random Block	663 (413-913)	0.64	14	54
White-tailed Deer	**2019**	**Transect**	**868 (545-1,192)**	**0.80**	**9**	**59**
	1995	Random Block	442 (371-513)	0.42	12	58
Moose	**2018**	**Transect**	**159 (80-238)**	**0.15**	**85**	**85**
	1995	Random Block	175 (116-234)	0.17	5	49

Table 2. Transect analysis results for the 2019 aerial ungulate survey in WMU 216 (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	15	6.0	0.34 (0.18-0.50)	0.089	0.28	367 (189-545)	103.14	0.28
White-tailed Deer	38	5.6	0.80 (0.50-0.11)	0.042	0.22	868 (545-1,192)	187.07	0.22
Moose	22	1.7	0.15 (0.07-0.23)	0.008	0.29	159 (80-238)	45.97	0.29

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.