

Aerial Wildlife Survey Report

Wildlife Management Unit 104 Aerial Ungulate Survey (2021)

Background

Aden Wildlife Management Unit 104 (WMU 104) covers an area of 1,024.4 km² and includes Writing-on-Stone Provincial Park (WMU 718; 26.9 km²). The WMU has substantial hoodoo formations and coulee habitat along the Milk River and adjoining creeks (e.g. Red, Police, Dickson, and Deer) as well as native upland habitat. The WMU contains mostly dry mixed-grass and small portions of mixed-grass subregions. The WMU contains large expanses of native grassland and agriculture, which is primarily privately owned or grazing lease land.

Hunter harvest in WMU 104 is currently managed using a special licence draw for antlered and antlerless mule deer, antlerless white-tailed deer, and elk. A special licence draw is also used to manage antlered mule deer in the archery only season. Antlered and antlerless white-tailed deer and antlerless mule deer general archery licences are available for purchase. Landowner licences for mule deer and elk are also available to eligible residents.

A survey for mule deer was last conducted for WMU 104 in 2008 using the random stratified block methodology (Random Block) and at that time abundance was estimated to be 1,392 (see Table 1 for more details on previous ungulate survey estimates).

The objective of the February 2021 survey was to assess the status of the deer population in WMU 104 by determining estimates for abundance, density and age-sex composition. Observations were also recorded for additional species of game management or conservation concern including moose, pronghorn, carnivores, game birds, and sensitive or At Risk species.

Survey Method

The transect survey was conducted flying 13 east-west lines at 1.6 km intervals, with 50% coverage (800 m wide survey strip) from February 10-11, 2021 for a total survey effort of 570.4 km. Survey conditions were excellent for snow cover and visibility. Observers counted all mule deer, white-tailed deer, moose and elk within 400 meters of each side of the aircraft (Bell 206 L4). At each observation point, ungulates were classified by species, and when possible, determined sex and age – though extreme cold conditions reduced age and sex classification at times, to limit animal stress. Because transects varied in length (see Krebs 2014, Jolly 1969), the average density (R ; #/km²) of mule deer and white-tailed deer was calculated by summing the total animals counted per transect ($\sum x$) by total area searched (length of transects multiplied by 800 m 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 $SE = \text{sq root variance}$, 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. It was assumed that 100% of deer were detected within the 800 m survey strip, based on the sightability found in previous deer surveys conducted in the grassland natural region and to provide a conservative estimate of the deer population.

Results

Mule Deer

A total of 708 mule deer were observed in 55 groups (Table 2). The estimated density was 1.55 mule deer/km² (90% CI 1.17 – 1.93) and the estimated abundance was 1,589 individuals (90% CI 1,201 – 1,977; CV = 13.7%). A total of 429 mule deer were successfully classified and the buck:doe:fawn ratio was estimated to be 93:100:76.

White-tailed Deer

A total of 1,132 white-tailed deer were observed in 62 groups (Table 2). The estimated density was 2.48 deer/km² (90% CI 1.66 – 3.30) and the estimated abundance was 2,541 individuals (90% CI 1,697 – 3,385; CV = 18.6%).

A total of two moose and 1,345 pronghorn were observed during the survey, though no elk were observed. In addition, two short-eared owls, seven golden eagles, 361 sharp-tailed grouse, and 84 coyotes were observed.

Table 1. Historical ungulate survey estimates for WMU 104 using the Random Block method. Estimates include number of individual ungulates, density and age-sex composition ratios. 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	2008	Random Block	1,392 (1,086 - 1,698)	1.35	70	67
	2000	Random Block	724 (486 - 962)	0.72	NA	NA
	1997	Random Block	613 (NA)	0.60	94	55
	1994	Random Block	799 (NA)	0.78	36	75
White-tailed Deer	2000	Random Block	389 (88 - 691)	0.39	NA	NA

Table 2. Transect analysis results for the 2021 aerial ungulate survey in WMU 104 (D = estimated # individuals/km², N = estimated abundance, CI = 90% confidence interval, SE = standard error, CV = coefficient of variation).

Species	Number of Groups	Mean Group Size	D (90% CI)	N (90% CI)	SE _N	CV _N
Mule Deer	55	5.0	1.55 (1.17-1.93)	1,589 (1,201-1,977)	217.9	0.137
White-tailed Deer	62	9.1	2.48 (1.66-3.30)	2,541 (1,697-3,385)	473.30	0.186

Literature

Krebs, C.J. 2014 Ecological Methodology, 3rd Edition. Chapter 4, Estimating Abundance: Quadrat Counts [online] https://www.zoology.ubc.ca/~krebs/downloads/krebs_chapter_04_2017.pdf .

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