

Aerial Wildlife Survey Report

Wildlife Management Unit 106 Aerial Ungulate Survey (2021)

Background

The Verdigris Wildlife Management Unit 106 (WMU 106) covers an area of 3,078.9 km² and includes the Etzikom Coulee and Verdigris Coulee systems with associated creeks, lakes and reservoirs. The WMU is almost entirely dry mixed-grass with some mixed-grass subregions along the west edge, near Highway 4. The WMU is mostly comprised of agricultural land and is primarily deeded land.

Hunter harvest in WMU 106 is currently managed using a special licence draw for antlered and antlerless mule deer and antlerless white-tailed deer. Antlered and antlerless white-tailed deer and mule deer general archery licences are available for purchase. Landowner licences for mule deer are also available to eligible residents.

A survey for mule deer was last conducted for WMU 106 in 2008 using the random stratified block methodology (Random Block) and at that time mule deer abundance was estimated to be 729 individuals (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 populations in WMU 106 by determining estimates for abundance, density and age-sex composition. Observations were also recorded for additional species of game management or conservation concern including elk, moose, pronghorn, carnivores, game birds, and sensitive or At Risk species.

Survey Method

The transect survey was conducted flying 23 east-west lines at 1.6 km intervals, with 50% coverage (800 m wide survey strip) from February 9-12, 2021 for a total survey effort of 1,638 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, sex and age was recorded - though extreme cold conditions reduced observers ability, at times, to classify age and sex to limit animal stress. 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) or large (antlers with ≥ 4 points, antlers outside of ears). Though some antler drop in male deer was evident so sex classification should be regarded with caution. 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 736 mule deer were observed in 56 groups (Table 2). The estimated density was 0.56 mule deer/km² (90% CI 0.44 – 0.69) and the estimated abundance was 1,730 individuals (90% CI 1,343 – 2,117; CV = 13.0%). A total of 503 mule deer were successfully classified and the buck:doe:fawn ratio was estimated to be 45:100:45. Of the 113 mule deer bucks classified, 33 (28%) were classified 'small', 26 (22%) 'medium', and 54 (46%) 'large' with the remaining 5 (4%) unclassified.

White-tailed Deer

A total of 1,569 white-tailed deer were observed in 73 groups (Table 2). The estimated density was 1.20 deer/km² (90% CI 0.96 – 1.44) and the estimated abundance was 3,687 individuals (90% CI 2,944 – 4,430; CV = 11.7%).

A total of 1,697 pronghorn were observed during the survey and no elk or moose were observed. Other species observed include six short-eared owls, 95 sharp-tailed grouse, seven red fox, five golden eagles, two snowy owls and 94 coyotes.

Table 1. Historical ungulate survey estimates for WMU 106 using the Random Block method. Estimates include number of individual ungulates, density and age-sex composition ratios. Ranges in parentheses represent 90% confidence intervals.

Species	Survey Year	Survey Method	Abundance Estimate	Density	Ratio to 100 females	
			Mean (90% CI)	Sq. km	Males	Young
Mule Deer	2008	Random Block	729 (542 - 916)	0.24	45	38
	2002	Random Block	194 (NA)	0.06	NA	NA
	1997	Random Block	186 (NA)	0.06	117	58
	1995	Random Block	143 (NA)	0.05	68	58
	1993	Random Block	129 (NA)	0.04	16	70

Table 2. Transect analysis results for the 2021 aerial ungulate survey in WMU 106 (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	56	4.8	0.56 (0.44 - 0.69)	1,730 (1,343 - 2,117)	225.44	0.13
White-tailed Deer	73	9.6	1.20 (0.96 - 1.44)	3,687 (2,944 - 4,430)	432.79	0.12

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.