Aerial Wildlife Survey Report
Wildlife Management Unit 118 Aerial Ungulate Survey (2019)

Background

Alberta Wildlife Management Unit (WMU) 118 is located in southeast AB, south of the Cypress Hills Interprovincial Park and north of secondary highway 501. It is bounded on the east side by the AB/SK border and to the west by secondary highway 889, which passes by the hamlet of Manyberries. This WMU is dominated by native dry mixed-grass prairie with extensive silver sagebrush communities. It also contains numerous permanent and intermittent watercourses forming sinuous steep to rolling valley complexes. The majority of the WMU contains very little tree cover. It is considered one of the premier mule deer units in Alberta due to it being dominated by large blocks of high quality native habitat with relatively low human impacts. Land ownership is dominated by provincially owned Public Land under grazing lease, and cattle ranching is the primary human land use in the area. The total area of the WMU is 1964 km^2.

The established pre-hunting season population goal for WMU 118 is 2475 mule deer. Mule deer harvest in WMU 118 is currently managed using a special license draw for antlered and antlerless mule deer, antlerless white-tailed deer, elk, and moose. During the archery only season, antlered white tail deer and mule deer are hunted with general licenses, which are available without the requirement of a Special License obtained through the draw process. Landowner licenses for mule deer and elk are also available to eligible residents.

This WMU was last surveyed in 2013. Results from that survey provided a population estimate above the WMU goal with an estimated population of 3040 mule deer with a ratio of 30 bucks and 45 fawns per 100 does.

Survey Method

An Aerial Ungulate Survey (AUS) of WMU 118 was conducted on Feb 16, 17, and 18, 2019. The survey followed Alberta's Aerial Ungulate Survey Protocol using a distance sampling design, where each minute of latitude was surveyed via 26 total transects, which totalled 1058.6 km of transect. This was the first use of this methodology for open country mule deer in Alberta. Highland helicopters 206B jet ranger equipped with bubble windows and a Global Positioning System (GPS) enabled Apple IPad with the Avenza maps application were used to fly and navigate the survey. Survey conditions were excellent (10/10) for snow cover and visibility. On days one and two of the survey, all of the odd transect lines were flown and all mule deer groups were classified to age, sex, and antler size. On day three of the survey all even transects were flown, but groups were only counted and not classified due to time constraints. A total of 167 groups were observed on the entire survey out to a distance of 1464m from the aircraft. The estimated strip width (ESW), for the survey before truncation was determined to be 505m, which is the distance at which a survey with imperfect detection and ESW equal to X effectively covers the same area as a study with perfect detection out to a distance of X.

Results

On days one and two, a total of 746 mule deer were observed resulting in 42 small, 103 med, 84 large bucks, 311 does, and 206 fawns. An additional 950 mule deer were observed on the 3rd day of the survey, for a minimum total count of 1696 mule deer. These observations would result in a ratio of 74 bucks:100 does:66 fawns.

The Half Normal – Cosine, Hazard, Negative Exponential, and Uniform models were fit to the data and the Half Normal Cosine was selected as the best fit based on Akaike Information Criterion (AIC) scores. However

Alberta

Buckland (2001) recommends that survey designs whose transects overlap are not recommended, and that the furthest 5-10% of data may need to be truncated. The Half Normal Cosine Truncation 10% model included all observations to a distance of 912m which did not overlap with the transects given that transects were spaced one minute of latitude or one nautical mile – 1840m apart (1600*1.15=1840m). This results in a detection function that was < 1/ 2 of the transect strip width = 920m.   It was noted however, that surveying on day 1 and 2 likely moved deer onto even numbered transect lines, which could explain why there were 746 deer seen on the odd lines, and 950 seen on the even lines. The population estimate for mule deer was determined using an ESW (truncated) 481.4m, based on 150 observations, with a max distance of 911.6m.
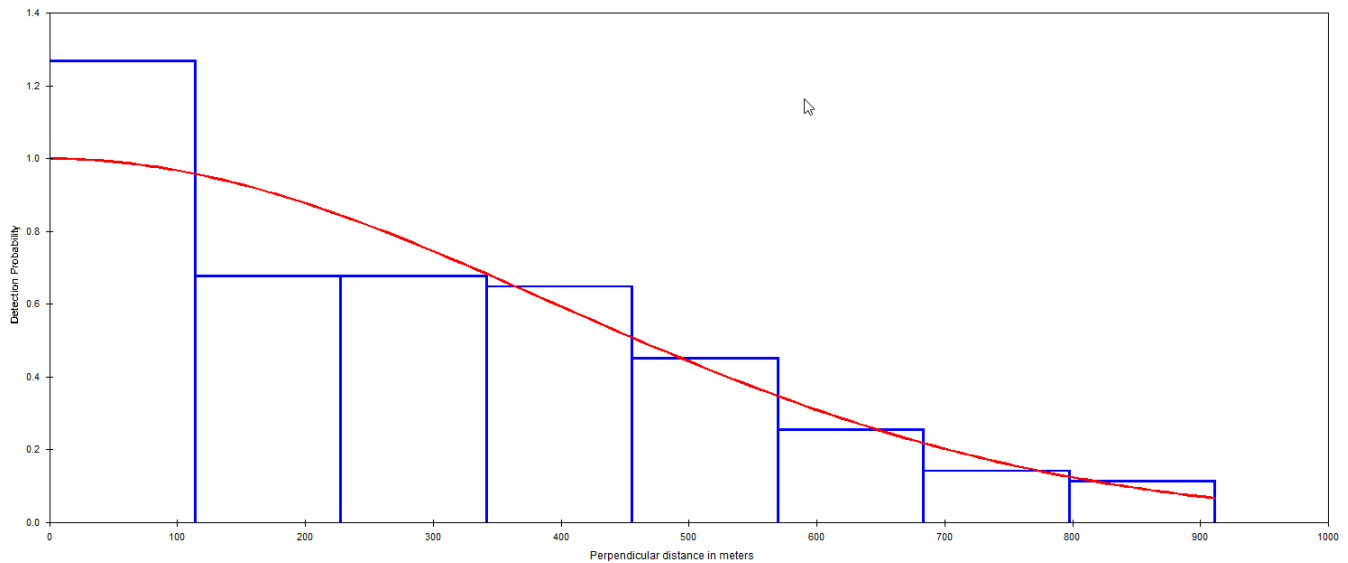

Figure 1. Count of Groups by Distance categories with right truncation 10%.

The encounter rate was 0.1417 (13.4% CV) groups per km of transect and 90% CI was 0.11289-0.17786 mule deer per km. Average cluster size was 9.95 mule deer per group (90% CI 8.8-11.1). The final density estimate was 1.1814 mule deer per km^2 CV 17.15 (CI 0.88925-1.5697) with a total population estimate of 2320 CV 17.15, (CI 1746-3082). Based on this number, WMU 118 is considered to be very close to the management goal and does not require significant adjustment of antlerless tag allocations at this time. The Alberta Mule deer management plan calls for a late winter ratio of 29 bucks and 60 fawns per 100 does. Current population structure in the WMU greatly exceeds the buck to doe ratio, and surplus bucks are available for harvest. Additionally considering the establishment of Chronic Wasting Disease (CWD) in the mule deer in the WMU, increased buck harvest is recommended to decrease the spread of CWD (Western Association of Fish and Wildlife Agencies, 2017).

Alberta

Classification: Public

Table 1 Mule Deer Population Estimate, Density, and Sex Ratios for WMU 118.

Species	Survey Year	Survey Method	Abundance Estimate	Density	Ratio to 100 Does	
			Mean (90% CI)	Sq. km	Bucks	Fawns
Mule Deer	2018/19	Distance	2320 CV 17.15, (CI 1746-3082).	1.1814	74	66

Further data analysis is warranted to compare this methodology to:
1. Strip transect methods,
2. Multi WMU strata analysis,
3. Within WMU post habitat stratification
4. Inclusion of covariate analysis for the following covariates that were collected: deer activity, snow cover, topography, vegetation type, canopy cover, and rear observer.

During the survey, two large groups of elk were seen totalling 534 animals. Cypress Hills Interprovincial Park and the north side of the Cypress Hills just into WMU 119 were also flown opportunistically during transit to the airport to detect elk, which resulted in the observation of two more groups of elk totalling 34 animals. This resulted in a minimum total count of 568 elk observed during the survey. Classification from photos resulted in 388 cows, 124 calves, and 56 bulls. This data results in a ratio of 32 calves: 100 cows: 14 bulls. While it is likely there were undetected elk to the east in the province of Saskatchewan, this likely represents the majority of the Cypress Hills elk herd. Bull elk detection was limited to mainly small bulls with 46 small, nine medium, and one large bull observed. It is likely a bachelor herd of bulls was not detected considering the low bull to cow ratio and hunter observations of a number of branch antlered bulls submitted during the previous hunting season. These results suggest the Cypress Hills elk herd will be at or slightly above the management goal of 700 animals after spring calving in 2019. Changes to elk harvest will be pursued in order to increase antlerless elk harvest in Alberta.

Table 2 Elk observed in WMU 118 and Cypress Hills Interprovincial Provincial Park, Alberta

Species	Survey Year	Survey Method	Abundance Estimate	Density	Ratio to 100 Cows	
				Sq. km	Bulls	Calves
Elk	2018/19	Minimum total count	568	0.29	14	32

Throughout the survey, ten moose were observed. These consisted of three cows, two calves, and one bull with an additional four moose observed but not accurately classified. Further observation of 27 White-tailed deer also occurred. These animals consisted of 16 does and 11 fawns. No bucks were observed. All remaining ungulate observations consisted of six groups of pronghorn totalling 188 animals. No attempt at classification of pronghorn was made.

Other notable observations during the survey included three greater sage-grouse and two large raptor nests that were likely one golden eagle and one ferruginous hawk.

Literature

T. Buckland, S & R. Anderson, D & P. Burnham, K & Laake, Jeffrey & Borchers, David & Thomas, Len. Introduction to Distance Sampling: Estimating Abundance of Biological Populations. Oxford University Press. 2001.

Western Association of Fish and Wildlife Agencies. 2017. Recommendations for Adaptive Management of Chronic Wasting Disease in the West. WAFWA Wildlife Health Committee and Mule Deer Working Group. Edmonton, Alberta, Canada and Fort Collins, Colorado, USA.