Aerial Wildlife Survey Report

WMU 203 Aerial Ungulate Survey – 2018

Background

An aerial ungulate survey in WMU 203 was last conducted in March 2003 using a random stratified block methodology. The 2003 population estimate for mule deer, white-tailed deer and moose was 1993 (90% C.I. = 23.1%); 1361 (90% C.I. = 57%); 272 (90% C.I. = 38.1%), respectively (Moore 2003).

In 2017, the archery only season ran from September 1 to October 31 for all three ungulate species. A General Licence for antlered and antlerless white-tailed deer and Special Licences for antlered and antlerless mule deer, moose, and antlered elk ran from November 1 to 30. A Special License for antlerless elk ran from November 1 to January 20. Elk seasons were combined with WMU's 200, 202, 203, 232, and 234.

Hunter harvest data for Special Licences indicate three-year average success as follows: antlered moose 100%, antlerless moose 90%, antlered mule deer 64%, antlerless mule deer 52%, antlered elk 30%, and antlerless elk 24%.

The objectives of this survey were to assess the status of mule deer, white-tailed deer and moose populations in WMU 203, and to determine a population estimate for these species based on density estimates, and a population split for sex and age classes of all three species.

Survey method

The transect survey was conducted flying east-west lines at 1.6 kilometre (1 mile) intervals, with 50% coverage (800 metre wide survey strip) from January 15 to 18, 2018. At each observation point, we counted ungulates by species, and when possible, we determined sex and age. We classified antler size for deer 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). Because transects varied in length (see Krebs 2014, Jolly 1969), we calculated the average density (R; #/km^2) of mule deer, white-tailed deer, and moose by summing the total animals counted per transect (∑x) by total area searched (length of transects multiplied by 800 metre survey strip [∑z]).

For a population estimate (unequal sized units, sampling without replacement), we multiplied the average density (R) by the overall area of the WMU (Z). A correction factor for detectability (estimated at 83%; Habib et al. 2012) can be applied to WTDE and MUDE density and population estimates in the Parkland for strip widths of 400 metre; since strip widths were double that of Habib et al. (2012), we set a correction factor for detectability at 66% and adjusted estimates accordingly. No correction factor was applied for moose population estimates.

We calculated the width of the 90% confidence interval by multiplying the t statistic for the left-tailed inverse of the Student's t-distribution, (t0.05,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))*(∑x2+R2*∑z2-2*R*∑xz) with N as the total number of possible transects given 100% coverage, and n as the number of transects sampled.

Alberta

Results

We surveyed 54 transects from January 15 to 18, 2018 for a total survey effort of 1484 kilometres. In total, we observed 679 mule deer from 107 groups. Of the 657, mule deer that were classified to age and sex, 131 (20%) were bucks, 304 (46%) were does, and 222 (34%) were fawns. Of the 131 mule deer bucks classified, 54 (41%) were classified 'small', 38 (29%) 'medium', and 39 (30%) 'large'. The buck:doe and fawn:doe ratios were .43 and .74, respectively. The final density estimate was 0.76/km^2 with a 90% confidence interval of (0.67, 0.85). This corresponds to a 90% confidence interval that is +/- 12% of the density estimate. The estimated mule deer abundance is 1836 (1616, 2056). We estimated the 2017/18 winter population of mule deer to be 367 buck, 845 doe, and 624 fawn.

We observed 281 white-tailed deer from 62 groups. Of the 252 white-tailed deer that were classified, 31 (12%) were bucks, 140 (56%) were does, and 81 (32%) were fawns and 29 were unclassified. Of the 31 bucks classified, nine (29%) were 'small', 19 (61%) 'medium'; and three 'large' (10%). The buck:doe and fawn:doe ratios were 0.22 and 0.58, respectively. The final density estimate was 0.32/km^2 with a 90% confidence interval of (0.23, 0.41). This corresponds to a 90% confidence interval that is +/- 27% of the density estimate. The estimated white-tailed deer abundance is 760 (555, 965). We estimated the 2017/18 winter white-tailed deer population to be to be 91 buck, 426 doe, and 243 fawn.

We counted 231 moose from 95 groups. Of the 229 moose that were classified to age and sex, 56 (24%) were bulls, 94 (41%) were cows, and 79 (35%) were calves. The bull:cow and calf:cow ratios were 0.60 and 0.84, respectively. The final density estimate was 0.19/km^2 with a 90% confidence interval of (0.15, 0.23). This corresponds to a 90% confidence interval that is +/- 21% of the density estimate. The estimated moose abundance is 466 (366, 566). We estimated the 2017/18 winter moose population split to be 113 bull, 189 cow, and 159 calf.

We did not observe any elk during the survey.

Table 1. Previous density, and age/sex composition ratios for mule deer and white-tailed deer in WMU 203. Survey types have included random stratified block (RSB), and transect sampling methods. Ranges in parentheses represent 90% confidence limits where available.

Year	Survey type	Population estimate MuDE	Density MuDE/km^2	Buck:Doe	Fawn:Doe
1998	NA	1064	0.44	NA	NA
2003	RSB	1993 (1534, 2451)	0.83 (0.64, 1.02)	NA	NA
2018	Transect	1836 (1616, 2056)	0.76 (0.67, 0.85)	0.43	0.73

Year	Survey type	Population estimate WtDe	Density WtDe/km^2	Buck:Doe	Fawn:Doe
1998	NA	2294	0.96	NA	NA
2003	RSB	1361 (585, 2142)	0.57 (0.24, 0.89)	NA	NA
2018	Transect	760 (555, 965)	0.32 (0.23, 0.41)	0.22	0.58

Year	Survey type	Population estimate Moose	Density Moose/km^2	Buck:Doe	Fawn:Doe
1998	NA	70	0.03	NA	NA
2003	RSB	272 (169,375)	0.11(0.07, 0.16)	1	0.65
2018	Transect	466 (366, 566)	0.19 (0.15, 0.23)	0.60	0.84

Literature cited

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.

Habib, T. J., D. A. Moore, and E. H. Merrill. 2012. Detection and stratification approaches for aerial surveys of deer in prairie-parklands. Wildlife Research: https://www.researchgate.net/publication/277513894

Moore, D.A. 2003. WMU 203 Ungulate Survey, March 3 and 4, 2003. Alberta Sustainable Resource Development. Upublished report. (7 pp).

Alberta