2011 Wildlife Management Unit 516 moose and white-tailed deer

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Moose, a highly sought after ungulate species from both a hunter and "Watchable Wildlife" perspective, are one of the primary game species in Alberta. Ecologically, moose can exert a significant impact on wildlife habitat and are an important component of predator-prey systems (Arsenault 2000). Moose range commonly overlaps with that of white-tailed deer, mule deer, elk and woodland caribou. Provided food and cover are available, moose are well-adapted to boreal climate patterns (Franzmann and Schwartz 2007), although moose in the boreal area of northeast Alberta typically occur at low population densities (Lynch 1999). This, combined

with hunting pressure, predator pressure and habitat change, make understanding their population dynamics and distribution essential to the management of these populations.

White-tailed deer are also a primary game species with aesthetic value and have historically been found in low densities in the boreal forest (Fish and Wildlife 1995). Recruitment has been low, with harsh climatic conditions likely being the primary limiting factor on white-tailed deer populations. Hunting pressure has historically been low because of limited access in northern boreal areas. Human caused habitat alterations favouring early seral forest stages, along with linear development and relatively mild winters, have allowed white-tailed deer numbers to increase in recent years (Latham et al. 2011).

Aerial surveys for moose in this area are generally conducted on a 5 - 7 year rotation when possible. These surveys are designed to gather population data on the density, distribution, and age/sex classification of moose and other game species (ASRD 2010). Although surveys for white-tailed deer in this area have not historically been conducted, their increasing density and distribution and potential effects on wolf and woodland caribou populations make quantifying these changes important.

Study area

WMU 516 covers 3,980 km^2 of diverse habitat and landforms, situated in the northern boreal mixed-wood forest of Alberta (Figure 1). The WMU is bordered by the Athabasca River to the east, Secondary Highway 813 to the west, the Calling River to the south, and its northern border is the latitude of 55 degrees 59 minutes. WMU 516 includes portions of the communities of Calling Lake, Sandy Lake and Wabasca-Desmarais. The area along the Athabasca River falls within a "Key Wildlife and Biodiversity Zone", while much of the mid to northern portions of the WMU fall within the West Side of the Athabasca (WSAR) caribou range.

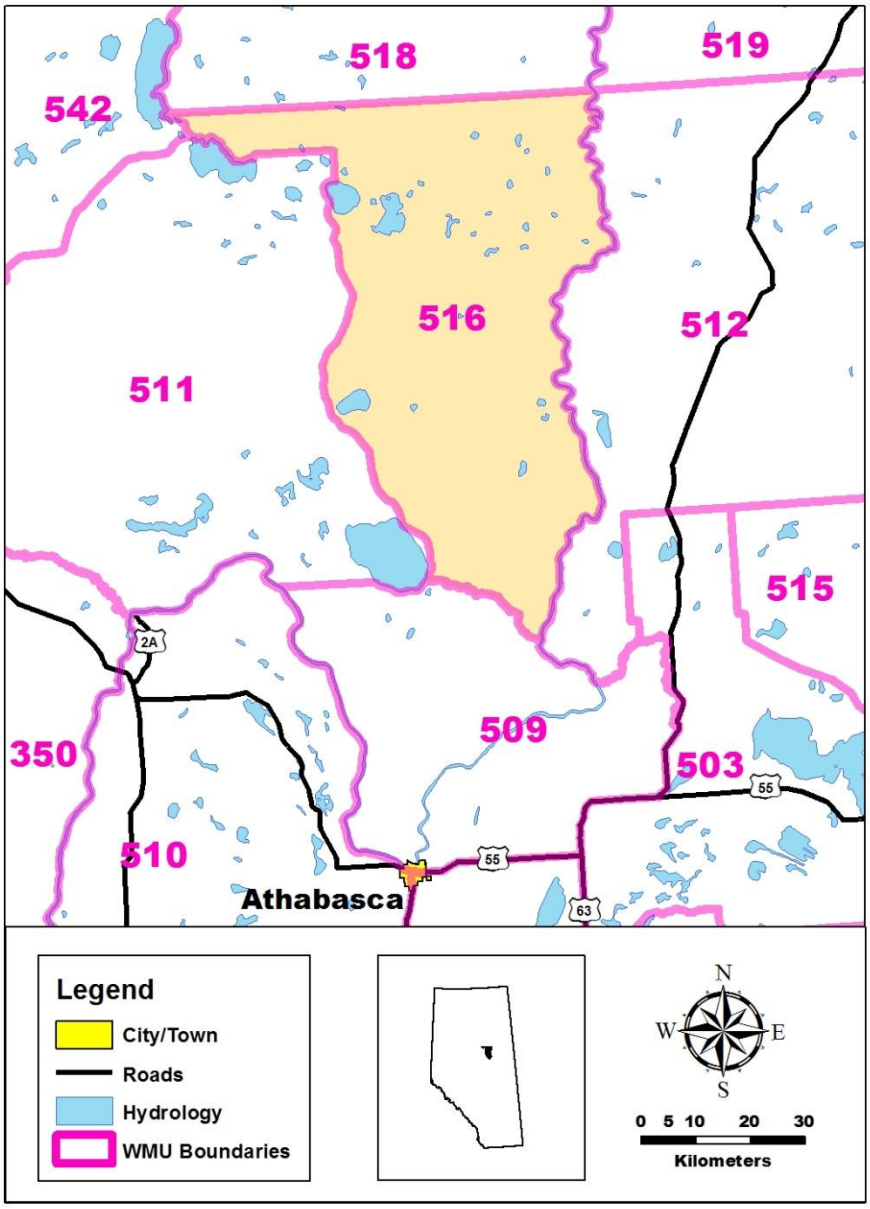

Figure 1. Location of Wildlife Management Unit 516 in Alberta.

Survey methods

Survey protocols are based on the modified Gasaway method (Gasaway et. al. 1986) and are outlined in the provincial "Aerial Ungulate Survey Protocol Manual" (ASRD 2010) which was followed for both the stratification and intensive survey block portions of the survey.

The WMU was stratified with a Cessna 185 fixed-wing aircraft for moose and white-tailed deer on 5, 7, 9, 10 January 2011. Wind conditions prohibited flying on 6 January, while snow and low ceilings grounded flights on 8 January and the morning of 9 January. All flights employed four crew members, including a pilot, a navigator in the front passenger seat, and two observers in the rear seat.

Data from the stratification flights were used to categorize the animal density of the WMU into 83 sampling blocks (5 degrees latitude x 5 degrees longitude) classified into low, medium, or high strata. This classification was based on moose and deer density, with water features omitted from the land area. The assignment of the survey blocks into strata was based on natural breaks in the data, with roughly 20% of the blocks in each of the low and high categories, with adjustments made according to results for individual species.

Fifteen of the survey blocks, 5 from each stratum, were randomly selected for the intensive survey block flights. Survey blocks were flown in an east/west direction on 11 - 13 January in a Bell 206B helicopter. Following the helicopter survey, these data were compiled and entered in the Quadrat Survey Method Program (Lynch 1999), and a population estimate and confidence intervals determined.

Age (juvenile vs. adult) and sex classification were obtained wherever possible for all moose and white-tailed deer encountered. Bulls and bucks were identified by the presence of antlers; cows were confirmed by the presence of a white vulva patch or calf at foot; while does and fawns were assumed to be those animals without antlers and were classified according to their size. Antler classification (ASRD 2010) was also recorded. All other wildlife sightings were recorded during the survey and a GPS waypoint taken. We did not correct for sightability; therefore, overall counts should be considered as minimum population estimates and direct comparisons of survey results among years may be difficult.

Snow conditions were good with fresh snow having fallen in the 3 days prior to the survey, although a fairly thick layer of snow was present on most trees. Temperatures ranged from -2 to -20 degrees Celsius during the stratification flights and -21 to -24 degrees Celsius during the intensive survey block flights. Wind speeds were generally calm, ranging from 13 - 32 km/h for both portions of the survey.

Results

For the intensive survey block flights, 15 blocks were flown for moose (5 low, 5 medium and 5 high) and the total moose population estimate was calculated to range from 671 to 1,195 (Table 1). Although the population variance (28.1%) was fairly high, it is not uncommon for northern WMUs, with less dense populations, to be in this range. The results of this survey suggest that the moose population in WMU 516 is increasing to a stable population (Table 1). The mean population estimate is higher than the previous survey but the difference is not statistically significant as the confidence intervals overlap. While the results of the 2011 survey are similar to the 1994 results, the population trend appears to have decreased sharply in 1998 and then increased in 2003. Caution should be used in interpreting these trends, as the population variance for each survey is large enough that results of all surveys overlap.

For the intensive survey block flights, 15 blocks were flown for white-tailed deer (5 low, 5 medium and 5 high) and the total white-tailed deer population estimate was calculated to range from 1,401 to 2,311 (Table 1). The sex/age classification is not reported for white-tailed deer as only a very small proportion of animals were observed with antlers. This was likely due to significant antler drop and not necessarily low buck numbers, as this was also the case in survey blocks with low hunting pressure (limited road access). If antler drop is indeed the reason for low buck counts, then does would be significantly overestimated (some bucks classified as does), which would underestimate the ratio of fawns to does.

The delays that occurred during the stratification flights and the temperature changes (-24 to -2 degrees Celsius) may have contributed to animal movement between survey blocks and/or differences in animal behavior. This may have resulted in differences in sightability between the stratification flights and the intensive survey block flights. The decision was made not to fly additional survey blocks in an attempt to reduce the variability, because of the time delay.

Table 1. Comparison of aerial survey results for moose and white-tailed deer in Wildlife Management Unit 516 from 1994 - 2011.

Species/Year	Population estimate (90% confidence limits)	Animals/km^2	Ratio to 100 Females	
			Males	Juveniles
Moose				
2011	933 (±28.1%)	0.26	32	45
2003	751 (±15.5%)	0.19	86	76
1998	493 (±43.0%)	0.12	50	41
1994	919 (±30.4%)	0.28	44	46
White-tailed deer				
2011[a]	1,856 (±24.5%)	0.49	--	--

[a] No data from previous years is available for comparison.

"--" Demographic ratios could not be accurately obtained due to the small sample size collected.

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