

2010 Wildlife Management Unit 501 moose and deer



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Moose and white-tailed deer are the primary big game species in WMU 501, providing recreational hunting opportunities and subsistence for many residents. Mule deer are also harvested within the WMU but occur at low densities. The objective of this survey was to obtain a moose population estimate for WMU 501 and compare the result with past estimates and surrounding WMUs. Aerial ungulate surveys provide population and density estimates, distribution patterns, and habitat-use data implemented in determining hunting license allocations. When conducted at regular intervals of every 3 years (ASRD 2010), surveys also offer valuable data for assessing ungulate and other wildlife population trends, in addition to providing an aerial appraisal of natural and anthropogenic changes occurring on the landscape. Although the purpose of the survey

was to inventory moose, the timing of the survey allowed for collection of valuable information on distribution and population levels for white-tailed deer and mule deer.

Study area

WMU 501 lies within the dry mixedwood subregion of the boreal forest natural region (Natural Regions Committee 2006). It has an area just over 2,100 km², it lies southwest of Cold Lake and is bordered by Saskatchewan to the east (Figure 1). Agriculture is predominant throughout much of the unit, however, several tracts of mixedwood stands occur north of Highway 55 and along the Saskatchewan border. Substantial water bodies within the WMU include Cold and Muriel lakes and several medium-sized lakes in the northern portion attract recreationalists. Quality riparian areas occur along the Beaver River and provide key summer and winter ungulate habitat. Urban centres include Bonnyville and Cold Lake, as well as several small communities and summer villages, which are dispersed throughout the unit. Portions of the WMU held under federal jurisdiction include Cold Lake First Nations and Kehewin First Nations Reserves, and Department of National Defence 4 Wing Cold Lake. Oil and gas extraction activities are common with abundant oilfield and related traffic through much of the area.

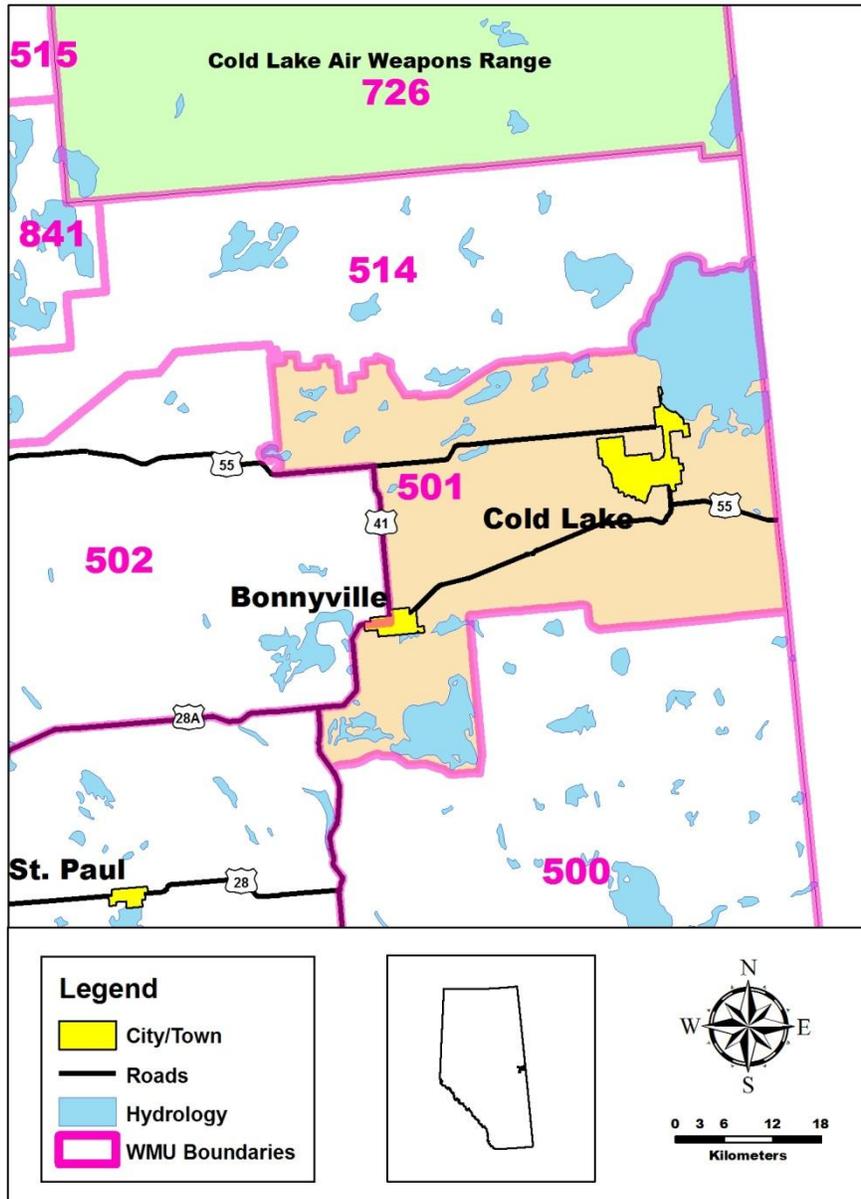


Figure 1. Location of Wildlife Management Unit 501 in Alberta.

Survey methods

WMU 501 was stratified for moose densities (Gasaway et al. 1986; ASRD 2010) using a Cessna 206 fixed-wing aircraft on 5 – 6 January 2010. Flight maps to aid in navigation were prepared using ArcGIS 9. A one minute latitudinal grid was overlaid on the WMU. Stratification lines were flown on the half-minute such that observations along a flight line would not straddle two sampling units. Approximate altitude and ground speed during the flights were 100 - 150 m above ground level (AGL) and 180 km/h respectively, allowing observers to detect animals within 200 m on either side of the aircraft. Height and speed of the aircraft varied slightly depending on the amount and type of tree cover. Species and number of animals were recorded; observation waypoints were taken using a Garmin 60Cx GPS unit.

Stratification information was used to determine stratum for each sampling unit based on moose density. Due to white-tailed deer population concerns, deer information was collected during the flights and a separate stratum was assigned based on white-tailed deer density. A sampling unit grid was established using ArcGIS 9 by dividing the WMU into units measuring 5 minutes longitude by 3 minutes latitude. Areas that were less than half of a full unit were combined or joined to adjacent units to ensure sampling units of fairly uniform size, resulting in 66 units. Units that overlapped Cold Lake and were comprised entirely of water were excluded from the survey and analysis.

Sampling units were ranked according to indices of moose and white-tailed deer density, calculated as the number of individuals observed per km² within each unit. Sampling units were then categorized into strata. Normally, approximately 20% of the blocks are classed as low, 60% as medium, and 20% as high. However, because moose density ranged from 0 to 0.75 moose/km² and 32 units out of 66 had no moose, only two strata were used, low and high. Sampling units based on white-tailed deer density were categorized into 3 strata (low, medium and high).

Sixteen sampling units were randomly selected from the moose stratified units to be intensively searched. These units were used to select four units within each white-tailed deer strata. Using a Bell 206B helicopter, twelve units were surveyed from 9 – 11 January 2010. Due to a less than adequate targeted precision estimate, two additional units were flown on 12 January. Navigation was aided by computer generated maps and a GPS unit. Units were flown in an east-west direction with a flight line separation of 400 m. Observations were recorded within

200 m of either side of the helicopter, allowing for total coverage of the area. Altitude was approximately 60 m AGL and air speed was approximately 80 km/h, reaching 100 km/h in open areas. Moose were classified using four criteria: presence of antlers or pedicel scars, presence of vulva patch, face and body shape and pigmentation, and behaviour. White-tailed deer and mule deer were classified by the presence of antlers, body size, and behaviour. All antlered moose and deer were classified as small, medium or large under the standardized antler classification system (Table 1). Where adults lacked antlers and sex was undeterminable, animals were recorded as unclassified. All wildlife observations were recorded on forms with locations recorded using a Garmin 60Cx GPS. 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.

Survey conditions during the stratification portion were fair with a small amount (< 6 cm) of recent snow and temperatures between -20 and -30 degrees Celsius. During the detailed block portion, temperatures rose steadily from -20 degrees Celsius on 8 January to -2 degrees Celsius on the last two days of surveying (11 – 12 January). Due to a freezing rain forecast between Lac La Biche, and Bonnyville, flights were cancelled for 9 January.

Results

The intensive search of fourteen sampling units resulted in observations of 49 moose (8 bulls, 29 cows, 12 calves), 758 white-tailed deer, and 48 mule deer. Of the 8 bulls observed, 1 was a juvenile, 4 had shed their antlers, and based on antler classification, 2 were classed as small, and 1 was classed as medium. Ten cow-calf pairs were observed, 18 cows were without calves, and one cow had twins. The Quadrat Survey Method Program generated a moose population estimate of between 145 and 265 (Table 1). Because of deteriorating survey conditions, especially on the last day, results excluding data from the last day (i.e. 2 blocks flown on 12 January) are also presented. Based on results from 12 sampled units, the Quadrat Survey Method Program generated a moose population estimate of between 182 and 304 (Table 1).

Of the white-tailed deer observed within 14 sampling units, 173 were does, 159 were fawns, and 346 were unclassified adults. The white-tailed deer population was estimated to be between 2,881 and 3,883 (Table 1). An age-sex ratio was not estimated for white-tailed deer due to the advanced antler drop; adult deer lacking antlers and obviously not accompanied by a fawn remained unclassified. Antler size classification for the 74 bucks that had retained their

antlers is as follows: 25 small, 30 medium, 19 large. Does with single fawns or twins could be accurately determined in small groups; in large groups when adult sex and doe-fawn associations could not accurately be determined, it was assumed 1 fawn per doe. The population estimate, where counts during the last survey day are excluded (i.e. 12 sampling units), was calculated to be between 2,798 and 4,184 (Table 1). A population estimate was not generated for mule deer.

Table 1. Comparison of aerial survey results for moose and white-tailed deer in Wildlife Management Unit 501 in 2000 and 2010.

Species	Year	Population Estimate (90% confidence limits)	Animals/km ²	Ratio to 100 Females	
				Males	Juveniles
Moose	2010 - 14 units	205 ($\pm 29.1\%$)	0.10	28	41
	2010 - 12 units	243 ($\pm 25.0\%$)	0.12	23	42
	2000	89 ($\pm 47.5\%$)*	0.06	--	--
White-tailed deer	2010 - 14 units	3,382 ($\pm 14.8\%$)	1.73	--	--
	2010 - 12 units	3,491 ($\pm 18.3\%$)	1.78	--	--
	2000	2,260 ($\pm 27.7\%$)	1.47	--	--

*Incomplete survey performed under poor conditions contributed to high precision of error (Saker 2000).

Literature Cited

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