

2008 WMU 502 white-tailed deer, mule deer, and moose

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White-tailed deer are an important ungulate species, providing recreational hunting opportunities and subsistence for many residents. Along with moose, white-tailed deer are the primary ungulate species in WMU 502. Within WMU 502, white-tailed deer are hunted under a general season with a two-tag antlerless 'Supplemental' license also available, whereas moose and antlered mule deer are hunted on a priority draw license system. When conducted at regular intervals, surveys 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.

The objective of this survey was to obtain a white-tailed deer population estimate for WMU 502. Two previous surveys were conducted in 1995 and 2000 (Gunderson 1996; Saker 2000). The most recent aerial survey conducted in January 2000 revealed a white-tailed deer population estimate of $5,560 \pm 17.8\%$ and density of $1.63/\text{km}^2$. It was assumed that under a general season and high degree of hunter success, long-term harvests would be approximately equal to recruitment rates in the population. In recent years, the public have raised concerns regarding increasing deer populations, vehicle collisions and crop depredation.

Although the purpose of the survey was to inventory white-tailed deer, coincidental data gathered for moose and mule deer can provide valuable information on distribution and population levels for those species. Members of the public have expressed concern regarding increased mule deer population and range expansion, especially in the northern part of the WMU. Currently, only an antlered mule deer harvest is offered in WMU 502. Additionally, concern has been raised regarding a

possibly declining moose population. This survey will serve to provide clearer information on the moose and mule deer populations.

Study area

WMU 502 is located approximately 200 km northeast of Edmonton and is comprised primarily of agricultural lands interspersed with small mixedwood stands (Figure 14). The WMU lies within the Central Mixedwood and Dry Mixedwood natural subregions. Larger tracts of mixed-wood and conifer stands occur along the northern WMU boundary and through the lake area in the southwest portion of the WMU. Two rivers, Beaver and the Sand, in addition to several large lakes including Moose, Whitefish and Fork occur within the 2,783 km² of the WMU. While much of the area has been converted to cropland or pasture, numerous wetlands and creek draws also contribute woodland habitat. Rich Lake and the Beaver River and Sand River valleys provide valuable habitat for moose and deer and are known wintering areas. The Sand River and Mooselake River corridors are characterized by sandy soils and extensive tracts of jack pine (*Pinus banksiana*). Several colonial bird species, including western grebes (*Aechmophorus occidentalis*), nest on larger lakes in the area. Osprey (*Pandion haliaetus*) and bald eagles (*Haliaeetus leucocephalus*) also nest along the shores of several of the large lakes; turkey vultures (*Cathartes aura*) have been observed roosting along the shores of Moose Lake. Historically, several sharp-tailed grouse leks were present throughout the area.

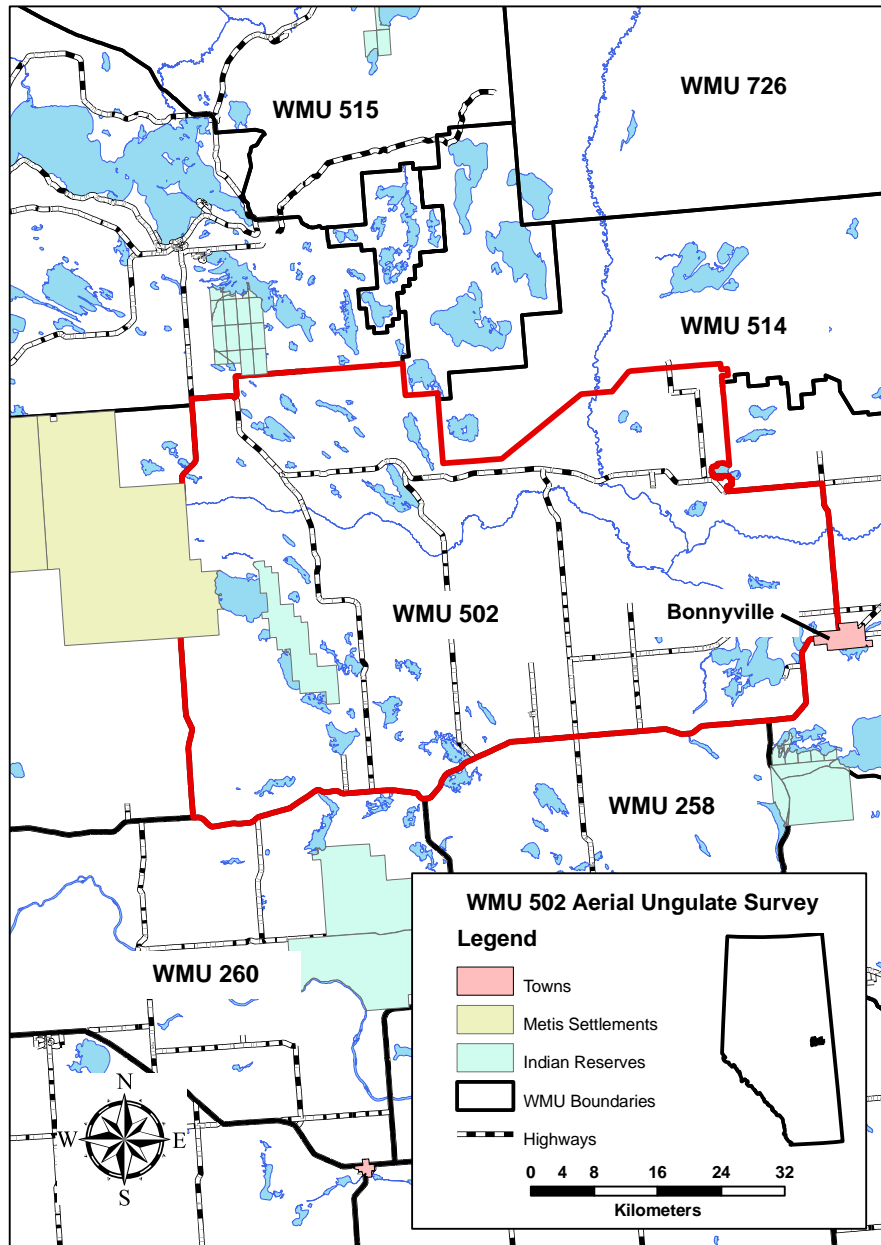


Figure 14. Location of the Wildlife Management Unit 502 aerial ungulate survey in Alberta.

The Town of Bonnyville lies in the southeast corner and numerous hamlets and cottage communities are interspersed throughout the WMU. Additionally, several small recreational grounds and Moose Lake Provincial Park also provide recreational facilities. Whitefish Lake Indian Reserve and a portion of the Kikino Métis Settlement occupy less than 10% of the landbase. Oil and gas extraction has increased in recent years with road access, well sites, pipelines, transmission lines and seismic lines becoming more common across the area. Adjacent WMUs 500, 501 and 514 have received greater industrial pressure than WMU 502. However, current oil and gas development is encroaching from the east and is most evident in the area near the confluence of the Beaver and Sand rivers. Additional industrial development has occurred in the form of small parcels of land leased or purchased by Alberta Pacific Forest Industries and converted to tree crops.

Survey methods

Wildlife Management Unit 502 was stratified for white-tailed deer (Gasaway et al. 1986) using a Cessna 185 fixed-wing aircraft between January 2-4, 2008. A 1 min latitudinal grid, which is equivalent to a 1.6 km separation between lines, was overlain on the WMU. Because sampling unit blocks were created using whole minutes of latitude and longitude, stratification lines were flown on the half-minute so that observations along a line would not straddle two sampling units. Approximate altitude and ground speed during the flights were 150 m above ground and 150 km/h, respectively. This allowed observers to detect animals within 200 m on either side of the aircraft, resulting in 25% coverage of the WMU. Three observers, including the navigator in the front, were required for the survey. Species and number of animals were recorded on paper with a geographic coordinate (waypoint) taken using a GPS unit. Height and speed of the aircraft varied slightly depending on the amount and type of tree cover and observational conditions.

Stratification information was used to determine stratum for each sampling unit based on deer density (Glasgow 2000). A sampling unit grid was established using ArcGIS 9 by dividing the WMU into blocks measuring 5 min longitude by 3 min latitude, resulting in blocks of approximately 30 km². Areas along the WMU boundary that were less than half of a full block were combined or joined to adjacent

areas to ensure sampling units of fairly uniform size, resulting in the generation of 119 units. The area for each sampling unit was measured using a digital planimeter. An adjustment was calculated for units in which water constituted greater than 25% of the unit resulting in a measurement of land area only.

Stratification observations were digitally rendered onto the sampling unit grid. Sampling units were ranked according to an index of deer density, calculated as the number of deer observed per km² within each unit. Sampling units were categorized into three strata: low, medium and high, with an assignment of approximately 20% of the blocks within each of the low and high categories. This resulted in the following criteria: 0 - 0.08 deer/km² in low density; 0.08 - 0.4 deer/km² in medium density; and 0.4 - 0.7/km² in high density.

Nine sampling units (3 per stratum) were randomly selected and intensively searched using a Bell 206 helicopter on January 15-17, 2008. 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 aircraft, allowing for total coverage of the area. Altitude was 60 m above ground and air speed was approximately 80 km/h, reaching 100 km/h in more open areas. White-tailed deer, mule deer, and moose were counted and classified according to age (juvenile vs. adult) and sex. Deer were classified by sex and age according to presence of antlers, body size and shape, and behaviour. Sex ratios may be inaccurate if antlers were dropped by some deer prior to the survey. Moose were classified using four criteria: presence of antlers or pedicel, presence of vulva patch, face and body shape and pigmentation, and behaviour. We assumed that bull moose without antlers were sexed with the same accuracy as those with antlers present. All wildlife observations were recorded on forms and locations marked using a GPS unit. Three observers, including the navigator in the front, were required for the survey.

After each day of surveying, white-tailed deer data were entered in the Quadrat Survey Method Excel program designed to provide a population estimate and confidence intervals as per the Gasaway population model (Gasaway et al. 1986). Crude moose and mule deer population estimates were generated by multiplying

the number of animals of each species observed during stratification by four (assuming 25% coverage) and adjusting this number for sightability by assuming that approximately 20% were not observed along the flight path.

Results

Survey conditions were good to excellent with complete snow coverage, overcast sky, and light winds.

After surveying three units within each stratum, the sample variance was greater than acceptable limits. However, surveying additional medium and high units did not result in sample variance reduction. The stratification portion of the WMU 502 survey yielded observations of 843 white-tailed deer, 59 mule deer, and 178 moose. During the intensive search of 3 Low, 4 Medium, and 4 High sampling units, 584 white-tailed deer, 107 mule deer, and 118 moose were observed. The white-tailed deer winter population estimate was $6,051 \pm 30.7\%$ with a density of 1.79 deer/km² (Table 13). The sex ratio (antlered/100 antlerless/fawns) was estimated at 17/100/75; however, 79 white-tails could not be classified. Of the animals that were classified, 44 were bucks, 254 were does, and 190 were fawns.

Using the rudimentary calculations described above, we developed an estimate of 557 moose in the survey area. When the crude formula was applied to mule deer, an estimate of 283 animals was generated. However, mule deer are more gregarious than white-tailed deer or moose, and therefore this estimate should be used with additional caution, especially since 107 mule deer were observed in 11 units alone, equating to greater than one-third of the estimate.

Table 13. Draft estimates for 2008 Wildlife Management Unit 502 white-tailed deer, moose, and mule deer.

Species	Population Estimate (confidence limits)	Density/km ²	Ratio to 100 Females	
			Males	Juveniles
White-tailed deer	6051 (30.7%)	1.79	17	75
Moose ^a	557	0.16	45	48
Mule deer ^a	283	0.08	--	--

^aCrude, unofficial estimate only.

Literature Cited

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