2010 Wildlife Management Unit 305 mule deer

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The primary goal of the 2010 mule deer survey in Wildlife Management Unit 305 (south Porcupine Hills) was to obtain a current population estimate. There have been two previous surveys, in 1996 and 2000 (Quinlan 1996; Quinlan, pers. comm.). Until 1996, population estimates used for hunting license allocations were based on male harvest trends. It was assumed that under a general season and high level of hunter access, long term harvests would be approximately equal to recruitment rates in the populations (Bergman 2004).

Quinlan (1996) and Bergman (2004) suggest that concerns from stakeholders arose in the early 1990s, regarding the lack of a sound population estimate. Some members of the public claimed mule deer numbers were higher than those estimated, whereas others

felt numbers were actually lower. Due to public perception and the lack of a true inventory, license allocations were reduced in the early 1990s, and it was decided that an inventory system would be needed in southern foothill units, WMUs 300 to 308 (Bergman 2004).

In 1999, hunting regulations were changed to a limited entry hunt for antlered mule deer. This change removed the opportunity to use male harvest trends as indicators for population trends; thus, periodic aerial surveys are now applied to obtain a population estimate (Bergman 2004). This report provides the most current population estimate for mule deer in WMU 305.

Study area

WMU 305 is located in the South Porcupine Hills, north of Pincher Creek. It is a large WMU that is bordered by highways 3, 22, 2 and secondary road 520 (Figure 1). Portions of the unit lie within the montane, foothills fescue and mixedgrass natural subregions of Alberta (Natural Regions Committee 2006). The Oldman River creates coulee habitat along the southern portion of the WMU. Once amongst the Porcupine Hills, rocky ridges and forest form a bulk of the western half of the WMU while patchy Douglas fir, poplar and shrub communities located within rough fescue grassland shape the east. Coulee draws and varying aspects along the eastern edge of the WMU, where the hills convene with open grassland, create ideal mule deer habitat.

Survey methods

The survey method employed was based on density stratified random sampling. This method applies the principles of random sampling within previously defined strata, to increase precision in the resulting population estimate (Krebs 1989). Density stratification is based on mule deer numbers recorded during a pre-survey flight done rapidly through an entire area.

In 1996, WMU 305 was divided into 63 survey units, each averaging 33 km^2 in size. Survey unit boundaries were created by considering winter mule deer densities and combining those with recognizable land features (roads, fences, vegetation boundaries, etc.). These relatively large survey units allowed for detailed flying of fewer survey units and less sampling variance (Gasaway et al. 1986; ASRD 2010).

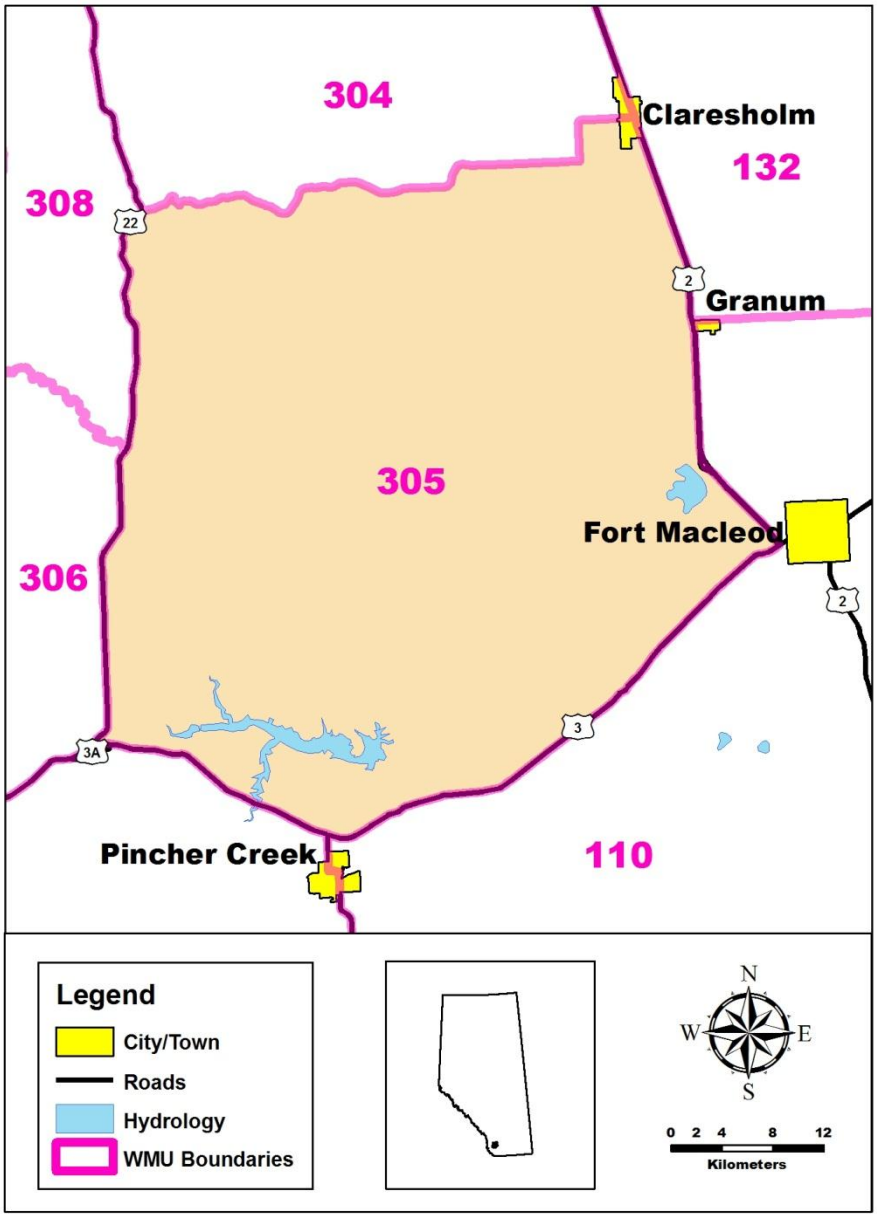

Figure 1. Location of Wildlife Management Unit 305 in Alberta.

A stratification flight briefly surveying each of the 63 units throughout the entire WMU was conducted first. The navigator operated a laptop computer with mapping software and a GPS unit in real time which allowed for efficient and accurate navigation of survey unit boundaries. The navigator and two rear seat observers provided continuous observation, with the right rear observer recording time "on and off survey unit" and total deer numbers, while the left rear observer marked deer locations and the survey track on a handheld GPS. During the 2010 survey, Canon 10 X 42 image stabilizing binoculars were used by the navigator to accurately identify deer to species and to aid with total count. In addition to the number of deer observed, each unit was subjectively rated as high, medium or low in regards to habitat quality and wildlife sign (Gasaway et al. 1986; ASRD 2010).

Following the categorization of survey units, 5 units in each stratum were randomly selected for detailed survey flights. Selected survey units were flown at speeds and heights required to provide thorough coverage. This varied from high and fast (>100 m above ground level (AGL), >120 km/h) in open cropland units, to low and slow (<50 m AGL and as slow as 20 km/h) in areas of dense mixed forest.

The navigator was responsible for all deer classifications, as well as maintaining the proper flight course and ensuring detailed coverage of each survey unit. Two observers occupied the rear seats, with the right observer recording all survey information and the left observer marking waypoints of animal observations and providing a total count of all deer.

All observed mule deer were classified into standard sex and age categories by the navigator using Canon 10 X 42 image stabilizing binoculars (often from a distance to prevent the animals from moving or running). Mule deer were classified as antlered, antlerless adult, and juvenile. Juvenile deer were distinguished from adults by body size. Mule deer that were considered male but to have dropped their antlers and mule deer with one antler were noted. To prevent observer confusion and increase total count and classification accuracy, when a large group of animals was encountered it was best if they were herded into separate groups and/or prevented from running/mixing together during classification. 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 over the three day period, 27 – 29 January 2010, were good; however snow cover was quite variable within the WMU. Snow cover conditions deteriorated in certain sections of the WMU, particularly around tree bases on south facing slopes.

Results

During the 2010 stratification flight, a total of 2,085 mule deer were observed within WMU 305. The stratification survey data resulted in 32 units being classified as low density, 18 as medium density, and 13 as high density. In total, 5 low density units, 4 medium density units, and 4 high density units were flown in the detailed survey to ensure a variance near 20% of the estimate.

The total estimated winter population of mule deer in WMU 305 was calculated to be between 3,662 and 5,835 mule deer (Table 1). The 2010 population estimate of 4,748 represents a 13% increase from the 2000 estimate of 4132; however, because confidence limits overlap, it is difficult to know whether this is a real increase or the result of sampling variability. As the previous survey was flown after nearly all antlers had dropped, we are not able to compare buck:doe ratios.

Table 1. Comparison of aerial mule deer survey results from 1996, 2000 and 2010 in Wildlife Management Unit 305.

Year	Population Estimate (90% confidence limits)	Mule deer/km^2	Ratio to 100 Females	
			Males	Juveniles
2010	4,748 (±22.9%)	2.26	43	35
2000*	4,132 (±12.5%)	1.99	0	35
1996	3,789 (±15.8%)	1.82	10	56

*2000 mule deer surveys were flown in March after many males had dropped their antlers.

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